Larry Niven's

Ringworld

Roleplaying Adventure Beneath the Great Arch

narrative descriptions
JOHN HEWITT

game design
SHERMAN KAHN

additional design and materials
LYNN WILLIS, SANDY PETERSEN, CHARLIE KRANK, ED GORE, RUDY KRAFT

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WHAT'S IN THIS BOX?

The RINGWORLD roleplaying game contains four books, several handouts, cardstock explorer figures, five dice, and other inserts. Each of the major items fulfills or supplements particular needs.

EXPLORER BOOK: explorers travel from Known Space to Ringworld for adventure, fame, fortune, and knowledge. The explorer book contains extensive rules for creating human, Kzin, and Puppeteer explorers. Skills are defined, and all important game mechanics presented. Here also are essays about species, and their major worlds and histories. The lengthy glossary at the back of the book is intended to summarize casual knowledge about Known Space. The explorer sheet-sides on the inside covers are photocopy masters.

TECHNOLOGY BOOK: a number of Human Space tools, vehicles, weapons, computers, etc., have been provided so that players can design to some extent their explorers' capabilities. With this book and the explorer book, players have everything their explorers need to visit Ringworld — except a starship. The gamemaster provides the interstellar transportation; deck plans exist as part of the scenario in the gamemaster book — permission is granted to photocopy the deck plan pages. Atmospheric and interplanetary craft are included in the technology book.

CREATURES BOOK: this book is intended mostly for the gamemaster; here is a selection of aliens, Ringworld hominids, and Ringworld animals, and their relevant statistics. A lengthy essay puts the achievements and goals of the Pak in perspective.

GAMEMASTER BOOK: also for the gamemaster, the book contains many essays about the structure and intent of Ringworld, an augmented Ringworld printout, a scenario generator in the form of unanswered mysteries of Ringworld, a short selection of Ringworld hominid technology (including archaic weapons and their statistics), an extended scenario, gravity rules, psionics rules, and a short GM glossary for Ringworld and the voyages of Louis Wu (the gamemaster should carefully examine the player glossary as well).

HANDOUTS: (1) A four-page set of reference sheets contains most of the tables needed for playing the game. (2) Stapled together are two separate items. The four-page section titled 'Autopilot Printout' gives the players a computer readout of the Ringworld system's physical parameters; the computer occasionally uses terminology inherited from previous expeditions. To understand what their explorers see, the players should read the attached essays detailing general impressions of Ringworld. The four blank explorer sheets are ready for immediate use: cut them apart (they are printed front and back) or make photocopies.

CARDSTOCK EXPLORERS: following directions, cut the large rectangles apart. The pictures represent individual explorers in a variety of poses. Both sexes are present, as are Kzin, Puppeteers, City Builders, and a Grass Giant. Use these stand-up figures to show relative positions in explorations or fire-fights.

FIVE DICE: 2D20, 1D8, and 2D6 are all the dice necessary for play. If you are unfamiliar with these interesting shapes, pages 2-3 of the explorer book explain them.

WHERE IS THE MAP OF RINGWORLD?

The band below is one-half-inch wide, a width representing in scale approximately 1 million miles. The circumference of the Ring to this scale is nearly 25 feet (the actual circumference is some 597,000,000 miles). A 25-foot tape measure bent round upon itself will give the players a very good idea of the actual proportions (and awesome size) of Ringworld.

CREDITS FOR RINGWORLD

BACKGROUND AUTHOR and RINGWORLD/KNOWN SPACE EXPERT

JOHN HEWITT: all of the human world essays, all alien and hominid narratives, astronomical and technical background, the Ringworld printout, all Ringworld/Known Space historical and topical essays, impressions of Ringworld, Ringworld mysteries, various animal descriptions, Ringworld flora, most of the glossaries, GP hulls, Skyhook starships and descriptions of various Known Space technology items, Known Space technical concepts and chronology, technical background for cover art, project liaison with Larry Niven, innumerably clarifications and extensions; friend, turner of elegant phrases, and exactitude's muse.

DESIGN

SHERMAN KAHN: human, Kzin, and Puppeteer explorer generation, skills, and game system; most Human Space tools, weapons, generators, protective devices, medical aids, additional vehicles, gamemaster materials, and Ringworld technical items; the explorer sheet; some computers and autodocs; statistics for most aliens and hominids.
LYNN WILLIS: introduction, portions of explorer generation, skills, and game system; game portion of sunflowers, most of autodocs, memory plastics, water tools, and the notorious convincing coil; additional gamemaster materials, most vehicle descriptions; medicinal and recreational drugs; minor portions of the scenario; what's in this box, these credits.
SANDY PETERSEN: major portions of Ringworld animal descriptions; animal statistics; many informed and useful suggestions; superb expansions on game mechanics, particularly in the skills chapter.
RUDY KRAFT: initial explorer generation and skills; scenario plot; other design elements; poisons and portions of GM materials.
CHARLIE KRANK: simweb rules, The Journey of the Catseye scenario, Catseye starship design; additional computer rules; captions for creatures book illustrations.
ED GORE: initial computer draft.
GREG STAFFORD: portions of the Catseye scenario.
JEFF OKAMOTO: the falling objects damage table.

ARTISTS

RALPH McQUARRIE: cover painting.
LISA A. FREE: interior alien, hominid, and animal illustrations; the miniature drawings of explorers.
MICHAEL BLUM: technical items from Human Space.
YUREK CHODAK: additional diagram; maps.
JOHN HEWITT: Ringworld cross-section; star map showing the location of Ringworld as seen from Earth.
CHARLIE KRANK: Catseye ship plans.
LARRY TODD: Slaver disintegrator and GP hulls.

EDITORIAL

L YNN WILLIS: general editing; coordination, phase I negotiations, and anything wrong.
SHERMAN KAHN: additional editing for explorer, Human Space technology, and gamemaster books.
GREG STAFFORD: Ringworld animals and scenario editing; Phase II negotiations and angst.
SANDY PETERSEN: additional editing; inexhaustible game lore.
STEVE PERRIN: copyreading, encouragement, and good will.
THERESA GRIFFIN SAVOY: additional copyreading; timely energy.

PRODUCTION

YUREK CHODAK: box design and layout, book format, explorer and technology book layouts, most of gamemaster book layout, book cover design; victim of impossible time pressures and typography; victor against odds.
CHARLIE KRANK: creatures book layout.
SHERMAN KAHN: additional layout.
SANDY PETERSEN: typesetting.
THERESA GRIFFIN SAVOY: additional typesetting.
LYNN WILLIS: additional typesetting; box copy, minor layout.

PLAYTESTERS

Pat Biggins, Yurek Chodak, Morgan Conrad, Gigi D'Arn, Bruce Dresselhaus, Lisa A. Free, Ed Gore, Landon Hancock, Ken Kaufer, Charlie Krank, Gary May, Jeff Okamoto, Sandy Petersen, Bill Pierce, Raven, Steve Shoner.

SPECIAL THANKS

ED GORE: for gamemastering the playtest campaign.
JEFF OKAMOTO: for perceptive comments and long-term interest.
LEONARD KAUFER: for an excellent close reading of the first four chapters of the explorer book.
MIKE BLUM: for demonstrating systematic inadequacies in the 1983 game system and technology.
MATT L. EYRE: for a friendly hand from afar.
JEFF SEIKEN: for input and interest; the first reader.
LARRY TODD: for the last-minute illustrations.
PAT ORTEGA: for the dar'los.
LARRY NIVEN: for patience.
RALPH McQUARRIE: for patience.

COMING: The *Ringworld Companion.* Ten new hominid species, including Night Hunters; all of the rumored animals in the habitat table, Pierin, Martians, Slavers, and Tnuctipun; additional Human Space technical items; a new starship; more scenarios.

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EXPLORER BOOK

RINGWORLD EXPLORER SHEET

Front

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . .

MAS . . . . . General Hit Points . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll. . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects. . . . . .

EDU . . . . . .

AGILITY Root Maximum . . . . %

Archaic Melee Weap. (05%)R . . . . % ☐

. . . . . % ☐

Archaic Ranged Weap. (03%)R . . . % ☐

. . . . . % ☐

Athletics (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hide (10%) . . . . % ☐

Sneak (05%) . . . . % ☐

Unarmed Combat (00%) . . . . % ☐

V. Sword, F. Laser (15%)R . . . . % ☐

COMMUNICATION Root Max. . . . . %

Bargain (10%) . . . . % ☐

Debate (05%) . . . . % ☐

Fast Talk (10%) . . . . % ☐

Fine Arts (05%)R . . . . % ☐

. . . . . % ☐

Musicianship (05%)R . . . . % ☐

. . . . . % ☐

Orate (05%) . . . . % ☐

Own Language (INTx5) . . . . % ☐

Perform (05%)R . . . . % ☐

. . . . . % ☐

Psychology (00%)R . . . . % ☐

. . . . . % ☐

KNOWLEDGE Root Max. . . . . %

Anthropology (00%)R . . . . %

. . . . . %

. . . . . %

Astronomy (00%)R . . . . %

. . . . . %

Biology (00%)R . . . . %

. . . . . %

. . . . . %

Botany (00%)R . . . . %

. . . . . %

. . . . . %

Chemistry (00%)R . . . . %

. . . . . %

. . . . . % %

Computers (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Emergency Treatment (01%)R . . . % ☐

. . . . . % ☐

Engineering (00%) . . . . %

Farming (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

History (05%)R . . . . %

. . . . . %

. . . . . %

Law (00%)R . . . . %

. . . . . %

. . . . . %

. . . . . %

Mathematics (00%)R . . . . %

. . . . . %

. . . . . %

Physics (00%)R . . . . %

. . . . . %

. . . . . %

Planetology (00%)R . . . . %

. . . . . %

Second Languages (00%)R . . . . % ☐

. . . . . % ☐

Strategy (00%) . . . . % ☐

Theology (00%)R . . . . %

. . . . . %

. . . . . %

. . . . . %

Zoology (00%)R . . . . %

. . . . . %

PERCEPTION Root Max. . . . . %

Handgun, energy (05%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Handgun, projectile (03%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, energy (05%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, projec. (03%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Listen (05%) . . . . % ☐

Observe (05%) . . . . % ☐

Scent (00%) . . . . % ☐

Search (05%) . . . . % ☐

Track (05%) . . . . % ☐

TECHNICAL Root Max. . . . . %

Aquatic Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Atmospheric Craft (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Ground Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hyperdrive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Personal Flyer (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reaction Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reactionless Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Repair (00%) . . . . % ☐

Ringworld (00%) . . . . %

Weapons System (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Other ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

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EXPLORER BOOK

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RINGWORLD: Explorer Book is a portion of Chaosium Inc.'s Ringworld science-fiction roleplaying game, copyright © 1984 Chaosium Inc., all rights reserved. Narrative portions of this book (pp. 27-44, 48-50, 52-55, and numerous glossary entries) are copyright © 1984 by John Hewitt, all rights reserved. Except as in this publication and associated advertising, illustrations for the Explorer Book remain the property of the artist.

INTRODUCTION

The Ringworld Game
This game draws directly from six books — *Ringworld, Ringworld Engineers, The World Of Ptavvs, A Gift From Earth, Protector,* and *Neutron Star.* Additional stories and novels by Larry Niven have been combed for background and specific detail.

These Known Space tales chronicle the common history of a group of stars and planets which include our own Sol and Earth; over a period from the present to about the mid-29th century. In that distant time occur the first two Ringworld expeditions from Known Space, as recorded in the Ringworld novels. The period covered by your game is flexible; the gamemaster chooses the year in which it begins. We recommend that play be approximately contemporary with the two expeditions for which Louis Wu was shanghaied, and be at least later than 2850 A.D., the year of his first expedition.

Roleplaying requires that the mechanics and scenarios allow a wide range of actions by the player-characters. Skilled gamemasters cannot control events as easily as does the writer of fiction.

Because Mr. Niven wrote dramatic narrative and not game rules, portions of his background lack needed detail. With Mr. Niven's approval, the authors of the Ringworld game have created new planets, hominid species, items of technology, and especially new Ringworld animals. Gamemasters may create their own new material as well. Anyone desiring to add more scenarios, animals, technical items, and other information to the material contained herein are invited to submit for acceptance especially good manuscripts to Ringworld, c/o Chaosium Inc., Box 6302, Albany, CA 94706-0302.

This explorer book includes detailed instructions concerning creation of human, Kzin, and Puppeteer player-explorers, their skills and skills definitions, the complete rules for the game, and background essays for 12 human worlds of origin. There is a large glossary at the end of the book, defining such entries as UNS (United Nations Standard).

See the *What's In This Box?* sheet for a discussion of all the *Ringworld* components and how they are intended to be used.

Explorers
Player-characters visit Ringworld as explorers, to uncover new concepts and technologies, to pursue the rumors haunting Known Space, to test long-held scientific and social theories, and to meet with or study the inhabitants of the Ring. With their insights, explorers can expect to unlock new knowledge for themselves and Known Space.

In the beginning at least, the explorers may be UN representatives, ambassadors, or expedition leaders, while pursuing individual careers as anthropologists, artists, physicists, zealots, etc. Each explorer will have made the long journey from Known Space for personal and career motives, as well as to augment the knowledge of his species or for all of Known Space.

The vastness of the Ring, the richness of its variety, its trillion inhabitants, the diversity of its cultures and technologies, and the sophistication and power of the forces which guard the Ring force every expedition to be explorational. Even the foulest brigands of the spaceways can hardly avoid being intrigued and impressed by the greatest structure ever made by intelligence.

The arrival of the explorers may shock Ringworlders who know the universe only from mythology, or may threaten advanced Ringworld civilizations as interlopers who are bold and powerful. Whether or not explorers have superior weapons, explorers who do not make friends will not live long; the inhabitants of the Ring are intelligent, resourceful, and courageous. Explorers close to an autodoc are hard to **kill**; explorers in the bush sans minidoc should step carefully. In this game weapons **kill**; the wise explorer will avoid combat and live longer. An ambush by fifty longbowmen does not care that you are armed with automatic weapons or lasers.

As the explorers survey Ringworld and accomplish their missions, they may aid, protect, or harm the intelligences, creatures, and ecologies they encounter. Whether they decide to be despoilers of, missionaries to, or friendly equals with their cousins from the Ring, the explorers' skills will sharpen and increase. If the explorers survive to return to Known Space, material benefits may come to them. If they bungle their mission or destroy a civilization, then judgment may be harsh.

Explorers who survive the glories and hazards of months or years on Ringworld and return to Known Space will bring back useful scientific and technical information. For a while at least, they will be heroes. Just how that is handled is mostly beyond the scope of the present game, in which life in Known Space must be abstracted.

Playing the Game
Roleplaying is a unique recreation which allows players to act in a dramatic setting, like characters in a story. Each player constructs one or more fictional personas called explorers. The gamemaster, the person who moderates the evolving story, prepares challenges for the explorers. He or she maneuvers all the elements of setting and non-player-characters, and interprets the game rules. The players determine their explorers' actions, and the game rules interpret how the problems are resolved. In the resulting story everyone is a star.

Play mostly consists of verbal interchange among players and gamemaster. The gamemaster has the burden of communication, for all new information must flow through him to the players. He may hand out prepared information to the players. He may sketch a map or plan of the situation on the tabletop, and then maneuver miniature figures about to illustrate the encounter. The players must pay attention to and cooperate with the gamemaster.

Players relate their explorers' intentions to the gamemaster, who interprets them with the game rules and responds with a statement or question, for instance, he might approve and go to the next action ("Your message is sent off, but the ship is still out of control."), he might require a game system die roll to determine the success of the intended action ("Try to make your explorer's Kzin Second Language roll to see if she understands it"), or he might flatly refuse to allow something ("The wall is too high to jump").

If an explorer survives an adventure, he may learn from his experience, and his statistics will change to reflect this increased experience. Over long periods of play, an explorer can grow and change significantly.

Play Aids
The *Ringworld* box contains everything necessary for play: five dice (2D20, 1 D8, 2D6), individual books detailing the game rules and background, and assorted handouts. Paper, pencils, and erasers are desirable.

Some gamemaster wish their players to have graph paper, to aid in mapping regions, areas, or buildings.

Metal figures are frequently used to represent explorers and other characters. If you lack metal figures, the box includes a sheet of paper explorers in various poses.

Dice for Ringworld
Included in the box are two 20-sided dice, one 8-sided die, and two 6-sided dice. Combinations of or divisions of results rolled on these dice can create different types of die roll results. The variously-sided dice allow different probability ranges.

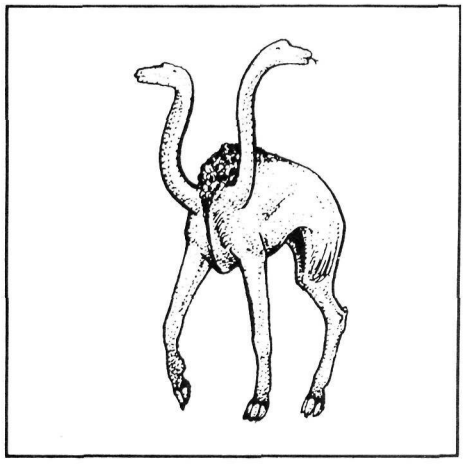
Dice rolls are abbreviated in a standard fashion. The letter D always stands for the word 'die,' or 'dice,' The letter D will be followed by a number denoting the number of sides on the indicated die. Thus D20 always means a 20-sided die, D6 always means a 6-sided die, and D100 always indicates percentile dice (explained below).

Dice designations may be preceded by a number. That number instructs the reader to roll a specific quantity of that type of die. For instance, 2D6 requires the sum of two rolls of a 6-sided die.

Sometimes numerical additions to particular die rolls are specified. A '1D6+1' means that the final sum must be between 2 and 7, though the actual total depends on the result of the roll. Always add any number following the plus-sign to the actual result of the roll. Sometimes a number is subtracted rather than added to a die roll.

Occasionally specified die rolls require several types of dice. For a weapon doing 1 D6 + 2D4, for instance, find the actual damage by rolling all the indicated dice and summing the results.

Reading Dice
D2: simulate a 2-sided die by rolling any die.



The odd-numbered results equal 1; the even-numbered results equal 2. Or flip a coin.

D3: roll a 6-sided die, and divide the result by 2. Round up any fractional result to the next whole number. A result of 1 or 2 equals 1, a result of 3 or 4 equals 2, and a result of 5 or 6 equals 3.

D4: divide by two the result rolled on the provided 8-sided die; round up any fractional result to the next whole number.

D6: this is the familiar cubical D6. Read it by throwing it so that it rolls, then take as the result the number which is face-up.

D8: roll and read the D8 the same way as the D6. Take as the result the number which is face-up.

D10: roll the 20-sided die and read the number on top. Though this die has 20 sides, it has two sets of single digits 0-9 on those 20 sides. Treat a roll of 0 as a 10.

D20: the 20-sided die is also used for D20 rolls. There are two ways to make such die rolls.

You can mark in one each of the digits 0-9, and then decide whether the marked or unmarked series represents the single digits. The other series will be the numbers 11-20. A green marker yields the 'teen is green' mnemonic, but any color will do. The lower 0 represents 10; the higher 0 represents 20.

Alternatively, roll one D20 and any one other die at the same time. Read the D20 result by the result of the second die — low equals 1-10; high equals 11-20.

D100: this roll requires both D20s. Ordinarily the dice will be of different colors — choose which represents the tens place and which die represents the ones. Once you've chosen, resist the temptation to shift the way you read them when you see the actual roll. If the dice are of the same color, mark the numbers of only one D20, or mark both in different colors, and designate which die represents the tens, and which the ones.

EXPLORER CREATION

Known Space is a roughly spherical volume of space some 80 light years across. Within are at thousands of stars of all spectral classes, a corresponding number of planets, uncounted moons, planetoids, and comets, and at least eleven intelligent species. Known Space, sometimes called the "known volume,' includes areas of Kdatlyno, Kzin, Pierin, and Trinoc sovereignty, but much of Known Space is Human Space, a sprawling knot perhaps 40 light years across at its broadest. The shapes and contiguities of the various alien sovereignties are irregular and sometimes inter-reaching.

Within Human Space live at least five intelligent species — Bandersnatchi, Dolphins, Grogs, Orcas, and humans. Martians and Sperm Whales, two intelligent species formerly of Sol system, are believed in the Ringworld era to be extinct.

From so many worlds and species, many individuals will crave adventure, new experience, and new worlds. This chapter tells how to create such explorers for play. Playing an explorer is sometimes called 'running' that individual. Players may roleplay human explorers from 1 2 different worlds, offering a variety of history and environment; explorers from different home worlds often vary significantly in their characteristics.

As the game progresses, your gamemaster may allow you to create non-human explorers. Procedures for generating Kzin and Pupeteer explorers are found at the end of this chapter. Basic characteristics and notes for many other intelligent species also exist, permitting an inventive gamemaster easily to create procedures for running explorers of those species as well. For the gamemaster's peace of mind, no player may run any non-human explorer without the gamemaster's consent.

About Explorers

'Explorer' is the term used for the game characters which players maneuver through science-fiction adventures. The gamemaster uses the *Ringworld* game to organize and dramatize situations which the explorers encounter.

Explorers range in chronological age from their late teens to over 400 years old; it was roughly four centuries before the Ringworld era that the antiagathic drug boosterspice became available, vastly extending user lifespans. Originally boosterspice was rare and fantastically expensive — only a handful of humans could afford treatment. Very old explorers will be few.

Explorers usually are created in random fashion. To create your explorer, you'll need to follow a sequence of procedures. Often a particular step involves one or more die rolls. If a player wants to skip one of the die rolls, simply picking an appropriate result for his character, this is fine, as long as the gamemaster's approval is received beforehand.

If you already know what you want, jot down appropriate skills levels and work backwards to the characteristics to uncover your explorer. In using this method, refrain from granting any skill higher than 100%.

Whichever way you build explorers, the point of doing so is to create interesting and enjoyable adventures; with guidance from your gamemaster, you should feel free to adjust explorer generation to suit your needs.

Getting Ready

To create an explorer, first obtain a blank explorer sheet. Notice that the sheet is printed on both sides. Though there seem to be many entries to make, creating your first explorer probably will take about an hour, and about half that after a few times. Most spaces on the explorer sheet will be left blank or mostly blank, for the sheet has been designed so that it can adjust to the growth and triumphs of your explorer over many sessions of play. Since skills regularly increase, enter skills percentages in pencil so that old numbers can be erased and new ones written in.

Be sure to write your own name on the sheet: it will help to return your explorer to you if lost, or if collected by the gamemaster to help in planning new adventures.

Gender

The sex of your explorer is purely a matter of personal choice. Perhaps you don't like to play males (or females). Perhaps you want the explorer to come from a community in which men (or women) dominate. The *Ringworld* game rules do not endow one human sex with any advantage over the other. Choose one.

Home World

A 'home world' is that planet or other environment in which the explorer was raised. The gravity of the home world may have influenced the explorer's build or health in some way. To determine your explorer's home world and any influences, use the following table. Particular instructions regarding home world gravities are summarized in an adjacent box, and are integrated into the instructions for generating explorer characteristics — which will soon be encountered.

Home World

roll 1D100	*planet*	*gravity class*
01-04	Canyon	light
05-08	Down	normal
09-69	Earth	normal
70-72	Gummidgy	normal
73-75	Home	normal
76-79	Jinx	heavy
80-82	Margrave	normal
83 86	Plateau	normal
87-88	Silvereyes	normal
89-93	Belt	light
94 97	We Made It	light
98-00	Wunderland	light

Other places of origin certainly exist; your gamemaster may allow you to originate explorers native to interstellar slow boats, Oort cloud stations, and so on, or the gamemaster might generate new home worlds unique to his or her own campaign. Additional planets within or at the edge of Human Space doubtless exist. This list includes only those Human Space worlds described in detail.

Home World Gravity Summary

LIGHT GRAVITY: an explorer raised in such an environment must have subtracted 3 each from STR and MAS, and have added 3 to his or her DEX.

NORMAL GRAVITY: an explorer from a normal gravity environment has no changes made to his or her rolled characteristics.

HEAVY GRAVITY: an explorer originating in a heavy gravity environment must have added 3 each to STR and MAS, and have 3 subtracted from his or her CON.

Defects

Though no person is physically perfect, the folk of Known Space are very nearly free

from medical problems. If an arm or a leg is lost, a new one can be transplanted, or even re-grown. Insanity can be cured (or the patient's personality altered) by drugs and psychotherapy. Most diseases have been eliminated.

A few chronic physical and medical problems still afflict humanity, hive important ones are albinism, addiction, boosterspice allergy, resistance to organ transplants, and the hyperspace blind spot phobia. Determination is straightforward.

Explorer Defects Table

roll 1D100	*defect*
01-30	no defect
31-50	no defect *
51	albinism
52-53	boosterspice allergy
54	current addiction
55-74	hyperspace blindspot phobia *
75-94	hyperspace blindspot phobia
95	transplant resistance
96-99	roll twice; ignore repeat results
00	gamemaster's choice

** explorers originating for We Made It are subject to albinism on any roll of 31-50 or 55-74.*

Chronological Age

With boosterspice and the advanced medical technology of Known Space, people can live indefinitely. No regular user of boosterspice has died of old age since it was first synthesized. Consequently, the range of ages available to starting explorers is broad. To determine an explorer's age, roll 1 D8 and consult the following table. Though the table allows for a roll of 1D10, ordinarily the gamemaster should not allow such ancient explorers, restricting these highest ages to non-player-characters or special cases only.

Explorers possessing boosterspice allergy should roll only 1 D4. The 1 D4 age roll is also recommended for new players, who may be overwhelmed by the number of choices possible in fleshing out older explorers.

Chronological Age Table

roll 1D10	*age (in UNS years)*
1	1D6+ 17
2	1D6 + 23
3	1D6 + 29
4	1D6 + 35
5	1D6 + 41
6	1D6 + 47
7	1D6 + 53
8	1D100 + 59
9	1D100 + 159
10	2D100 + 259 *

** characters with ages over 400 may not have physiological ages less than their chronological age minus 400.*

Physiological Age

An explorer's physiological age is that age in chronological years to which an explorer's mental and physiological functions would be equivalent if further use of longevity drug was suspended. This can be any age equal to or less than one's chronological age. For most explorers, physiological age is a matter of choice; for boosterspice allergies it must be equal to chronological age. No human can take boosterspice before the age of 18, so explorers with that chronological age also have a physiological age of 1 8. Players of explorers with physiological ages over 60 should read the game system chapter entry concerning aging.

Common Human Space Physical Defects

Albinism: albinism is lack of pigmentation — the hair is very light, usually white, the eyes are pink or red, and the skin is abnormally pale and susceptible to sunburn. The condition can be suppressed in this era, so that it only manifests if the subject is unable to obtain normal medical supplies or treatment, or when the trait is passed on to children.

Boosterspice Allergy: the drug boosterspice, made from ragweed DNA, allows humans to live indefinitely. Since boosterspice allergies cannot use the drug, they are condemned to grow old at the normal human rate — as is any human deprived of or not desiring boosterspice. Advanced medical techniques permit non-boosterspice users to survive for over a hundred years, but such survivors are enfeebled all their elderly years.

Current Addiction: colloquially, current addicts are known as wireheads. Such a person has had a wire surgically implanted in the back of his head. This wire connects directly with the pleasure center of the brain. Current trickles into this socket by means of a transformer known as a droud. Using the droud, a wirehead plugs himself into a current source and directly stimulates the brain's pleasure center, bringing uncontrolled bliss. The experience is so direct and so encompassing that addiction to it is the normal consequence.

Usually drouds are equipped with a timer which periodically interrupts the current, enabling the wirehead to eat, sleep, or take care of other activities that a person on the wire considers unessential. A wirehead deprived of his or her droud feels depressed and hostile, and often can be bent to the will of one who offers time on the wire. An explorer receiving this result may have another addiction allowed or substituted by the gamemaster.

Hyperspace Blindspot Phobia: a common human defect. There is no known cure or treatment for this fear of the hypernatural. A person with this phobia cannot stand seeing the hyperspace blind spot, a disturbing phenomenon which manifests when an explorer looks into the void of hyperspace. The viewer perceives the void to be expanding, and it soon engulfs his or her entire surroundings. A phobic viewing the blindspot becomes catatonic, and remains so until revived in a non-hyperspace environment. Explorers with this disability can never learn the Hyperspace Pilot skill.

Transplant Resistance: transplant-resistant humans cannot receive replacement limbs or organs. Mechanical replacements and prosthesis may be available, but the lack of a limb or a vital organ will nonetheless handicap the explorer and require ingenious thinking to show how he or she overcomes the handicap. Prosthesis will require servicing, and might require special repair if damaged.

Characteristics

Eight essential numbers, called characteristics, define each explorer's capabilities. An accompanying table presents the names, abbreviations, and normal generating rolls for the eight characteristics. The first seven characteristics represent the explorer's genetic heritage; the eighth (EDU) represents his cultural heritage.

Summary of Characteristic Rolls

characteristic	*abbr.*	*normal roll*
Strength	STR	2D6 + 6 *
Mass	MAS	2D6 + 6 *
Constitution	CON	2D6+ 6 *
Intelligence	INT	2D6 + 6
Power	POW	2D6 + 6 t
Dexterity	DEX	2D6 + 6 *
Appearance	APP	2D6 + 6
Education	EDU	see EDU entry

** may be altered if character comes from a high or light gravity home world,*

t if older than 100 years or not Earth born; otherwise, see POW entry.

The characteristics are listed in the order they appear on the explorer sheet. Spaces for recording these numbers exist on both sides of the sheet for easy reference; they must be entered on at least the front side, because you will need to refer to them during play.

Most Known Space human characteristics are generated by dice rolls of 2D6 + 6. Since each human has eight characteristics, you will need to roll dice eight times for your human explorer. As you roll, work your way down the list of characteristics, following the instructions for the particular characteristic and entering the total in the space just to the right of that characteristic's abbreviation.

In every instance (except conceivably for MAS), high dice rolls mean that the generated explorer is more capable and skilled. Rolled characteristics can be raised in certain ways, detailed later. Home world gravity can affect STR, MAS, CON, and DEX.

A number of attribute rolls derive from the characteristics, and will be taken up later.

Strength (STR)

This characteristic measures the relative muscle power of the explorer. Your explorer can lift or move heavy objects, or determine whether such a lift is feasible, by comparing his STR to the object's MAS, or tussle with other characters by comparing relative STRS.

This characteristic also helps determine how much damage an explorer can inflict with hand-to-hand weapons.

The initial characteristic roll for STR will vary by your explorer's home world gravity rating. If your explorer came from a light gravity world, roll 2D6 + 3 for STR. If he came from a normal gravity world, roll 2D6 + 6. And if he came from a heavy gravity world, roll 2D6 + 9.

Mass (MAS)
This characteristic combines the explorer's size and body mass into a single number, serving in ordinary situations to indicate the relative weight and bulkiness of explorers, objects, or floating cities. The same MAS number might indicate a squat Jinxian or a willowy citizen of We Made It.

Weight measurements very from world to world; without gravity, there is no weight at all — only mass, an unvarying resistance to change of motion. In extreme conditions, a MAS number may indicate very high or very low densities, but the number used here corresponds to Earth-normal perceptions of the relationship. An explorer's MAS helps determine how much damage that explorer can inflict with hand-to-hand weapons. It also helps to determine the explorer's hit points.

The initial characteristic roll result for MAS will vary with the explorer's home world gravity rating. If he comes from a light gravity world, roll 2D6 + 3 for MAS. If he comes from a normal gravity world, roll 2D6 + 6. If he comes from a heavy gravity world, then roll 2D6 + 9 for his MAS.

Constitution (CON)
Constitution is the relative measure of explorer health and stamina. Explorers initially withstand damage from drowning, falls, poisons, etc. using their CON, or using their CON- and MAS-derived hit points.

The initial characteristic roll result for CON varies with home world gravity rating. If your explorer comes from a light or normal gravity world, his CON will be rolled on 2D6 + 6. If he comes from a heavy gravity world, it will only be rolled on 2D6 + 3.

Intelligence (INT)
The INT characteristic reflects an explorer's relative reasoning ability, memory capacity, and mental agility. Intelligence has bearing on the skill percentages with which the explorer starts the game as well as other skill calculations. All humans roll for INT on 2D6 + 6.

Power (POW)
This characteristic measures the relative strength of explorer will-power, luck, and psionics. Power is usually rolled as 2D6 + 6 for humans, but humans from Earth that are less than 100 chronological years old can have abnormally high Powers. If doubles are rolled on the initial 2D6 + 6 roll for such a human, (i.e., two 6s, two 5s, two 2s, etc.) write down the total and reroll 2D6, adding the new roll to the old total. If the new 2D6 roll is also doubles, add it to the original total anyway, and then reroll *again.* Continue until a 2D6 roll received is no longer doubles. Thus, young Earth humans can have extremely high Powers. This is believed to be the result of Puppeteer genetic experimentation.

Dexterity (DEX)
An explorer's DEX reflects his or her agility, deftness, and quickness. Whether or not an explorer manages to, for example, catch a thrown object or surreptitiously remove secret plans, etc., could depend on his or her DEX. In combat, explorers with higher DEX act and react more quickly.

The die roll for DEX varies with the explorer's home world gravity. Characters from normal or heavy gravity worlds roll 2D6 + 6 for their DEX. Characters from light gravity worlds roll 2D6 + 9.

Appearance (APP)
This characteristic summarizes many personality elements, including physical appearance, physical bearing, and the sum of many intangible impressions given by the explorer. It could mean, according to the player's interpretation, that the explorer is handsome or beautiful to that degree, or that the explorer has a vivacity which shines through a rugged exterior, or that he or she has innate sex appeal, or something else entirely. This characteristic, along with EDU, calls for special role-playing thought by the player; it is a great opportunity to begin to form unique and memorable explorers.

Education (EDU)
EDU represents the explorer's learning and general knowledge. Each point of EDU roughly represents one year of schooling. It need not mean classrooms: sleep learning, apprenticeship, hypnosis, on-the-job experience, and machine or individual tutoring could all explain how your explorer obtained his EDU.

Determining EDU is done quite differently from other characteristics. All explorers start with 10 EDU points. Roll 1 D6 and add that result to the EDU total. If the result of the 1 D6 was a 5 or 6, then roll 1 D6 a second time and add that result to the EDU total. Continue to roll and to add to your explorer's EDU until a D6 roll comes up 1-4.

EDU may never exceed a character's chronological age minus 6; excess EDU points are lost. Characters whose EDU equals their age minus 6 have just finished their training, but have no pursuit experience.

Explorer Attributes

Attributes are qualities and common die rolls derived from explorer characteristics. They are a major way in which explorers relate to the game world. This section is concerned with those attributes listed just to the right of the characteristics entry on the explorer sheet.

Damage Modifier
Stronger and bigger people do more damage in hand-to-hand combat than do smaller, weaker folk. Therefore, the damage modifier for each explorer derives from the total of his individual STR plus MAS. This modifier reflects the amount of points of damage which is added to or subtracted from all successful attacks with natural and archaic melee weapons. This result is expressed as a die roll which is added to such attacks. Thus, a character that has a damage bonus of +1 D6 adds 1 D6 to all damage done in hand-to-hand combat. Missile weapons do not use this damage modifier. To determine your explorer's damage modifier, consult the Damage Modifier Table.

Damage Modifier Table

STR + MAS total	*damage modifier*
02-08	subtract 1D6
09-16	subtract 1D3
17-24	zero
25-32	add 1D3
33-40	add 1D6
41-50	add 2D6
51-60	add 3D6
61-70	add 4D6
each +10	add one more D6 *

** for every 10 points of combined STR and MAS past 70, add 1D6 more to the damage modifier. Be sure to enter the result in the spaces provided. Write 'subtract 1D6' as '-1D6' and 'add 1D3' as '+1D3', for instance.*

General Hit Points
Your explorer's hit points measure his or her relative ability to take damage. No matter how an explorer is harmed, whether through animal bites, laser burns, falls, or even drowning, damage is measured against his hit points. An explorer has a number of hit points equal to the total of his CON + his MAS. Write in that amount in the spaces provided on both sides of the explorer sheet, and circle that amount in the hit point tally on the back of the sheet.

Health Roll
The health roll is equal to the character's CON x 3. This represents the potency of the explorer's immune system, his overall hardiness,and the state of his health. The health roll is always a 1D100 roll called for by the gamemaster. It might be called for if an explorer is poisoned, or exposed to a disease. If the D100 result is equal to or less than the explorer's health roll, then he takes minimal or no harm from the adverse circumstance. A health roll might be reduced to CON x 2 or even CON x 1 to reflect especially difficult situations. The health roll is not reduced by wounds or injuries, though permanent or temporary loss of CON will certainly reduce this roll. Write in your explorer's health roll in the space provided.

Reasoning Roll
Determine your explorer's reasoning roll by multiplying his INT x 3. This is checked on a D100 roll by the gamemaster, just as with the health roll. It reflects the reasoning ability of the explorer, as well as his long-term specific memory capability, perhaps called for if he needs to remember a piece of information, or if he wishes to use a piece of unfamiliar equipment. The chances of success on this roll can be reduced to INT x 2 or less in difficult situations. Write the reasoning roll in the space provided.

Luck Roll

The luck roll is equal to your explorer's POW x 3. It reflects the explorer's chances to avoid the ill effects of a crisis. Situations calling for a luck roll (checked on 1D100) are innumerable; the gamemaster must request luck rolls as seems appropriate. The luck roll can be used to determine whether or not an explorer comes upon a random bit of information, or encounters something fortunate. The gamemaster may reduce a luck roll chance to POW x 2 or even POW x 1 if the situation is especially difficult. Write the character's luck roll into the space provided.

Dodge Roll

The dodge roll for your explorer will be equal to his DEX x 3, and is checked on 1 D100, as with the other attribute rolls. The dodge roll is most often used in combat situations, to avoid damage. This roll can also be called for in non-combat situations such as avoiding a falling boulder, a charging beast, or a moving vehicle. As with all attribute rolls, difficult situations can reduce chances for success to DEX x 2, or DEX x 1. Write in your explorer's dodge roll in the space provided.

Hit Point Location Table

general HP	*arms*	*legs*	*head*	*abd.*	*chest*
9-10	3	3	3	3	4
11	3	4	4	4	4
12	3	4	4	4	5
13	4	4	4	4	5
14	4	5	5	5	5
15-16	4	5	5	5	6
17	5	6	6	6	6
18-20	5	6	6	6	7
21-22	6	7	7	7	8
23	6	7	7	7	9
24	6	8	8	8	9
25	7	8	8	8	9
26	7	8	8	8	10
27-28	7	9	9	9	10
29-30	8	9	9	9	11
31	8	10	10	10	11
32	8	10	10	10	12
33	9	10	10	10	12
34	9	11	11	11	12
35-36	9	11	11	11	13
37	10	12	12	12	13
38-40	10	12	12	12	14
41-42	11	13	13	13	15
43	11	13	13	13	16
44	11	14	14	14	16
45	12	14	14	14	16
46	12	14	14	14	17
47-48	12	15	15	15	17
49-50	13	15	15	15	18
51	13	16	16	16	18
52	13	16	16	16	19

Hit points and hit point locations are further explained in the game system chapter.

Hit Locations

A person is not a solid sphere — damage in one part of his body can have different effects than that in another part. This fact of existence is portrayed in *Ringworld* by use of the hit location system. Humans and most hominids have seven hit locations: right leg, left leg, abdomen, chest, right arm, left arm, and head. Each location has a number of hit points related to the total hit points, representing the damage that location can withstand. The hit points in all locations totalled together will add up to more than the character's general hit points. Basically, the arms have a number of hit points equal to .25 of the general hit points; legs, abdomen, and head have a total of .30 that of the general hit points, and chest has .35 that of the general hit points. Always round fractions up.

Find the amount of your explorer's general hit points in the first column of the Hit Point Location Table, then insert the matching hit point amounts per location in the correct spot on the back of the explorer sheet.

Action Rankings

Explorer dexterity varies. More dextrous explorers can complete more actions in a given amount of time than slower ones. An explorer's action ranking is based upon his or her DEX; an action rank is defined as the amount of time in which an explorer can complete one simple action such as aiming a pistol or tying a knot. The action ranking for each possible Dexterity is given on the Action Ranking Table.

Action Ranking Table

explorer DEX	*action ranking*
1-4	7
5-8	6
9-12	5
13-16	4
17-20	3
21-24	2
25+	1

Write in your explorer's action ranking in the appropriate box on the explorer sheet.

Speed

All humans normally move at a speed of three meters per impulse (an impulse is a game system term, explained later). Mark '3m' in the space for speed on the explorer sheet. Running all-out, a human can move twice normal speed for a while, see the game system chapter for full information.

Psionics

Leave the psionics section of your explorer sheet blank till the gamemaster requests you to fill it in. Though the Hyperdrive skill is psionically operated, a character need not have a specific psionic ability to use it.

Occupation Points & Pursuits

Occupation points are received by explorers engaged in pursuits, education, training, and research which are systematically translated into percentiles for particular skills.

A pursuit is an activity, job, or condition in which the explorer spent considerable time, reaping occupation points in specified skills. A skill is a natural or acquired ability or talent; they are discussed in the skills chapter.

Initial explorer skills derive from past education, pursuits (usually job-related), and special interests. Skills percentiles with which to initially outfit an explorer are obtained by converting occupation points into skills percentiles. Such conversions are made on a one-for-one basis. If a character put 10 occupation points into his Fast Talk skill, his base chance in that skill would be increased by 10 percentiles.

Determine the total number of occupation points available from various sources from the Occupation Points Generation Table.

Occupation Points Generation Table

derivation	*formula*
education	(EDU -10) x 20
pursuits	(Age - [EDU + 6]) x 20
special interests	INT x 10

Each of the three ways to gather occupation points must be calculated and distributed among the explorer's skills independently; the explorer's initial skill percentages will stem from these allotments.

Education

For each year of education (i.e., each point of EDU) after the tenth, your explorer receives 20 occupation points. This includes the character's formal education. Earlier years presumably provide a foundation for occupations and special interests as well as education. The occupation points derived from education can be spent only for the following skills:

Athletics	History
Anthropology	Law
Astronomy	Musicianship
Biology	Mathematics
Botany	Orate
Chemistry	Own Language
Computers	Perform
Debate	Physics
Emergency Treatment	Planetology
Engineering	Second Language
Farming	Strategy
Fine Arts	Zoology

Pursuits

There are eighteen different pursuits, each yields occupation points. The number of different pursuits which an explorer has followed varies with his chronological age and his years of education. Subtract the ex-

plorer's EDU plus 6 from his chronological age to determine the number of years he spent in pursuits before entering play. Find that result in the left-hand column of the Total Pursuits Table. The right-hand column indicates corresponding die rolls; the result of the die roll is the raw number of pursuits your explorer followed in his formative years.

Total Pursuits Table

age - [EDU + 6]	*possible number of pursuits*
zero	none
1-10	1
11-15	1D2
16-25	1D3
26-40	1D4
41-60	1D6
61-80	1D6+1
81-100	1D6+2
101-150	2D6
151-200	2D6+1
201-250	2D6+2
251-300	2D6+3
301-400	2D6+4
401 and up	2D6+5

Determining Previous Pursuits

Having established the number of pursuits that your explorer has followed, roll 1D100 on the Pursuit Table once for each pursuit. Write down the results in the pursuits workspace section of the explorer sheet; also be sure to put the wealth value of each pursuit there. If the same pursuit is rolled more than once, assume that the explorer spent extra time at it, or that he left it and later returned to it.

After the pursuits are rolled and recorded, allot the actual number of years during which the explorer was committed to each pursuit. The total number of years available are equal to the character's age minus his [EDU + 6] . Only one year need be allotted for each pursuit for each time the pursuit was rolled on the table, but any allotment must be made in full years. For each year, the explorer gains 20 occupation points in that pursuit.

Pursuit Table

1D100	*pursuit*	*wealth value*
01-07	artist	0
08-27	colonist	1
28-29	criminal	1
30	dilettante	5
31-36	engineer	2
37-38	entertainer	2
39-52	explorer	1
53-56	functionary	3
57-59	journalist/writer	1
60-65	miner	1
66-68	pilot	3
69-76	police officer	1
77-78	politician	3
79-80	prisoner	0
81-84	scholar	1
85-94	scientific researcher	1
95-98	soldier	1
99-00	zealot	0

Keep track of the wealth values rolled, and the number of years spent in each wealth category: this will be explained later in this section.

Descriptions of the Pursuits

Occupation points earned from pursuits can be spent only for the skills listed for that pursuit. Skills are described in the skills chapter.

Artist: *Athletics, Computers, Fast Talk, Fine Arts, Hide, Musicianship, Observe, Perform, Psychology, Scent, Theology.* An artist has exceptional visual, perceptual, auditory, tactile, muscular, or gustatory expertise — a chef, dancer, sculptor, holographer, masseur or masseuse, musician, athlete, or so on. Danccers, musicians, and athletes must have DEXs of 15 or more.

Colonist: *Atmospheric Craft, Bargain, Ground Vehicle, Farming, Handgun (Energy), Personal Flyer, Listen, Heavy Weapon (Energy), Observe, Planetology, Search, Track.* The explorer has lived in a primitive terrestrial-type environment while establishing a settlement. The gamemaster should choose a particular colony. If he wishes, the skills may be modified for skills appropriate to an non-terrestrial environment.

Criminal: *Bargain, Computers, Fast Talk, Hide, Personal Flyer, Handgun (Energy), Handgun (Projectile), Sneak, Unarmed Combat.* In primitive regions, the criminal may be an ignorant thug or bandit; in technical societies criminals prefer burglary, smuggling, fraud, and computer theft.

Dilettante: any skills in any amounts desired, at the rate of only 1 5 occupation points per year instead of 20. This pursuit indicates that the explorer is independently wealthy; he might be a noble, an heir to a great commercial fortune, a miner who found an asteroid composed entirely of some rare alloy or element, an inventor who rediscovered the hula hoop, and so on. He can do anything, but, being comfortably to filthy rich, his motivation for achievement is not as strong as it once was. An explorer who was at one time a dilettante but went on to another pursuit has lost his or her fortune and may be appropriately bitter, cynical, philosophical, etc.

Engineer: *Astronomy, Chemistry, Computers, Engineering, Ground Vehicle, Mathematics, Personal Flyer, Physics, Planetology, Reaction Drive, Reaction/ess Drive, Repair.* Engineers build, invent, and modify machines and structures. They are the technicians and architects of Known Space.

Entertainer: *Athletics, Bargain, Language, Musicianship, Observe, Orate, Perform, Psychology, Search, Sneak.* Includes public performers of every sort, though famous performers are unlikely to go to Ringworld. These people are by definition reasonably successful. Entertainers who depend in part on agility must have a DEX greater than 13.

Explorer: *Athletics, Atmospheric Craft, Bargain, Biology, Botany, Emergency Treatment, Engineering, Ground Vehicle, Handgun (Energy), Heavy Weapons (Energy), Hyperdrive, Observe, Planetology, Reactionless Drive, Repair, Search, Track, Zoology.* Explorers contract to survey or study new worlds on or beyond the fringes of Known Space.

Functionary:*Bargain, Debate, Fast Talk, History, Language, Law, Observe, Orate, Psychology, Strategy, Theology.* Might be a canny diplomat, devious governor, shyster lawyer, or wealthy businessman. Choose the job and attitude, but let the gamemaster choose the situation. See also politician.

Journalist/Writer: *Anthropology, Bargain, Computers, Debate, History, Fine Arts, Own Language, Law, Observe, Psychology, Search, Second Language.* Tridee news is very important in Known Space. Thousands of journalists, tri-dee, and technical writers constantly update memory spheres. Poets, authors, designers and other such wretches also survive, but rarely make good money.

Miner: *Atmospheric Craft, Aquatic Vehicle, Bargain, Climb, Computers, Emergency Treatment, Engineering, Handgun (Energy), Heavy Weapon (Energy), Observe, Personal Flyer, Planetology, Reaction Drive, Reaction/ess Drive, Repair, Search.* Miners usually operate alone or in small groups on the frontiers. Many work in space, piloting small, cramped singleships between asteroids in search of metal ores, ice, and magnetic monopoles.

Pilot: *Astronomy, Atmospheric Craft, Computers, Engineering, Hyperdrive, History, Law/Interstellar, Mathematics, Physics, Reaction Drive, Reactionless Drive, Repair, Strategy, Weapons System.* Most interstellar pilots are humans or Kzinti. No explorer suffering from hyperspace blindspot phobia may learn the Hyperdrive skill.

Police Officer: *Atmospheric Craft, Bargain, Computers, Fast Talk, Emergency Treatment, Handgun (Energy), Handgun (Projectile), Heavy Weapon (Energy), Heavy Weapon (Projectile), Law, Observe, Personal Flyer, Psychology, Search, Unarmed Combat.* This occupation includes public police forces, private security agents, bodyguards, and military police. Human Space police are sophisticated and rarely need to use open force.

Politician: *Bargain, Computers, Debate, Fast Talk, History, Orate, Own Language, Perform, Psychology, and one of the following: Engineering, Farming, Second Language, Strategy, or Theology.* In this game, a politician (as opposed to a functionary) is a person publicly elected or one appointed to a highly-visible public position, whose continued status depends in part or whole upon public or party approval.

Prisoner: *Bargain, Fast Talk, Hide, Observe, Psychology, Search, Sneak, Unarmed Combat.* Even though procedures exist for quick mind alteration, an explorer can be harshly imprisoned: perhaps ostensibly waiting for a trial which never takes place, perhaps stuck in a remote spot where mind-control devices do not exist. If this pursuit is rolled, tell the gamemaster, who will arbitrarily indicate the the length of the prison term, or if you wish, mutually decide upon an arbitrary length. Decide upon the nature of your explorer's crime as well, and whether or not he or she was mentally altered as a result.

Scholar: *Pick no more than two of the following — Anthropology, Astronomy, Biology, Botany, Chemistry, Computers, Engineering, Fine Arts, History, Law, Mathematics, Own Language, Physics, Planetology, Second Language, Theology, Zoology.* This is the classical pedant, lost in his books.

Scientific Researcher: *Pick no more than three of the following — Anthropology, Astronomy, Bargain, Biology, Botany, Chemistry, Computers, Engineering, History, Mathematics, Observe, Personal Flyer, Physics, Planetology, Psychology, Repair, Search, Zoology.* This is the basic scientist or technician, seeking new knowledge or repairing applied science to technical works.

Soldier: *Athletics, Atmospheric Craft, Aquatic Vehicle, Computers, Emergency Treatment, Fast Talk, Ground Vehicle, Handgun (Energy), Handgun (Projectile), Hide, Heavy Weapon (Energy), Heavy Weapon (Projectile),*

Search, Sneak, Unarmed Combat, Weapons System. Most planetary governments maintain at least a small standing army or paramilitary force, or space force. Any explorer over 200 years old who has been a soldier is likely to have seen action during the Kzinti Wars. This is up to the gamemaster.

Zealot: *Bargain, Debate, Fast Talk, Fine Arts, Handgun (Energy), Handgun (Projectile), Hide, Own Language, Law, Strategy, Orate, Psychology, Theology.* Zealots may work at a job, but they devote their time and attention to a cause — perhaps something as important as feeding the hungry, or something as insignificant as retro-programming brassieres into old Lorelei Huntz tridees.

Special Interests
Special interests include hobbies, fads, and incidental knowledge and interests (such as playing roleplaying games or reading science fiction). Multiply your explorer's INT x 10 and allot that many occupation points to any game skill or skills except Hyperdrive.

Allotting Occupation Points
A single occupation point buys one skill percentile. Add the resulting percentiles onto any already existing percentiles in a given skill to determine the new percentage chance with that skill.

Before allocating occupation points, players should familiarize themselves with the first part of the skills chapter, which describes use of skills and the different types of skills available.

Wealth
Wealth derives from age, luck, and occupation. To calculate an explorer's wealth, write down the results for all three steps. Generally speaking, all *Ringworld* money is the currency of Human Space — the star, equivalent in purchasing value to $5 to $10 U.S. mid-1980s dollars.

(1) You should already have determined the explorer's pursuits and marked down the wealth value for each pursuit. Multiply each wealth value by the number of years spent following that pursuit. Total the result.

Attempt the explorer's luck roll once. If successful, double the total wealth value. If the roll is a failure, do not change the total wealth value.

Multiply the final total wealth value by 100. The result is the first part of the explorer's fortune in stars.

(2) roll 1D10 x 1000. The result is the second part of the explorer's fortune in stars.

(3) Total the stars generated from parts 1 and 2. Your explorer owns that number of stars at the start of the game. He or she may be carrying some of it in cash, but the bulk is likely to be banked or in debit cards.

Beginning Equipment
Regardless of wealth, every explorer owns some of the following. Possessions of a wealthy explorer may be of higher quality and in better condition than those of an explorer down on his luck. Take time to describe to yourself how these items actually look and feel.

- Two suits of clothing and footwear in the style of the explorer's home planet; one is semi-formal wear, the other all-weather gear.
- A pocket-or wrist-instrument showing both the explorer's home world time and UNS 24 hour universal time. Has a calculator mode, four-hour audio recorder, a color tridee receiver, and an auxiliary library of tridee stories and electronic games. Optional inscription on the back.
- 1D20 stars in UN (or your home world) cash, including one star coins, decistar coins, and centistar coins.
- One of the following: a good luck charm of no intrinsic value, a transfer booth token from Alpha Plateau, a five-centistar coin, a 3-minute pay phone token.
- One combination pocket tool with an 8 cm microsteel blade, microscopic enhancer for study of small items, a sonic deseamer for opening plastic cases, and a semi-permeable sonic rain umbrella.
- Current ID card from home world (as well as nation, if from Earth), containing retina-print, blood group, tridee photo, birthplace, credit history, and so on.
- Passport ID from home world, showing all off-world travel (and international travel, if from Earth). Depending on the origin, this and the current ID card described above may be the same thing.
- Choose one of the following: hairset, combosolve lockpick (50% successful), depilatory-repilatory cream pack, igniter and smokables, lume, two-meter spool of Sinclair monofilament, six 90-minute microtales of naughty fiction keyed to microscopic enhancer in pocket tool, a pet animal, platinum class ring from Hypatia Interstellar Technical Institute (your explorer's home world branch), false ID card (any world desired), hat, holo album, antique optical binoculars (7-20x, 60mm lenses) from late 21st century, a pamphlet of unspecialized memory-plastic tools, ear-mounted audioplayer with three songpearls, a nudist's license, 1D10 doses of recreational drugs, four-octave music synthesizer, season tickets to the theater, or ten tickets to the zero-gravity jai-alai fronton, a plush Grog doll, counterfeit birthright lottery ticket (Earth natives only).
- IntraStar debit card dischargeable through the Interstellar Bank of Jinx; your explorer may or may not have deposited his entire fortune in this card.
- UNI-CREDIT chargecard issued by Banco de Yamashita (Ceres, Luna, and the explorer's home world). Issued to a C-level credit rating; good only in direct-link credit sphere of issuer.

Credit Rating
Put an X in this space on the explorer sheet. The X indicates that the explorer's Known Space credit is suspended until he or she returns from Ringworld. Your gamemaster has additional information about your credit rating but may choose not to bring credit ratings into the game.

SKILLS

A skill is a natural or acquired ability or talent. Though abilities such as walking and chewing are skills, they are learned so early and become so automatic for humans that for game purposes their exercise is always considered to be successful.

As with citizens of the 20th century, no Ringworld explorer has uniformly superb skills; usually players choose to emphasize a few skills so that their explorers are capable in some things rather than mediocre in everything. An explorer's percentage of proficiency in a particular skill might be zero or more than 1000%. For the most part, Known Space humans are quasi-immortal; they have a long time to build up skills.

The present percentage ability for a skill is determined by the base chance for the skill, by the occupation points allotted to the skill when the explorer is created, and by any in-play explorer experience or research which adds percentiles to the skill.

There are five categories of skills; Agility, Communication, Knowledge, Perception, and Technical; these categories are related to the explorer's characteristics and bear upon how well the explorer can generalize his skills.

As a skill improves, it becomes more and more likely that an explorer succeeds in performing it, and progressively more difficult for it to be improved.

Base Chance

On the explorer sheet, the base chance for each skill is printed beside the skill name. The base chance of a skill represents the initial probability that any normal human can successfully perform that skill: therefore, the base chance for a particular skill is identical for all normal members of a species.

Base skill chances vary because some skills are easier to perform than others. For example, an explorer equally ignorant of Chemistry and of melee combat finds it intrinsically easier to hit a foe with a club than to synthesize tetraethylammonium hydroxide.

Allocation of Occupation Points

As the Pursuits section explained, a single occupation point buys one skills percentile. When the occupation points have been exchanged, add the resulting percentiles to any existing percentiles for the skill in order to determine the present percentage chance for that skill. Skills percentiles must be bought in whole units of one or more; fractions can never be purchased.

The rest of this section defines the general use of skills, the skills classes, and the actual skills.

USING SKILLS

In a specific game situation, the gamemaster may ask the players for particular skill rolls, or the players may suggest possible skill rolls — to which the gamemaster agrees or demurs.

The player checks his explorer's percentage ability with the skill in question, then rolls D100. Whenever the explorer skill percentage is 95% or less and the roll is equal to or less than the explorer's current percentage ability, then the player's roll succeeds and the explorer has successfully used the skill. If the roll is greater than the explorer's current percentage ability, then the player's roll fails and the explorer did not successfully perform.

A simple failure with a combat skill means that the explorer missed his target. A simple failure for a non-combat skill means that the character failed to do what he was trying to do or failed to learn what he was trying to learn.

Special Success

If the D100 roll is equal to or less than one-fifth of the amount needed to succeed with the skill (round up any fraction), then a special success occurs. *Example: Sharki has 56% skill in Emergency Treatment. She wishes to stop her friend's bleeding. To do so, her player must roll 56 or less on D100. To get a special success, the player must roll 11 or less (56 divided by 5, round down any fraction). Thus any roll result between 01 and 11 is a special success.* The meaning of a special success is determined by the gamemaster, though most of the skill descriptions provide some guidelines. In terms of the example, if Sharki received a D100 roll of 10, her friend healed more quickly than normally possible, or perhaps Sharki may have discovered a new technique during treatment, or the gamemaster may have made some entirely different choice.

Special Failure

The chance for a special failure equals 1/20th of the chance for a failure (round up any fraction). *Example: Sharki also has a 44% chance to fail at Emergency Treatment. Dividing 44 by 20 (1/20th chance, remember) yields 2.2, which rounds up to a 3% chance for a special failure. On a result of 00,99, or 98, a special failure occurs.*

A special failure with a non-combat skill usually means that the explorer has done something grossly wrong or that he has come to the wrong conclusion. The gamemaster has the right to embellish and modify these meanings as much as he wishes. In combat, the special failure often is called a fumble, because the gamemaster often rules that in consequence the explorer dropped or broke his weapon, possibly accidentally wounding a friend in the process.

Effects of High Skills Percentages

Ability can continue to rise after an explorer reaches 100% proficiency with a skill, to a level of 1000% or more.

The chance for a special success increases with the skill percentage. Up to a skill percentage of 600%, D100 rolls of 96-00 always fail. At a skill percentage of 601%, only a roll of 97 00 fails. The failure chance decreases by 1 percentile per 100 percentiles of skill thereafter. At 701% it takes a roll of 98-00 to fail; at 1000% or more, only a roll of 00 fails. A roll of 00 is always a special failure, no matter to what dizzying height of skill an explorer reaches.

Monetary Value of High Skill Values

Explorers with skills percentages in excess of 100%, or xenologically-qualified skill percentages above the normal limits, may receive some monetary benefits from their mastery of the skill. This can be gained from the writing of articles, consultation, government pensions, or from whatever source the gamemaster and the player can agree upon.

Skill Against Skill

At times one skill will be pitted against another. *Example: a Kzin raider is actively searching for the human children cowering in the bushes. The Kzin's player failed his Scent skill roll; the humans' players succeeded with their Hide skill rolls. The Kzin now pits his Search skill against the humans' Hide skills. Search is the active skill; Hide is the passive (defending) skill. Since the children are huddled together, subtract the percentiles of the lowest Hide skill from the percentiles of the Kzin's Search. The Kzin's player then attempts to roll D100 equal to or less than the remainder. The lowest Hide among the children is 35%; the Kzin's Search is 60%. The Kzin player must roll a 35 or less on D100.*

If the children had hidden independently, then the cruel Kzin would need to Search for each independently.

Even if the active skill is less than the passive skill, the active party always has a 01-05 range (5% chance) of success. Skill need only be pitted against skill if the passive skill was successful using an ordinary skill roll previous to the challenge. If the passive skill fails, a successful normal roll using the active skill will achieve the required results. Thus, in our example above, if the children had failed in their Hide rolls, the Kzin's chance of spotting them would be his full 60% Search ability.

IMPROVING SKILLS

Skills increase during the course of play through experience, research, and training. All three methods of improvement are discussed in the game system chapter. Improvement always consists of increases in skills percentages.

Types of Skills

To provide the gamut of skills necessary to a realistic science fiction game, *Ringworld game* skills function as either 'single' or 'root/branch.' The individual skill description indicates which skill type it is. The letter R also appears beside each root skill on the explorer sheet. Single skills have no such indicator on the explorer sheet. All skill rolls are D100 rolls.

Single Skills

Single skills are those which define or encompass a specific action or a close grouping of related actions within which specialization (for game purposes) is impossible. Most communication and perception skills are single skills, for instance. Single skills are marked with an S in these descriptions.

Root/Branch Skills

Root/branch skills define endeavors within which specialization is possible. The root skill percentiles represent that knowledge, training, talent, etc. common to all practitioners of the general skill area; the branch skills represent the specializations possible from a particular root skill's fund of information. Since there are thousands of specializations, each root skill listed on the explorer sheet is accompanied by several spaces in which particular branch skills can be entered.

Two athletes, for instance, may have equal percentages in the Athletics root skill, but one might have 70% Swim as a branch skill, while the other has earned two branches, 70% Climb and 35% Soccer. There is no theoretical limit to the number of branch skill specializations possible, though the gamemaster must agree to the reasonableness of any proposed branch.

Every skills category has a maximum possible root skill percentage, an amount in percentiles equal to the sum of two specified explorer characteristics. Because characteristics differ, explorers normally have slightly different root skill maximums.

Skills Category Root Maximums Table

skills category	*maximum percentage*
agility	explorer's STR + DEX
communication	explorer's INT + APP
perception	explorer's POW + CON
knowledge	explorer's INT + EDU
technical	explorer's DEX + INT

It is unnecessary to choose a branch skill until the root skill under which it is covered has been raised to its maximum.

Once a particular root skill maximum has been reached, percentages of individual branch skills from that root skill can rise indefinitely beyond the root skill percentage. In themselves, branch skills behave identically to single skills. Branch skills always must be written in on the explorer sheet; only root skills and single skills are pre-printed on it.

Once the root skill maximum for a particular skill has been reached, an explorer can further train, gain experience, or receive the fruits of research in that skill only in its separate branches.

The value of a particular branch skill has no bearing on the percentage of any other branch skill. *Example: Myron Mellow's Physics root skill is 30%. His Physics/Cryogenics is 85%, and his Physics/Crystallography is 35%. Every other conceivable branch of Physics for Myron is exactly 30% until Myron improves another branch (perhaps Physics/Spectrography). Becoming 100% in the whole of Physics could take Myron centuries.*

Cumulative Example: H.Q. Smith is learning Lift Belt. The root skill for Lift Belt is Personal Flyer, and H.Q.'s technical skills category root maximum is 28. Until H.Q. exceeds 28% Lift Belt, his player merely changes the percentages for Personal Flyer. That means that H.Q. has that much proficiency in any tiny aircraft which the gamemaster agrees is some kind of Personal Flyer.

Once H.Q. reaches 29%, however, he has gone beyond the basics, and his player much open a branch skill beneath Personal Flyer in order to accumulate the increased skill — for H.Q., Personal Flyer cannot increase beyond 28%, for that is H.Q.'s technical root skill maximum. Since H.Q. has trained only in Lift Belt, the gamemaster indicates that the branch skill must be Lift Belt: had H.Q. trained in several kinds of Personal Flyer, then his player could have chosen any one of them as the branch skill.

The player now writes in Lift Belt below Personal Flyer, and marks down 29% as the

Lift Belt percentage. Since the training in Lift Belt brought the Personal Flyer root skill to 28%, H.Q. can operate any Human Space Personal Flyer at that initial percentage, and can train up particular branches from that percentage.

XENOLOGICAL QUALIFIERS

Xenology is the general study of intelligent individual aliens, and their thought, societies, knowledge, and artifacts. In the *Ringworld* game, the skills are effectively Human Space-based, and consequently xenological qualifiers are applied to many skills in order to reflect the actuality of different views and goals.

Alien species are more- or less-well-known to Human Space explorers, as the accompanying table indicates. Each species maximum represents the Human Space limits of knowledge — the percentage limit above which an explorer cannot advance before play, nor by training from standard Known Space sources. Generally any increase beyond these maximums will require an explorer to do some form of field research or to learn by experience.

Only root/branch skills can be xenologically qualified — one cannot learn to Throw, Scent, or Fast Talk as a Kzin would, for instance. The gamemaster must judge whether or not it is likely that a skill be so suited.

Human Space Xenological Limits Table by Species

species	*maximum %*
Bandersnatch	15%
Dolphin	50%
Grog	10%
Kdatlyno	15%
Kzinti	75%
Martian	01%
Outsider	01%
Pierin	30%
Pak	25%
Puppeteer	15%
Slaver	20%
Tnuctipun	03%
Trinoc	25%
Whale	50%

Procedure

To possess a specific alien species' version of a specific skill, the explorer must activate a xenological qualifier. This can be done during explorer generation or later, during play. The procedures differ:

DURING EXPLORER GENERATION: (1) the explorer must know the root skill to its root maximum to know enough about the skill to be able to gain a xenological qualifier, and (2) the player must sacrifice 10 occupation points from his explorer's stockpile. Those 10 occupation points only activate the xenologically qualified skill; they represent the unusual effort required to understand an alien viewpoint and increase no skill nor play any further part in the game. Once activated, the xenologically-qualified skill is known in a particular alien species' version either to the root skill maximum, or to the xenological qualifier maximum, whichever is lower. Xenologically-qualified skills may only be specific branches, never root skills.

DURING PLAY: (1) the explorer must know the root skill to its root maximum for it to be xenologically qualiable, and (2) the explorer must receive a successful experience roll in circumstances appropriate to activating a specific alien version of a specific skill, or (3) the explorer must successfully complete a research project appropriate to such activation. Once activated, the xenologically-qualified skill is known in a particular alien species' version either to the root skill maximum or to the xenological qualifier maximum, whichever is lower.

In either procedure, later experience or research can raise a branch skill to any amount, but xenologically-qualified branch skills cannot be trained beyond the percentage maximum given in the xenological qualifers table.

Example: marooned in the bucolic district of Fanged Contempt, H.Q. Smith finds an abandoned Kzinti Personal Flyer, in appearance equivalent to the human lift belt. H.Q. wants to fly in this vehicle rather than spending a month walking back to his expedition's base. But the gamemaster states that the principles of operation are quite different.

Since H.Q. has no Kzin Lift Belt skill, for him to fly this alien artifact, his player must roll against H. Q.'s Personal Flyer root skill percentage - 28% - to keep H.Q. aloft. The player rolls a 27, just enough. The gamemaster grins, and says that Smith's craft wobbles all the way home.

The player asks if H. Q. gets an experience check for flying this alien craft. The gamemaster agrees that he should, for there was a strong chance that H.Q. might have crashed. The gamemaster further says that H.Q. can have an experience check to his present human PF/Lift Belt, if he wishes — or that H.Q. can instead activate the Kzin Lift Belt skill and apply the experience to it. After thinking about H.Q.'s present situation, the player decides to activate Kzin Lift Belt (not Kzin Personal Flyer, as only individual branches can be xenologically qualified) as a new branch skill of the Personal Flyer root skill, and writes Kzin Lift Belt below the already-present (human) Lift Belt on the explorer sheet. He writes in 28% as well I equal to H.Q.'s Personal Flyer root skill)and checks the experience box beside the entry.

In a few weeks the adventure concludes, and the player makes a D100 experience roll for Kzin Lift Belt. The roll succeeds easily, and the subsequent 1D6 roll for points yields a 5. The player adds 5 to H.Q.'s PF/Kzin Lift Belt, so that the percentiles total 33. H.Q. now has a 33% PF/Kzin Lift Belt skill.

Had the gamemaster ruled that this type of Kzin lift belt was similar to a human lift belt, then H.Q.'s player would have rolled against H.Q.'s normal Lift Belt percentage, now risen to 53%. H. Q. would have been safer, but also without a chance at skill activation.

Individual Skills

All skills available to an explorer are discussed in this section. The skills are arranged in a single alphabetical list. Each entry is headed by the skill name, an S or an R for single or root skill, the skills category to which the skill belongs, and the base chance of the skill for humans.

In using these skills, gamemaster and players alike must remember to distinguish between cultural levels. Astronomy, for instance, is far different for a member of a primitive culture than it is for a representative of Known Space. Primitive Ringworld cultures might distinguish a pattern in the stars, and use them to tell the day or season, or navigate by them. Advanced cultures would know of stars, planets, galaxies, and the elaborate workings of the cosmos, and think of the primitive culture's astronomy as merely incidental observations. However, a person from the advanced culture could not navigate by the stars nor tell the time of night by them.

ANTHROPOLOGY (R)

Knowledge (00%)

Major branch skills are Cultural Anthropology, Physical Anthropology, and Archaeology. Despite the literal meaning of the term, Anthropology in the *Ringworld game* concerns the social life of any sentient species. A special success roll indicates that the user has come to a particularly insightful conclusion concerning his or her problem.

The Five Skills Categories

AGILITY: the explorer's quickness and muscular control. Root skill maximum: STR + DEX. Skills: Archaic Melee Weapons, Archaic Ranged Weapons, Athletics, Hide, Sneak, Unarmed Combat, Variable Sword/Flashlight Laser (VW/FL).

COMMUNICATION: the explorer's ability to impart, understand, and manipulate information. Root skill maximum: INT + APP. Skills: Bargain, Debate, Fast Talk, Fine Arts, Musicianship, Orate, Own Language, Perform, Psychology.

KNOWLEDGE: the explorer's formal learning. Root skill maximum: INT + EDU. Skills: Anthropology, Astronomy, Biology, Botany, Chemistry, Computers, Emergency Treatment, Engineering, Farming, History, Law, Mathematics, Physics, Planetology, Second Languages, Strategy, Theology, Zoology.

PERCEPTION: the explorer's sensory and concentration abilities. Root skill maximum: POW + CON. Skills: Handgun (energy and projectile), Heavy Weapon (energy and projectile), Listen, Observe, Scent, Search, Track.

TECHNICAL: the explorer's ability to comprehend and use instruments, structures, and devices. Root skill maximum: DEX + INT. Skills: Aquatic Vehicle, Atmospheric Craft, Ground Vehicle, Hyperdrive, Personal Flyer, Reaction Drive, Reactionless Drive, Repair, Ringworld, Weapons System.

[Cultural Anthropogy is the study of ways and mores, and the social responses of a species to its environment. A cultural anthropologist can hypothecate as to cultural or environmental factors causing particular group behavior.

[Physical Anthropology is the study of no-longer-existent sentient beings and their cultures, the primary evidence being fossils and associated material.

[Archeologists study extinct cultures from their remaining cultural artifacts, such as tools, old dwellings, and weapons.

On Ringworld, Cultural Anthropology will probably be the most useful; both artifacts and hominid remains are normally recycled by the inhabitants and fossils are rare.

AQUATIC VEHICLE (R)

Technical (00%)

The explorer's ability to pilot a water-borne boat, ship, or submersible. It does not endow the explorer with the ability to navigate. There are as many individual branches to this skill as there are vehicles covered by it. A special success with this skill indicates that the explorer has gone faster or remained afloat longer than he or she otherwise would.

Skills List for Ringworld

Anthropology (R)
Aquatic Vehicle (R)
Archaic Melee Weapons (R)
Archaic Ranged Weapons (R)
Astronomy (R)
Athletics (R)
Atmospheric Craft (R)
Bargain (S)
Biology (R)
Botany (R)
Chemistry (R)
Computers (R)
Debate (S)
Emergency Treatment (R)
Engineering (S)
Farming (R)
Fast Talk (S)
Fine Arts (S)
Ground Vehicle (R)
Handgun (energy) (R)
Handgun (projectile) (R)
Heavy Weapon (energy) (R)
Heavy Weapon (projectile) (R)
Hide (S)
History (R)
Hyperdrive (R)
Law (R)
Listen (S)
Mathematics (R)
Musicianship (R)
Observe (S)
Orate (S)
Own Language (S)
Perform (S)
Personal Flyer (R)
Physics (S)
Planetology (R)
Psychology (R)
Reaction Drive (R)
ReactionlessDrive (R)
Repair (S)
Ringworld (S)
Scent (S)
Search (S)
Second Languages (R)
Sneak (S)
Strategy (S)
Theology (R)
Track (S)
Unarmed Combat (S)
Variable Sword/Flashlight Laser (R)
Weapons System (R)
Zoology (R)

-ARCHAIC MELEE WEAPONS (R)

Agility (10%)

No Known Space explorer should know more than the base chance for this skill without good reason. (Remember, Louis Wu didn't even know what an axe was.)

Archaic Melee Weapons are primitive melee weapons such as swords, axes, and maces used in combat. Each type of weapon is a branch of this root skill. A special success allows the wielder of the weapon to do double damage to his target. The dice should be rolled twice and added together.

ARCHAIC RANGED WEAPONS (R)

Agility (10%)

No Known space explorer should have this skill without very good reason. Archaic Ranged Weapons represent an explorer's skill with primitive ranged weapons such as longbows, crossbows, slings, catapults, and arbalests. Each type of primitive ranged weapon is a branch of this root skill. A special success allows the player to either choose a particular target hit location, or to do double damage.

ASTRONOMY (R)

Knowledge (00)%

Observational Astronomy has been completely computerized in Known Space; most Astronomers are actually astrophysicists. A special success roll for a problem in practical Astronomy such as navigation or time-telling means that the observer made particularly exact observations or calculations; special success with theoretical Astronomy (such as calculating an orbit) indicates a confirmation of a hypothesis or the streamlining of a research procedure. Branches of astronomy include cosmology, astrodynamics, astrophysics, galactography, and hyperspace-micrometry.

ATHLETICS (R)

Agility (15%)

Athletics in general indicates the explorer's physical conditioning and training. Several important activities (Acrobatics, Climb, Swim, Throw) can be branches of this root skill.

Athletics/Acrobatics represents an explorer's expertise with tumbling, gymnastics, and weightless movement and coordination. An explorer with this skill knows how to fall safely, can walk more safely on slippery or narrow surfaces, or can maneuver in a weightless environment at a percentage equal to his or her skill level. The results of a special success are left to the gamemaster.

Athletics/Climb involves training or experience in scaling dangerous or difficult slopes or structures. While his explorer climbs, a player periodically will be asked to make a climb roll, at a frequency depending on the danger as decided by the gamemaster. A relatively easy climb such as up a tree or up a hillside may require an Athletics/Climb roll every four meters. A difficult climb may require a roll every meter. If a player fails an Athletics/Climb roll, then the explorer slips and does not advance. If a fumble is rolled, the explorer falls. A special success indicates that the player need not make the next Athletics/Climb roll — he will automatically succeed.

[Athletics/Run is an explorer's trained ability to run faster and/or longer than the untrained. An explorer possessing the Athletics/Run skill can bring him or herself an extra burst of speed for a limited duration, adding one-half again to the explorer's running speed. A human explorer under normal gravity conditions can thus add 3 to his or her normal running speed of 6 for a total of 9 meters per impulse. This swiftly fatigues one; an explorer can only keep it up for his or her CON in impulses, after which he or she must rest, moving no faster than 3 meters per impulse, for one full minute.

A successful use of the Athletics/Run skill will also allow an explorer to move at 1 m/impulse faster than normal while still performing actions. A human in normal gravity who succeeds with an Athletics/Run skill can move at 4 meters per impulse while still performing other actions. An explorer need not attempt ths roll again once it is successful until he or she stops moving.

The third function of the Athletics/Run skill allows the athlete to run at 1m/impulse faster than normal, with the usual limit of his or her CON in minutes as for a normal runner.

The fourth function of the Athletics/Run skill is to increase an explorer's endurance. With a successful Athletics/Run roll an explorer can increase his or her endurance by half again what it would be according to the appropriate table in the game system chapter.

The four aforementioned functions are mutually exclusive; an explorer can only use one function at any given time. The explorer's player must state which function his or her explorer wishes to use before he or she rolls the skill.

[Athletics/Swim covers the ability to move through water for various distances at various speeds, and to float. An explorer who has at least 30% proficiency need not make his or her roll except under extraordinary circumstances, such as a whirlpool, storm, or aquatic attack. If an explorer fails an Athletics/Swim roll, he or she must make a luck roll or begin to drown. If the character Fumbles the luck roll, he or she is unfortunate, and begins drowning immediately. A player for an explorer who has begun to drown can attempt an Athletics/Swim roll on each of the explorer's action rankings to halt the process. A special success means that the next required swim roll in that sequence of action automatically succeeds. The effects of drowning are fully described in the game system chapter, under asphyxiation.

[Athletics/Throw allows an explorer to hurl objects to an approximate location, to the best of his ability as defined by his characteristics. He can throw a small, hand-sized object as far as the average of his STR plus DEX in meters. . Larger objects can be thrown to a distance in meters equal to his STR x 1/2. Heavy objects can be hurled to a distance in meters equal to his STR x 0.2. Only the gamemaster can define the class of object being thrown. A special success Throw roll allows the user to toss the object to the exact spot aimed for, if possible to reach.

ATMOSPHERIC CRAFT (R)

Technical (00%)

Applied to all vehicles of more than one seat or one-seated vehicles with some storage space whose operation is limited to the atmosphere

of a planet, this skill includes flycycles, flying cars, copters, copters, ornithopters, stasis blimps, Known Space airplanes, and hobbyist free balloons. If an explorer is familiar with the vehicle in question, the skill remains unmodified. If the explorer is unfamiliar with the vehicle, the percentage chance of safely operating the vehicle on its first flight is that of the root skill. For example, even though a human explorer might know about 20th century Earth aircraft, he could not get such a craft off the ground without considerable research and tentative experimentation. Special success results for this skill depend on the situation and must be decided by the gamemaster.

BARGAIN(S)
Communication (10%)

Use this skill in transactions with other intelligent beings, either to attempt to buy something at less than the normal asking price, or to sell something at higher than the normal asking price. If the gamemaster rules that the character's price or barter is substantially more or less than the market value, halve or double the seller's bargain skill. To use this skill, only one bargainer on each side may participate.

This skill also can be temporarily modified up or down by the game master in order to reflect the relative difficulty of a situation. A special success Bargain roll indicates that the explorer got even more from the deal than he expected — how much more is for the gamemaster to decide.

If two characters bargain against each other and both succeed, the player who rolls lower wins the session. If they both fail or if they both roll the same successful number, the encounter is inconclusive and their players must roll again. No combination of successful or unsuccessful bargain rolls can force an explorer to buy something; the rolls only influence the final price.

Depending on the culture, Bargain may take one or two game minutes, or much of a leisurely day.

BIOLOGY (R)
Knowledge (00%)

This skill represents an explorer's knowledge of the basic workings of life as well as his understanding of how life has evolved on his planet. Specialties include bacteriology, cytology, embryology, microbiology, genetics, and pharmacology. For Ringworld explorers, this skill offers a lot of opportunity. A Xenology qualifier indicates expert knowledge of a specialty as it is on another planet. A special success roll indicates that the explorer has made a particularly insightful observation.

BOTANY (R)
Knowledge (00%)

A measure of the knowledge of plant life, this skill can be used in identifying unfamiliar plants, in ascertaining any medicinal properties, in hybridizing plants to create felicitous combinations of traits, making ecological predictions, and in many other ways. Branch skills include plant pathology, phytopaleontology, mycology, and so forth. A Botany percentage may be lowered by the gamemaster to reflect unfamiliarity with the plant or the plant's environment. A special success with this skill indicates valuable insight into the problem, or could perhaps shorten a research project.

CHEMISTRY (R)
Knowledge (00%)

Chemists understand the relationships of a vast number of molecular structures, and can confidently analyze present properties of substances and predict likely properties from research data. They are familiar with a wide range of analytic and experimental equipment, and can use it to synthesize literally millions of compounds, and to create reactions in plasmic, gaseous, exotonic, liquid, solid, or super-cooled states. Without proper equipment, chemists are less effective and must take longer to achieve effects. Excellent portable lab kits are available in most of Known Space. The myriad branch skills include nuclear chemistry, industrial chemistry, organic chemistry, stereochemistry, petrochemistry, high-temperature chemistry, and so on. A special success indicates desired results were obtained more quickly than usual.

COMPUTERS(R)
Knowledge (00%)

There are two branches to this root skill, Computer/Hardware and Computer/Software.

Computer/Hardware: an explorer can use this skill to create, repair, analyze, or redesign computer systems. An explorer with a high percentage in this skill can add new components and functions to an existing computer or create a new system. The gamemaster always should reduce operative percentile ability of the explorer to reflect the difficulty of the situation. This reflects a root skill ability with computers in general, and the ability to write simple programs, but does not endow any creative Computer/Software abilities. No new equipment can be built if the appropriate materials are unavailable. This skill is appropriate for researching alien information-processing devices. A special success with this skill indicates that the explorer performed exceptionally well.

Computer/Software represents the explorer's ability to program, understand, and communicate with computer systems, as well as to create new approaches to information systems. This skill is not concerned with simple library requests -- most Known Space computers are easily activated by verbal commands even idiots can handle and will obligingly flood the questioner with millions of words about anything — but it does take skill to extract all of the pertinent data about a special subject or situation, or to retrieve data associated with the subject in special ways. A computer makes use of data only in routine or requested fashions. Long problems or programs may be research projects (see the game system chapter). A special success allows the explorer to complete his work in less time and possibly to eliminate some steps.

DEBATE (S)
Communication(05%)

With successful Debate, a target can be intellectually convinced that the user correctly propounds a principle. The target may still emotionally deny the proposition, but he will admit to himself that the debater is right, and on a special success actually will be converted to the user's point of view. If two characters use Debate against each other and both succeed, the character whose player rolls lower will win. If both fail, or if both roll the same successful number, the encounter is inconclusive and the players must roll again. The Debate skill takes at least 1 5 game minutes to use effectively. Debate normally works only against one target, though more may be convinced during formal proceedings such as trials.

EMERGENCY TREATMENT (R)
Knowledge (01%)

Successful use of this skill can heal 1 D3 hit points of damage from wound, injury, disease, or localized poison. Such aid must be applied soon after the problem has become apparent, or treatment is ineffective. The exact amount of game time must vary with the situation, but for open wounds assume that five game minutes are the maximum effective interval. Emergency Treatment may be performed only once for a particular problem per damaged location and patient. Subsequent applications of the skill will be ineffective. Assume that this skill requires one game minute to apply without bandages, drugs, instruments, etc. With a portadoc, etc., assume Emergency Treatment takes 20 impulses. A special success indicates that the full hit points have been healed. Emergency Treatment will not restore CON, or any other lost characteristic points. The branches of this skill are made up of individual species.

ENGINEERING (S)
Knowledge (00%)

Engineering represents an explorer's knowledge of the practical resources of Known Space (or the appropriate culture's) technology. Engineering can be helpful to research projects, from helping to figure out an unfamiliar device to the construction of mechanical or electronic devices. The gamemaster should feel free to lower the percentage chance of creating a complicated device, or to increase the time involved; the gamemaster should be informed about desired features such as strength, durability, speed of construction, or reduced weight. A special success with this skill indicates that the user achieved his or her goal more quickly or in a superior manner.

FARMING (R)
Knowledge (00%)

With this skill, the user knows how to plant, grow, and harvest crops, as well as care for common domestic animals. An explorer with this skill can raise food for himself and others. Growing crops in an unfamiliar environment will subtract percentiles from the explorer's Farming percentage. The gamemaster also should modify this skill percentage by the difficulty of the environment. A special success means that the crop or animals raised are better than average. An explorer practicing the farming skill receives an experience check once per season spent actively farming.

A practical knowledge skill. Farming is not well-suited for involved problems or for research, though it is for xenological qualifiers. Different branches of farming cover different crop plants, domestic animals, planetary ecologies, as well as specialties like aquaculture or hydroponics.

FAST TALK (S)
Communication(10%)

A successful use of this skill causes the target to agree with whatever the fast talker says. He will do so without thinking and will do whatever the fast talker wishes, within reason. If allowed a few minutes of thought, the target can come to his senses provided he makes a successful reasoning roll. Fast Talk takes

about one game minute to apply, and can be effective against no more than a handful of targets. Fast Talk cannot be used against someone currently Fast Talking, though Bargain can be. When trying to sell a material object, an explorer should use the Bargain skill; Fast Talk should be used when an explorer wishes to sell an idea, plan, or concept.

Fast Talk is worthless against someone who has firmly made up his mind — Debate or Oratory must be used instead. For a short time, Fast Talk can be used to pass off obviously false or suspect ideas or goods as normal. It also takes less time (only a minute or two) to work. Debate and Oratory take 1 5 minutes to be effective. Given a special success Fast Talk roll, the skill user has so completely convinced his target that the target will not rethink the situation for a half hour, unless obvious flaws in the Fast Talker's reasoning are pointed out by a third party.

FINE ARTS (R)
Communication(05%)

A user of Fine Arts practices the skill for aesthetic purposes — his art form may be a art form such as painting or computer-generated art, or sculpture, artistic holography, poetry, etc. Kdatlyno touch sculpture can only be represented by Fine Arts with the Kdatlyno xenological qualifier in the branch skill of Touch Sculpture. A special success Fine Arts skill roll in creating a work indicates that the product is unusually good — perhaps worth more to collectors, perhaps just more satisfying to the artist.

GROUND VEHICLE (R)
Technical (03%)

This skill covers the driving of motorized ground vehicles, including ground cars, tanks, walkers, and amphibious vehicles when landbound. A player need not attempt his skill roll if it is over 30% unless his explorer is driving under hazardous or unusual conditions Special success results vary with the situation.

The skill of driving an archaic vehicle (such as a horse drawn chariot) is a separate root skill not listed on the character sheet, because of its almost complete non-existence in Known Space. Hominids from primitive cultures on Ringworld with the skill of Ground Vehicle can be assumed to have the archaic version of the skill.

HANDGUN, ENERGY (R)
Perception (05%)

All energy handguns are covered by this skill. With a user can define, acquire, and hit a target with the energy the handgun emits. The user understands in an operational fashion the maintenance and repair of the weapon to his skill percentage. This skill covers stunners, lasers (except the flashlight laser), some tasps, and many other weapons, each as a separate branch skill. Understanding energy handguns of different cultures or species may require xenological qualifier rolls, reasoning rolls, research attempts, or even appropriate Engineering rolls. A special success with this skill means that the user can either do maximum damage to a random target hit location, or choose a target hit location.

HANDGUN, PROJECTILE (R)
Perception (03%)

This skill covers all projectile-firing handguns. With it a user can define, acquire, and hit a target with the projectile fired from the gun. The user understands in an operational sense the maintenance of the weapon to his skill percentage. The user of the skill can manipulate missile-firing weapons of various eras (but not archaic weapons such as bows, which are a different skill), including dart guns, gyro pistols, micro-submachineguns, and so forth. Each weapon would be a different branch skill. Projectile weapons of a different culture or species may require a reasoning roll, xenological qualifier skill, or appropriate Engineering roll to fully comprehend. A special success roll means that the user can choose the particular hit location struck.

HEAVY WEAPON, ENERGY (R)
Perception (05%)

This skill resembles the Energy Handgun skill, except that it applies to weapons too large to be put in a pocket or fired easily with one hand. There is no particular maximum size to the weapons covered by this skill, except that warship-sized and other very large weapons require technical skills, not perception skills, and are properly weapons systems — discussed under that skill. Each different weapon is a different branch skill. As a general guide, weapons too large for a single man to carry do not fall under this skill, but this is a matter for gamemaster ruling. The branch skills include laser rifle, slaver disintegrator, etc. With a special success roll, the player can choose the target hit location where the shot strikes, or can do maximum possible damage to a random target hit location.

HEAVY WEAPON, PROJECTILE (R)
Perception(03%)

The Projectile Heavy Weapon skill resembles the Energy Heavy Weapon skill, except that it applies to projectile-firing weapons. Again, each separate weapon is a different branch skill, and weapons too large for a single man to carry are usually considered to be weapons systems, rather than weapons. Included under this skill are the Pneumo rifle, various mercy rifles, etc. With a special success roll, the player can choose the target hit location where the shot strikes.

HIDE (S)
Agility (10%)

This skill is used to allow a character to hide behind objects or under cover, and to camouflage himself or others, assuming that the terrain is suitable. A character can attempt to hide when moving, if there is sufficient cover, but he will have to roll a special success in order to succeed.

HISTORY (R)
Knowledge (00%)

The history skill covers many branch skills. It might represent a general knowledge of the history of the explorer's species and home world, a specialized approach to history (such as techniques, quantitative history, or principles and resources for Kdaptist analytics)), a historical period (such as the Kzin wars), or a historical topic (such as spaceflight and colonization, or the names and histories of the spacecraft missing in the Serpent Stream). No historian is systematically expert in more than a few such branches. A special success History roll means that the explorer has made an important insight into the relationships of historical events or processes, or has detected intriguing (or depressing) parallels between current events and historical analogs.

HYPERDRIVE (R)
Technical (00%)

There are singularities in the mathematics of hyperspace. One such singularity surrounds every sufficiently large mass in the Einsteinian universe. Outside of these singularities ships can travel faster than light. Inside they disappear if they try it. **- Larry Niven, *Ringworld.***

This skill represents the explorer's ability at piloting a hyperdrive ship. The two main branches of this skill are the Quantum 1 and Quantum 2 (very uncommon) hyperdrives, plus more branches with xenological qualifiers. If the ship type is familiar, and flying under normal circumstances, a player need not make a Hyperdrive roll as long as his branch skill exceeds 30%. On voyages into unknown space, or under difficult conditions such as dense star-fields or equipment malfunctions, this skill may have to be used to stay on course or avoid a singularity. An explorer piloting a damaged Quantum 1 ship or piloting any Quantum 2 ship, must receive a successful Hyperdrive roll every 24 hours to avoid disaster. A special success allows the player to be automatically successful on his next Hyperdrive roll.

The Hyperdrive skill consists mainly of avoiding singularities (the aspect which any large mass projects into hyperspace) with the use of a device called a mass-indicator — *a* transparent sphere with a number of blue lines radiating from the center. The mass indicator is a psionically-operated device which detects singularities; the blue lines sweep out over the curvature of the sphere, each representing a singularity, and lengthening as the ship nears it. In a Quantum 1 ship, the lines take hours to move perceptibly, but in a Quantum 2 ship the pilot can actually watch the lines slowly changing in length.

Due to the psionic operation of the mass-indicator there can be no autopilot for faster-than-light travel in Known Space. The mass indicator must be operated by a living being. To successfully operate a mass-indicator, a pilot must have a minimum POW of 14; no one with a lower POW can have the Hyperdrive skill. A character with hyperspace phobia can also never gain the Hyperdrive skill under any circumstances.

LAW (R)
Knowledge (00%)

Law has at least four important branches: Law/Criminal, Law/Contract, Law/Civil, and Law/Interplanetary. Having a high skill does not necessarily mean that the explorer can practice law, be a member of the bar or any legal guild, or have standing in any court. For this to occur, the occupation of Functionary must have been rolled during explorer creation, or the gamemaster must establish procedures for the explorer to pass the bar. These should be complex, taking many sessions of play. Law percentages may be temporarily lowered when the explorer encounters a new government.

Law/Criminal: an explorer with this skill can use technicalities to avoid punishment and win cases (if he is a lawyer). He can also tell what acts are illegal and what the likely fines or penalties are to be. If a character faces a difficult case, the gamemaster should reduce an explorer's chance for success at this skill. A special success in this skill used in the courtroom means that the explorer has

won his case handily and possibly set a legal precedent.

Law/Contract: an explorer who receives a successful Law/Contract roll for a given contract cannot be cheated in that contract; the skill can also be used as a written form of debate. It is possible to attack characters with unfavorable contracts, and have them stick if the target (or his representative) does not succeed in Law/Contract as well. This skill can also be used to try to escape from contracts. Documents written with the aid of Law/Contract tend to last longer and are harder to break. The bribery, blackmail, and legal cover-ups practiced by the Puppeteer traders of General Products are examples of creative use of Law/Contract. The gamemaster may rule that the major points of a contract must be rolled for separately. A special success indicates that the user has gotten signed an instrument as favorable to himself as possible, or escaped easily from an undesirable contract.

Law/Civil: using this branch skill, an explorer can trace and document people and property from public records, understand and utilize the civil and administrative legal systems, and otherwise effectively work with government officials and businessmen. A special success Law/Civil roll means that the explorer has noticed a legal quirk which may permit him or someone he knows to gain material advantage or to stop up a loophole. Understanding the civil law for one government or planet may be a different branch skill than that of another world. This is a matter for the gamemaster to determine.

Law/Interplanetery: an explorer with ability in this skill knows and can maneuver through the laws of interplanetary and interstellar trade, of patent and copyright, and of extradition and of statutes of limitations, knows the theories ofsovereigntyand legitimate influence, and even such legal niceties as to whether or not prisoners of war have boosterspice rights. This legal specialty might be available to interstellar merchants, or smugglers and rogues. An explorer receiving a few successful Interplanetary Law rolls along with a few successful Fast Talk or similar skill rolls could probably bring anything he needed down-planet. International treaties discuss much the same problems as interplanetary/interstellar treaties. A special success means that the explorer achieves his goal as well as he possibly could have, or with as much profit.

LISTEN (S)

Perception (05%)

This skill represents the explorer's chance to hear and make sense out of subtle but not inaudible sounds. This skill and Sneak work in tandem; to find a sneaking character match the searcher's Listen against the successful Sneak skill using the skill against skill rules.

MATHEMATICS (R)

Knowledge (00%)

Branches of mathematics include statistics, calculus, topology, game theory, operational analysis, and dozens of skills even more esoteric. In general, a player of an explorer possessing skill in any type of mathematics other than arithmetic should never have to make a skill roll for ordinary arithmetic, nor should anyone using a computer for any computational function. Primitive cultures usually know little mathematics other than arithmetic and geometry. It might be possible to create branch skills in Mathematics associated with another science skill, similar to the fashion used for Engineering. A special success in this skill indicates that a calculation, research result, or analysis is completed more quickly and accurately than usual.

MUSICIANSHIP (R)

Agility (05%)

This skill covers musical performance by voice or instrument. Unless the piece performed is improvised, this skill has little to do with Fine Arts. A successful Musicianship roll means that the performer pleased the audience. A special success indicates that the performer did very well, and that his audience is very pleased. Also see the Perform skill.

OBSERVE (S)

Perception (15%)

This skill represents an explorer's ability to discern the properties of an object or a process through cursory visual study, and to remember small or half-hidden details about a room, a person, or situation. Also use the Observe skill when making a general survey of the surroundings, or to discern a particular detail when not actively searching. The gamemaster may ask the players to attempt Observation rolls for their characters if he feels there is some detail the explorers might notice. A special success indicates that the explorer notices all pertinent details.

ORATE (S)

Communication (05%)

With this counterpart to the Debate skill, a user can emotionally convince any number of targets that what he says is true, though Orate will not necessarily make the listeners intellectually understand the user's proposition. The skill must be used for at least 15 minutes before it becomes effective, and it can convince only those actually witnessing the oration. Orate can be a more potent tool than Debate, but if the victims take an hour or so to think the problem over, they will be able to poke holes in the logic of the oration by means of a reasoning roll. A special success with this skill indicates that a reasoning roll will not work and that the target(s) will not begin to see through the oration until its falsehood, if any, is apparent.

OWN LANGUAGE (S)

Communication (INT x 5%)

This skill represents the explorer's ability to speak, read, or write his native language, no matter what tongue the player claims it to be, and can plausibly rationalize to the gamemaster. In general, Own Language in Human Space is Interworld. The skill roll need only be attempted when something being spoken, read, or written is especially difficult.

A character's skill in Debate, Fast Talk, or Orate can never be higher than his or her skill in the language he or she is speaking.

PERFORM (R)

Communication (05%)

This skill most narrowly concerns acting and stage presence; it includes minor useful abilities such as makeup, disguise, mimicry, and ventriloquism. If used non-theatrically, suspicious enemies might employ skills like Fast Talk, observe, or Psychology to penetrate the persona, or just cleverly question the skill user. A successful perform satisfies those present that the performer is in some fashion that which he or she portrays. A special success Perform roll indicates that the explorer has utterly convinced those seeing him of the veracity or larger-than-life nature of the persona portrayed. This skill does not include musical performance with instrument or voice.

PERSONAL FLYER (R)

Technical (15%)

This is the ability to use one-man open aerial transport, usually worn like an item of clothing. Nearly every human in Known Space has this root skill, mainly with Lift Belt as the branch skill. Another common branch is Jet Belt. Once a character's skill has surpasses 30%, he need only roll for it under the most extraordinary circumstances; the meaning of any special success roll likewise must vary with the situation.

PHYSICS (R)

Knowledge (00%)

There are a vast number of branches to this skill, including electronics, cryogenics, optics, chromodynamics, acoustics, biophysics, nuclear physics, crystallography, gravities, statiphysics, and hyperphysics. Many specialists would be needed to offer an adequate summary of Known Space physical knowledge. This skill might be used to analyze alien mechanisms —at least to theorize as to the principles involved. An appropriate Engineering branch skill would be needed to figure out the device's operation. A special success in Physics indicates that the explorer has found a way to solve a general problem, or to solve it quickly or more elegantly.

(PLANETOLOGY (R)

Knowledge (00%)

This skill measures an explorer's ability to define and analyze the major physical components of planets — atmosphere, weather, magnetosphere (if any), oceans, tectonic activity, internal structure, magnetism, heat balance, tidal effects, and so on. Planetary life-forms are also superficially covered — names and general types may be recognizable, but specific details will only be known if they directly relate to the planet's physical makeup (such as the way that Terran coral polyps build vast reefs). Many planetologists specialize in terrestrial planets, but even more study the jovians and their vast resources. Features specific to particular planets may require extensive research — the sequencing of jumbled strata, for instance, is easy to comprehend as a problem, but difficult to decipher. Planetologists can recognize areas liable to frequent earthquakes, volcanic activity, tornadoes, hurricanes, typhoons, and the like. This skill is not useful on Ringworld; the Ringworld skill is needed to comprehend the major elements of that artificial structure. A special success in a Planetology roll indicates special insight into or a quicker-than-normal solution to a specific problem, or a deduction of new facts. The branches of this root skill are defined by the individual planet or moon.

PSYCHOLOGY (R)

Communication (05%)

Like all communication skills. Psychology is considered here in its practical sense. A successful user of this skill can accurately judge the trustworthiness, intentions, or other aims of a being with whom the explorer is familiar. either personally or by species. But this skill

can take up to a full day of observation to employ, and any results will be true only for the following day. Familiarity with psychological theories and observations of current validity in the target's society may help. The gamemaster is within his rights to state the result of a successful roll in a cryptic manner ("He acts like he wants to be helpful, but you suspect he might be concealing something.") The different branches of this skill consist of the various species of Known Space, and all thus possess the xenological qualifier limitations. A special success in a Psychology roll indicates that the explorer fully understands the motivations of the target, insofar as those motivations relate to the explorer or his companions.

REACTION DRIVE (R)

Technical (00%)

This skill is required to pilot all the reaction drive spacecraft used in Human Space, covering fusion torches, interstellar ramships, and chemical rockets. This skill and that of Reactionless Drive are as non-interchangeable as those practiced by the respective captains of clipper ships and diesel-powered ferries. A player need not roll this skill for an explorer if that explorer's skill is 30% or more, unless there are extraordinary circumstances, such as an emergency, bizarre occurrence, or combat. Special success results are chosen by the gamemaster.

REACTIONLESS DRIVE (R)

Technical (00%)

This skill is required to pilot all the reactionless drive spacecraft used in Human Space, covering gravity polarizers and thrusters. This skill and that of Reaction Drive are as non-interchangeable as those practiced by the respective captains of clipper ships and diesel-powered ferries. A player need not roll this skill for an explorer if that explorer's skill is 30% or more, unless there are extraordinary circumstances, such as an emergency, bizarre occurrence, or combat. Special success results are chosen by the gamemaster.

REPAIR (S)

Technical (00%)

One possessing this skill is capable of deducing needed repairs from observation, models, diagrams, and test equipment, and to make the needed repairs, changes, or parts replacements for both electrical and purely mechanical items with which he has no particular expertise. These procedures may not be creative or inventive except perhaps in the scavenging of or jury-rigging of replacement parts. Most repairs are greatly enhanced by the proper tools — the gamemaster is within his rights if he reduces or eliminates chances for a particular repair if the needed tools are absent. Any explorer with a 10% or better Repair may enter a tool kit as part of his explorer's personal effects. An explorer trying to repair extremely sophisticated equipment must know the equipment or have the plans for it; if he does not, then the proper skill to roll against is Engineering. A special success indicates that the device is as good as new.

RINGWORLD (S)

Technical (00%)

As a technical skill, Ringworld knowledge strictly concerns the physical structures and relationships of the components of Ringworld; it has nothing directly to do with the life thereon. In a sense, Ringworld is equivalent to Planetology in its concern with overall physical processes and relationships. A special success result reveals or confirms a particular fact about its macrostructure or a component.

Before they reach Ringworld for the first time, explorers have no Ringworld skill. When they first reach Ringworld, each receives the Ringworld print-out, detailing the observable and deduced physical properties of Ringworld: this information earns each of them one percentile of the Ringworld skill.

SCENT (S)

Perception (00%)

The olfactory organs are effective sensors, and some species have excellent senses of smell, though most Known Space humans have a maximum possible Scent of 05%. A human chef or gourmet might have 1 2 more percentiles of the skill.

A successful Scent use allows the user to detect the presence of a nearby odor source, to identify an odor, or to follow an odor trail. If a scent user is trying to detect an odor from which he is upwind, his proficiency should be at least halved, and the further upwind he is, the more his skill should be reduced. A special success in a Scent roll indicates that the user has gleaned all possible information from the scent.

SEARCH (S)

Perception (15%)

This skill gives an explorer's chance of noticing something that he is specifically looking for, especially hidden items, surreptitious movement, or a lurking creature. To find an explorer who has made a successful hide, match the user's Search against his victim's Hide.

SECOND LANGUAGES (R)

Knowledge (00%)

An explorer's Second Languages are limited to any xenological qualifier as well as to his or her skill in Own Language. A special success enables an explorer to understand all the nuances of the speech or writing he is analyzing. A character's chance in Debate, Fast Talk and Orate is limited to his skill in the language he is operating in. The branches of second language are the individual languages.

As a practical matter, comdisc translators handle most language problems.

SNEAK (S)

Agility (05%)

This gives an explorer's chance of remaining quiet while moving at a speed no greater than a slow walk. The gamemaster may adjust the explorer's Sneak percentage to fit the situation — it is easier to move quietly on a carpeted floor than a gravel road.

STRATEGY(S)

Knowledge (00%)

Strategy is applicable to any sort of battle; land, sea, air, or space — and to forces of any size over a mere handful. Strategy is a man-of-action's counterpart to Fine Arts — proficiency in Strategy requires subtlety, attention to nuance, and elegance in the manipulation of mass and momentum. It is conceivable that the gamemaster might call for a Strategy roll in certain non-combat situations. This skill might be rolled if a player feels that his explorer would know more about the subject than the player himself — or it could be called for if a gamemaster wishes to warn a player when his explorer is about to do something which he should know better than to attempt. Having excellent Strategy, however, is no cause to believe that events will happen according to plan. The explorer using Strategy should state just what he is trying to do. Gamemasters should never allow the fate of a group of explorers to be decided by a single Strategy roll. A special success indicates that the explorer has deployed his forces in the best possible fashion. This can still lead to the party's defeat if facing overwhelming force, superior technology, or a cleverer opponent. For example, a perfectly-laid ambush for a truck caravan can still be foiled by the existance of an unseen patrolling air-car.

THEOLOGY (R)

Knowledge (00%)

A theologist usually believes in supernatural or semi-mystical influence over the mortal universe, and has systematized his thinking in regard to that, or else he may simply study others such beliefs. He may be a fervent believer in a particular religion or he might be a student of comparative religion who attempts to comprehend the many nominal belief systems normal to humans and other species. The belief could also be a social theory of social forces (such as Marxism), with no direct connection to the supernatural. A theologist is a scholar in any case, content to sit back and reason about his faith, though he might be a zealot or missionary. With this skill, an explorer can impart specific religious and moral instruction, and with judicious use of Debate and Orate an explorer can even gain converts. Special successes must be ordained by the gamemaster. The different branch skills cover different philosophical systems, such as Islamic-Judaeo-Christianity, Buddhist-Hinduism, or Jinxian Ethical Systems.

TRACK (S)

Perception (05%)

The Track skill represents the user's chance to follow for some distance the signs of the passage of persons, animals, or vehicles. The gamemaster must vary an explorer's chance to successfully Track with weather, time, available light, and tracking surface. Fresh tracks in the snow may be impossible to lose; fresh tracks across concrete may be impossible to find. A character possessing the Scent skill can use both Track and Scent to try to follow an object. For each day of time after the tracks were made, subtract 20% from the chance of successfully Tracking. With a special success, or at the gamemaster's option, the user may be able to divine facts about those being tracked, such as their numbers or intentions. The gamemaster must decide how many Track rolls are called for in a given situation. A special success with a Track will allow the user to pick up the trail at a spot where he would normally have lost it, such as on the far side of an intervening obstacle like a river or hard surface, or to automatically succeed on the next tracking roll which would normally be required of him.

UNARMED COMBAT (S)

Agility (00%)

Unarmed combat involves fighting hand-to-hand using no weapons other than the body. There are many schools, all with colorful names, and there are versions of this skill available to Kzinti and other species, though these are impossible for a human to perform properly. In Human Space, this skill is taught

to police, soldiers, and hobbyists. Normally, an explorer with more than 10% skill in Unarmed Combat must register with local authorities.

When using Unarmed Combat, the explorer's player must roll a successful attack with Fist or Kick; if the result is also less than the explorer's Unarmed Combat, then the explorer doubles the rolled damage for that attack.

With this skill, an explorer can also parry hand-to-hand attacks. By making a successful parry roll which is equal to or less than the explorer's Unarmed Combat, the user's fist blocks 6 points of damage and the fist sustains no damage in parrying. Damage in excess of 6 points still applies, and the hit location must be rolled for normally.

A special success means that the target was hit very well,and the player may either choose the hit location in which the blow falls, or he may double the damage done at his option.

VARIABLE SWORD/
FLASHLIGHT LASER (R)
Agility (15%)
These dissimilar weapons are employed similarly: each is wand-like, and ordinarily swung in a gentle motion which meets no resistance, and the number of available targets is not an important concern, since the user is not limited to a point. No other Known Space personal weapons are both ranged and offer a significant simultaneous arc of fire. A special success roll concerning these weapons allows the player to choose a particular hit location of effect for one victim, or to do double damage to a random hit location. The Flashlight Laser branch skill is extremely uncommon in Known Space, and a character should have an extremely good reason to obtain this skill in his previous experience.

Though the various weapons included in this category are all considered to be hand-to-hand, a user's damage bonus, if any, is not added to the damage done by them.

WEAPONS SYSTEM (R)
Technical (00%)
Holders of this skill can maintain, repair, acquire targets for, and fire weapons systems of large size. Sophisticated weapons of smaller size are hand-guns, heavy weapons, variable swords, etc. All ship-mounted weapons are in this skill category. Each type of weapons system is a branch skill — laser cannon and guided missile are the two most important branches. A special success with this skill means that damage was done to the exact place desired. This sort of weapon is usually electronically aimed, so this skill includes little aiming function. Often, weapons systems require more than a single operator, each of whom must use this skill to properly operate the device.

ZOOLOGY (R)
Knowledge (00%)
Using Zoology, an explorer can understand the ecology, functions, motives, metabolism, and life cycles of animal populations and individual animals. This skill also represents a human explorer's chance of recognizing the species and origin of any animal originally from Human Space. Branch skills might include the specialized study of particular orders or phyla, of the creatures of particular planets, or of the analytical zoology especially useful to explorers. Major branches include parasitology, protozoology, herpetology, ecology, predator-preyinterrelationships,and many more. A special success indicates that the user has been able to deduce important creature motivations, habits, or exotic or useful capabilities.

GAME SYSTEM

The game system is the invisible thread from which hangs the roleplaying game's universe and all that occurs within it. Later chapters may elaborate upon rules presented here, but the procedures used in the *Ringworld* game will be clear to any player familiar with this chapter.

An explorer can never understand his universe as clearly as a player can understand these rules. The explorer understands as general tendencies most of what the player knows to be specific values or ranges, from the tables and instructions. An explorer might justly exclaim, "A flashlight-laser is a tanj'd useful tool!" But he will never read a rules description of the flashlight-laser, nor know its exact damage capabilities for each of it ten settings. As a player, allow each of your explorers his or her own perceptions. Do not be eager to guide them into situations unreal to their personalities merely because the game system may award a numerical advantage.

Increasing Skills Percentages
Once in play, an explorer can permanently improve his skills percentages through experience, training, and research. It is sometimes possible to raise a skill percentage temporarily by using a device or drug.

Skills Increases: Experience
A player attempts skill rolls for his explorers throughout an adventure. When such rolls succeed, the gamemaster judges whether or not the situations were important enough to warrant an experience check. At the end of the adventure, the player may attempt an experience roll for each experience check he has received. The gamemaster determines the official end of each adventure. The improvement in the skill always will be 1 D6 percentiles.

An experience check for a particular skill is made only once per adventure, no matter how many times the skill is successfully used. To indicate a check, simply place a mark in the small box by the appropriate skill. Some skills lack such a box, and these skills cannot be increased by experience, only through training or research. If a root skill cannot be improved by experience, neither may its branch skills. The outcome of an action or situation cannot remove an experience check; if an adventurer successfully Hides, for instance, even if he is later found with a Search roll, his player still may check Hide on his explorer sheet. All experience checks must be warranted by the gamemaster. Experience may be granted either through real experience or by means of the simweb machine further described in the technology book.

Experience Roll Procedure
Each player rolls 1D100 for each skill for which his explorer received an experience check during the adventure. There are two ways to roll for experience. Use the one which better benefits your explorer, but state the method being used before you make the roll. (1) If the D100 result is greater than the number of percentiles presently in the explorer's skill, the roll succeeds. (2) Or, if the D100 roll is equal to or less than your explorer's INT in percentiles, the roll succeeds.

Use method 1 until your skill reaches 100 minus your explorer's INT in percentiles; method 2 is obviously best after that. The explorer's chance to learn narrows as he comes to know more; native intelligence determines how quickly an expert learns.

Increasing Skills Beyond 100%
Experience can increase skills percentages to beyond 100%. To increase beyond 100%, the D100 roll must be below the explorer's INT as a percentage, as discussed just above. The main benefit for surpassing 100% is the increased chances for a special success, but surpassing 100% in certain skills, particularly combat skills, can be invaluable, as becomes apparent later in this chapter.

Skills Increases: Training
Explorer skills can be improved by training; instruction from computer simulators, training programs, library files, as well as living entities; some of the former are sufficiently advanced to enable explorers to engage in solitary training. All these sources are hereafter referred to as teachers. Any teacher can train an explorer in a limited number of skills. The training of an explorer to high percentages costs considerable time and money, and requires good teachers.

Teachers and Subjects
A teacher cannot teach a skill unless his own ability therein is above his root skill maximum for that skills category. A teacher can train a student up to his own percentage of skill, but no further. If teaching a particular branch, the education first raises the pupil's root skill, then continues in that particular branch. A teacher must always stay with his student(s) during the training time, and none of the time devoted to training can be used for any other purpose. The cost for teaching a skill must be dealt with on a case-by-case basis, but human instruction is necessarily expensive, since the highly-skilled human teacher must always be present. All skills can be taught, but a particular teacher will only be able to teach certain skills.

Procedure for Training
An explorer can train at any rate he chooses, but not for more than 1 2 hours per day (unless using a sleepset or other such device — see the technology book for capabilities). For each 60 hours of training in a particular skill, an explorer gains 1 percentile in that skill. An explorer need not complete training within any particular amount of time: he could train one hour per day for 60 days, ten hours a day for six days, or any other schedule, still

receiving his percentile after completing 60 hours of training in one skill.

Training costs pay only for training; during a learning experience, the student still must pay normal support costs for himself.

Maximum Trained Percentage

Training can improve no skill beyond 100%. After an explorer has reached or exceeded 100% in a skill, he may further raise his skill percentage only by experience or research.

Skills Increases: the Simweb

Besides the fantasy adventures for which the simweb is justifiably famous, the simweb is a practical training method useful for skills which have experience check boxes next to them on the explorer sheet.

The simweb computer subsystem must be programmed for the skills that will be tested. An explorer must remain within the simweb for one hour per percentile that he or she already possesses in the skill being trained. At the end of that time the explorer's player must attempt a D100 roll equal to or less than his or her explorer's skill. If successful, the symweb gently stimulates the pleasure center of the users brain, pleasantly awaking him or her. That explorer qualifies for an experience check next to the trained-for skill only. Explorers receive no no incidental experience checks. The experience-roll skill increase at the conclusion of the simweb session is for 1 D3 percentiles.

If the skill-roll is unsuccessful, then the sensors provide no pleasurable reward. The explorer learned nothing from that session and he or she awakes feeling rather tired, ready for a real night's rest.

If the skill-roll is a special failure and the session concerned weapons or other potentially dangerous training, then the explorer has suffered a simweb death, and will suddenly awake to a feeling of severe disorientation. See the simweb description in the technology book for more complete information.

Several skills can be trained at once, but the total number of hours required for the full experience accumulates for each skill. An explorer's player must make a skill-roll for each tested skill.

Applicable skills can be trained to 100% in a simweb, but no further. A simweb user with 100 or more percentiles in the training skill finds the simweb experience hollow just at times when his exceptional skill would be useful during play; there is no doubt to him that he knows more than the machine.

Characteristics cannot be increased through simweb use. Nor can latent psionic abilities be triggered through simweb use, for the brain somewhere knows that the simweb laser blast will not truly kill the body, even though it has agreed to pretend that it will.

Skills Increases: Research

Research is the most complex way to increase skills percentages. It is the only way to increase most knowledge and some communication skills past the 100% level, and the only way to increase xenologically-qualified skills past the general species limits set forth in the skills chapter.

Increasing explorer skills percentages through research requires input from the gamemaster. It is also the method which the gamemaster most often will find useful in generating or rationalizing scenarios during a campaign.

Research can also be used to find out specific useful facts , such as how to operate a cziltang brone, or where to find deposits of longevity drug.

The gamemaster must keep careful track of each explorer's research track, must map the path which the research takes, and must decide whether a line of research has any possibility of success.

A player proposing a research project must tell the gamemaster the goal which his explorer seeks before research can begin. The goal must be stated in a simple sentence. A player could not state, "Raja's goal is to learn all the secrets of scrith and how to get rich from them." He could say, however, "He wishes to discern the atomic structure of scrith." The gamemaster should assess explorer goals for specificity of purpose, intrinsic validity, the explorer's ability to achieve the goal, and the goal's objective difficulty. The gamemaster may wish to influence the campaign by suggesting certain research goals.

When a research project is begun, the gamemaster should understand which skills the explorer must use to complete the project evolves; the usefulness of other skills may become apparent. During the course of the research, skill rolls will need to be made for these active skills.

Steps and Transitions

First, the gamemaster, in conjunction with the player, must decide how many steps a project will take to reach completion. Each step must be completed to finish the entire project.

Completion of a step requires a successful skill roll, representing the transition from one step to the next. The more ambitious the project, the more steps there will be, and possibly the longer each step will take to complete. To increase the power capacity of a store-bought stunner might take only two steps, while inventing a matter-transmuter may take a thousand steps, or never succeed.

Types of Research

Normally, a research step consists of one kind of research. A project may require all types of research, possibly in a particular order. The four approaches are called armchair, field, laboratory, and library. Different types of research take different periods of time to complete.

After the number of steps have been determined, the gamemaster chooses the types of research necessary and their order of completion. For a four-step project, for instance, a gamemaster might decide that the explorer must first engage in library research, then use armchair research to form a theory, and then successfully complete two different laboratory experiments.

Armchair Research: the formulation of new theories, corollaries, or applications to existing knowledge, technique, or theory. No space is required for this type of theoretical research. The nominal time spent in a step of armchair research is 200 hours. Presence of a computer should lower the minimum time needed by 10-30%. The gamemaster should tailor the actual time spent to the situation.

Field Research: through field observations and collections, explorers gain new data for experiment and analysis. There should be a unit of field research in almost every project, thereby tying research directly into play. The amount of time needed to complete a unit of field research varies, because it is based upon occurrences during play. If the field research step is not important for purposes of play, and covers simple observations or procedures, allot 200 hours to this step. If the research involves biological or cultural systems, allot up to 600 hours. Computers and memory bubbles will not help in field research, but assistants will lower the time requirement by some reasonable amount (say, 10-20%), unless the inquiry involves living systems which change over time. Remember that the explorer has to devote time to his project; hours spent swapping stories with his compatriots or investigating an interesting nearby cave should not apply (unless the explorer is researching speleology).

Laboratory Research: chemists, physicists, and biologists spend the most time in the lab, conducting controlled experiments and discussing results. The presence of assistants, proper equipment, adequate research time, computers, and adequate memory bubbles all should shorten the time necessary to finish a step. The normal amount of time needed for *a* lab experiment is 200 hours, but often it may take many months. A relatively simple analysis of inert materials may take only a few hours of lab time.

Library Research: much may already be known about a particular topic. It is even plausible that an explorer may simply want to find out about something long since discovered and exhaustively researched by other students. The library research helps one to learn by others' errors and start from where they left off. Some skills, such as history, are almost entirely based on this type of research. Memory bubbles hold extensive libraries within small volumes of space; with them and a computer one can do library research. The gamemaster must ascertain that the explorers have the proper memory cubes for the subject under study. Assistants or elaborate facilities will not much lessen the time needed for library research, while lack of the proper materials will generally completely prevent this type of research, rather than merely making it lengthier. Normally, the time needed is 100 hours per step, but if a great deal of subtle cross-referencing is needed, or if enormous amounts of information are available and must be winnowed, an elaborate project could take thousands of hours.

Skill Increase Through Research

During the course of a research project, the explorer's player must make one or more skill rolls. His explorer gains normal experience rolls for each successful skill roll. For example, if an explorer received four successful Physics/Crystallography skill rolls during research on the crystal form of scrith, the *player* could attempt four experience increase rolls.

In addition, an explorer may receive a new branch skill through the use of research.

Cumulative Example

Sharki wishes to learn the secrets of the Muck Ogre life cycle. She currently knows that the Muck Ogres are large, seemingly asexual beings that live in swamps. The gamemaster feels that Sharki could achieve her goal, and agrees to the research, finally assigning the research four steps.

He decides that Sharki's active skill will be Zoology with a Ringworld qualifier to eventually form a Muck Ogre branch skill. He feels that her first priority should be to systematically observe Muck Ogres and their

habitat, and to obtain a live specimen. He assigns one step of field research to the observations, with a time requirement of 600 hours. The second step, obtaining a specimen, is also field research. He thinks that trapping a Muck Ogre and hauling it into the lab would make an interesting adventure for all of the explorers.

The gamemaster states that the third step should be around 250 hours of lab experimentation and analysis, which will adequately expose any remaining secrets of Muck Ogre structure and behavior. If Sharki can establish good relations with the creature she has kidnaped, this portion of her research will be greatly speeded. Assuming that everything has proceeded according to plan, Sharki's final step will be 120 hours of armchair research which culminates in a short scientific report covering everything included in the description for Muck Ogres in the creatures book. On a special success, the gamemaster might rule that the monograph is a classic, and that her peers become very respectful.

Sharki's Muck Ogre Research Project

(1j Complete field observations in about 600 hours; confirm observations with successful Zoology roll.

(2) Capture Muck Ogre and bring to lab; resolve during actual play session.

(3) Complete lab experimentation and analysis in about 250 hours; confirm data with Biology skill roll.

(4) In about 120 hours, digest and communicate information about Muck Ogres; confirm armchair research with Zoology skill roll.

At the end of her successful project, Sharki will get two experience increase rolls for her Zoology skill, and one for her Biology skill. If she had already surpassed her root skill maximum, the skill increases would be in Zoology/Ringworld and in Biology/Ringworld. In addition, the gamemaster rules that through her sterling efforts, she gains the skill of Zoology/Muck Ogre at a level of one percent higher than her Zoology root skill maximum.

RESEARCH TRACK FORM

Goal: . . . . . .

Active Skills: . . . . . .

Player: . . . . . Minimum Number of Researchers: . . . . . .

Research Leader: . . . . . Other Researchers: . . . . . .

Number of Steps: . . . . . Number Completed: . . . . . .

RESEARCH MAP

Step	Type of Research	Hours Required

Progress Reports

For each unit at which a successful skill roll is made, the gamemaster should give a brief progress report, perhaps as succinct as "You need a live specimen."

Research Time

An explorer can spend no more than 10 hours a day doing research. An explorer who performs research must have at least two hours in which to perform research. It is impossible to do 20 minutes here, and 30 minutes there: time committed to research must be of some appreciable amount.

Group Efforts: Research Assistants

More than one explorer can work on a particular research project, and the gamemaster should decide the maximum number of explorers who can work on a particular project, or on a particular step of a project — lab space, for instance, may be limited.

At the end of each step, players may make a skill roll for each explorer working on the project. If anyone succeeds in the needed skill roll, that step is considered to be a success, and the project can go forward. If anyone succeeded in making a special success, then the research time may be sped up, or the results better than anticipated. Since everyone working on the project can try the skill roll, and thus have a chance at a special success, not only is project time decreased, but there is a much better chance of overall success.

However, if anyone in the project receives a special failure, then that failure also applies to the project as a whole, possibly setting the researchers back a step, bungling the experiment, or otherwise hampering progress. Thus, it is generally counterproductive to have large quantities of unskilled workers participating in a research project. In the example with Sharki and the Muck Ogres, for instance, a special failure received during the third step could result in the captive Muck Ogre's death through some blunder during an experiment. This would force Sharki to go back and catch another Muck Ogre, greatly hindering her research progress.

Ambitious research projects may require a minimum number of researchers. If this is the case, inform the players and give a reasonable estimate of the number needed. Sometimes this will be obvious (Sharki would have trouble in trying to catch a Muck Ogre all alone). A project's step might, for instance, require two simultaneous special successes for the step to proceed, due to its extreme difficulty. Additional researchers may come from any source; obviously, those with occupational experience as technicians or scientists will be better assistants than others. Incompetent assistants might be better than none, or they might ruin the entire project. The gamemaster may decide that everyone in the project must have a specific minimum percentage of ability in the active skill or skills.

Changing Projects

An explorer may drop or alternate research projects. If an explorer leaves a project to return, he must spend some time becoming re-acclimated to his former project. As a rule of thumb, for every day an explorer spends concentrating upon another research project, or on adventures not associated with the research being performed, he must spend an hour becoming re-acquainted with his old project.

In any case, the maximum amount of time spent to re-familiarize an explorer with a project will never be greater than half the time the explorer has already spent on the project. Also, no skill rolls will be required.

Laboratories.

Labs are rated for the number of researchers and projects they can handle, and for the particular skills for which they are equipped. Labs are available 20 hours a day. The rest of the day, they must sit idle, being cleaned, restocked, or undergoing other support activity.

Purchasing a basic lab costs 20,000 Stars, plus 10,000 Stars per project that can be performed there simultaneously, plus 5000 Stars per researcher the lab can hold at a time, plus 2000 Stars per root or single skill which can be used there. Labs are considered to be equippedforxenologically-qualifiedbranch skills.

The standard lab can accommodate a maximum of four projects and eight researchers over a day, or two projects and four researchers in any one ten-hour shift. It is equipped for problems in chemistry, physics, and biology. This standard lab is the typical shipboard model.

Changing Human Characteristics

Some characteristics can be permanently increased. It is not possible to increase a characteristic using experience or research, though it is possible to learn *how* to increase a characteristic through research.

STR can be increased if it is lower than either the explorer's CON or MAS. If it is the highest of the three, or tied for the highest, it may not be increased at all.

CON may be increased if it is lower than either STR or MAS. If it is the highest of the three characteristics, it may not be increased.

During explorer generation (only), MAS can be increased by sacrificing one point of CON per point of MAS increase and one point of STR every third point of increased MAS, simulating explorer obesity. MAS could also be lost during generation, to a minimum of the explorer's STR; if STR already is greater than or equal to MAS, no MAS may be lost.

INT, POW, and DEX cannot be permanently increased except through transformation into a Protector.

Resistance Table

passive factor \ active factor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	50	55	60	65	70	75	80	85	90	95	95	95	95	95	95	95	95	95	95	95	00
2	45	50	55	60	65	70	75	80	85	90	95	95	95	95	95	95	95	95	95	95	95
3	40	45	50	55	60	65	70	75	80	85	90	95	95	95	95	95	95	95	95	95	95
4	35	40	45	50	55	60	65	70	75	80	85	90	95	95	95	95	95	95	95	95	95
5	30	35	40	45	50	55	60	65	70	75	80	85	90	95	95	95	95	95	95	95	95
6	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	95	95	95	95	95	95
7	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	95	95	95	95	95
8	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	95	95	95	95
9	10	14	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	95	95	95
10	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	95	95
11	05	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	95
12	05	05	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
13	05	05	05	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
14	05	05	05	05	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
15	05	05	05	05	05	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
16	05	05	05	05	05	05	05	10	15	20	25	30	35	40	45	50	55	60	65	70	75
17	05	05	05	05	05	05	05	05	10	15	20	25	30	35	40	45	50	55	60	65	70
18	05	05	05	05	05	05	05	05	05	10	15	20	25	30	35	40	45	50	55	60	65
19	05	05	05	05	05	05	05	05	05	05	10	15	20	25	30	35	40	45	50	55	60
20	05	05	05	05	05	05	05	05	05	05	05	10	15	20	25	30	35	40	45	50	55
21	01	05	05	05	05	05	05	05	05	05	05	05	10	15	20	25	30	35	40	45	50

For success, roll equal to or less than the indicated number.

APP can be temporarily trained up for a maximum of +2 points. Once raised, APP must be supported by spending the yearly cash equivalent of 2000 Stars per point of increase for better diet, finer clothing, comportment studies, fashionable surroundings, and so on. Unless the cash is spent (and there is somewhere to spend it), the explorer's APP returns to its original value. Pencil in the raise as present APP+1 or +2 on the explorer sheet. APP can be decreased (as can most characteristics) by disease, aging, battle scars, etc., on a case-by-case basis.

EDU can be permanently increased if the explorer returns to his or her studies, at a rate of 1 point of EDU per year at a good institution. During this year, the explorer must not come into play, and at the end of the year, he will receive normal Education occupation points to distribute.

When the gamemaster allows it, an explorer may attempt to train up his or her characteristics. This takes a number of training hours equal to the explorer's current characteristic x25. At the end of the training period, roll 1 D3 -1 and add the result (which may be 0) to the current value of the characteristic.

Explorers cannot train up characteristics on a simweb. They must find a teacher or a device specially designed for increasing a particular characteristic.

The Resistance Table

Generally, the resistance table is used when pitting one characteristic against another, such as an explorer's STR to lift against the MAS of an object, or an explorer's STR against the STR of a door he or she wants to force open. The resistance table is not used for skill rolls.

Procedure

To use the resistance table, distinguish the active factor and the passive factor. The active factor is that characteristic attempting to alter, influence, or overcome the other (passive) factor.

For example: an explorer wants to use his STR to lift a stone, which resists with its MAS. The explorer's STR of 1 8 is the active element; the stone's MAS of 12 is the passive element. Using the resistance table above, the active factor column of 1 8 intersects with the passive line of 12 at the number 80. On a player roll of 01-80, his explorer lifts the stone; on a player roll of 81-00, the stone stays on the ground — perhaps the explorer used a bad lifting strategy, the stone was slippery, or whatever else is suggested by the situation.

If the amounts of the two characteristics are equal, there is a 50% chance of success. For every characteristic point that the active factor exceeds the passive factor, there is a 5 percentiles higher chance that the active factor prevails; for every characteristic point that the active is less than the passive factor, there is a 5 percentiles more chance that the active factor fails.

Percent Chance of Success =
50 + (active x5) - (passive x5)

Normally, it is unnecessary to calculate the problem. The provided handy table shows all the most likely relationships.

Common situations include STR against STR to open a stuck door, bend a metal bar, wrestle a Kzin, etc., STR against MAS to move a heavy object, and CON against the potency of a poison.

Time, Movement, & Game Intervals

Time Units

Hours and minutes are UNS (United Nations Standard) intervals, unless otherwise noted. The UNS hour is made up of 60 UNS minutes, and each minute is made up of 60 UNS seconds. The units represent intervals identical to those commonly used on Earth in the 20th century.

The UNS day is 24 UNS hours long; the Ringworld day is 30 UNS hours long. All days are Ringworld days, unless otherwise noted, or unless the explorers are far enough away from Ringworld that using UNS days is more reasonable. Despite the inequities involved, it is strongly recommended that the two days be accepted as exactly equivalent whenever game effects are stated in days. All decisions in such matters are the province of the gamemaster.

Of the 30 Ringworld hours, exactly 21 are daylight, and 7.5 hours are night. The remaining time consists of two 45-minute twilight periods at dawn and dusk.

Movement Rates

Movement rates are determined individually by the speed of each creature or vehicle, usually by kilometers per UNS hour for long distances, and by meters per impulse for short distances; the term "impulse" will be explained in the next section. Human normal movement is 3 meters per impulse (10 kilometers per UNS hour); humans can sprint for relatively short distances up to 6 meters per impulse.

All vehiclular speeds are given in kilometers per UNS hour (km/h) and in meters per impulse (m/im). One km/h equals .28 m/im.

The Action Sequence

The action sequence orders and regulates the sequence of events within short intervals of game time. Use the action sequence in situations when time is important, such as combat, specific movement, and races to the food-processor.

The action sequence always begins at impulse 1, and then increases by single impulses (1, 2, 3, 4, etc.) until the events which prompted the count are completed, and no new ones have been started.

Impulses and Major/Minor Actions

The impulse is the basic unit of the action sequence. Each impulse represents approximately one UNS second of game time. Minor actions, such as the firing of a ranged weapon, take one impulse to perform. Performing major actions takes a number of impulses determined by the individual explorer's DEX; see the Action Ranking Table.

Major and minor actions are distinguished solely by the amount of time they take to complete. Major actions include drawing or putting away a weapon, aiming a ranged weapon, attacking with a melee weapon, getting up after being knocked down, using a perception skill, and employing the Unarmed Combat skill. Three important minor actions are: firing a ranged weapon, falling, and rising from a kneeling position to a standing or running position.

An explorer initiating a major action on the current impulse completes that major action in a number of impulses equal to that explorer's action ranking. The accompanying impulse record sheet offers a way to check off the total number of impulses as they are called out. At any break in the action, the gamemaster should restart the action sequence at impulse 1.

The gamemaster may find it convenient to call a break in the action every 10-20 impulses in order to be sure that all pertinent elements

Impulse Record Form

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

If more than 100 impulses are needed, start again at 1.

are clear in his or her mind. Such breaks have no game significance.

Action Ranking

Every explorer has an action ranking derived from his or her Dexterity characteristic: the action ranking is that number of impulses quired to elapse before an undertaken major action can be completed — this is a number between 6 and 3 for normal humans. The major action ranking changes only if the explorer's DEX changes.

Action Ranking Table

DEX	*action ranking*
1-4	7
5-8	6
9-12	5
13-16	4
17-20	3
21-24	2
25+	1

Statement of Intent

A statement of intent is a declaration of what an explorer or other character will do during an impulse. The statement only can concern one or two actions (such as running, or running-and-firing) and must be easily understood by the gamemaster and the other players. The gamemaster always makes his statements of intent first in the impulse, giving the players some chance to react. The players make their declaration in any regular order around the table.

Only statements of intent can free explorers to act. They must be made at the start of the impulse during which the action is to start. If an explorer wants to change his action before he has completed his present action, the player must say so, and restart the action ranking from that new impulse.

It is up to the player to remind the gamemaster that it is time for his explorer's major action to be completed: total the current impulse plus the action ranking of your explorer and write that number in the workspace in the spot marked "impulse of completion," then mark out that amount when the action has occurred.

Example: Ingrid Umlaut has a DEX of 13, making her action ranking 4. Starting on impulse 1 of the action sequence, she begins drawing her hand laser; at the end of impulse 4 her weapon is drawn. She then starts to aim it, another major action, on impulse 5; at the end of impulse 8 she has a target and is ready to fire. Firing is a minor action, taking 1 impulse and happening and taking effect during the same impulse as the statement of intent; on impulse 9 she fires and hits. The target does not go down, but since she is still aiming at it until her player says otherwise, she can fire again on the following impulse (10). This time the target falls.

On impulse 11 of the sequence her player states that she is turning around to look behind her, which the gamemaster sensibly interprets to mean that Ingrid no longer is aiming at her original target. On impulse 12, the gamemaster announces that her original target is back on his feet and charging her. Ingrid curses, and her player states on impulse 12 that she is re-acquiring her original target. At the end of impulse 15, she once more has the fellow in her sights. On impulse 16, she fires and hits, and this time the target doesn't rise.

Impulse Order

If two or more characters act on the same impulse, the one with the higher DEX acts first If the DEXs are identical, then the effects of the actions are considered to be simultaneous.

Human Speed

During the action sequence, humans normally walk or trot at not more than 3 meters per impulse. While moving at such speeds, it is possible for humans to perform one other action as well. All humans can run at up to double normal speed (6 meters per impulse), but cannot commit any other action while moving faster than 3 meters. Lacking the Athletics/Run skill, humans can run for their CON in minutes, then must slow to a maximum of 3 meters an impulse. If a particular explorer has a disproportionately-large MAS, the gamemaster may further restrict that explorer's ability to run.

Encumbrance

A normal human in normal gravity can carry his or her STR in kilograms without penalty. Each additional ten kilograms or fraction thereof adds one to the encumbered explorer's action ranking (this does not change the time needed for minor actions, of course). Carrying weight in excess of his STR limit also reduces the explorer's normal speed to 2m/im and his running speed to 4m/im.

In light or heavy gravity, multiply the MAS of the items carried by the gravity value.

No rules specifically govern the maximum MAS which an explorer can carry, but players are urged to use discretion. As a rule of thumb, explorers should not carry extra MAS totalling more than half their body MAS for any extended length of time.

Cumulative Example: Dr. Uwe Freiberg is being chased by angry Ringworld natives who have among them one automated laser rifle which fires once every three impulses. Dr. Freiberg must run 28 meters to the safety of his ship. Dr. Freiberg, like all normal humans lacking the Athletics/Run skill, runs full-tilt at 6m/im unencumbered, but unfortunately he is lugging a stolen idol of Zeebdlieebdli from the natives' temple. The idol weighs 18kg, 4 over Dr. Freiberg's STR. He is therefore running at 4m/im, his fastest possible speed thus encumbered.

The gamemaster begins the chase at impulse 1. The doctor can run 12 meters before the laser fires on impulse 3. The laser fires and misses. Dr. Freiberg runs an additional 4 meters; it is now the end of impulse 4.

At the start of impulse 5, the gamemaster says that the natives continue to pursue and fire. Dr. Freiberg's player says that the doctor continues to run. Since the ground is getting rough, the gamemaster asks the doctor's player to attempt a dodge roll for the doctor. The player misses, and the gamemaster rules that the doctor gets his foot caught in some roots and falls to the ground during impulse 5. Since he took no damage. Dr. Freiberg needs to spend only impulse 6 getting to his feet. The laser fire on impulse 6 just misses the doctor.

Dr. Freiberg resumes running on impulse 7. The player declares that Dr. Freiberg will drop the precious idol before starting to run, an activity which costs no impulses; unencumbered, the doctor's running speed improves to 6 m/im. On impulse 8, Uwe Freiberg reaches the door of the spaceship, which he carefully locked that morning. The gamemaster rules that the time Freiberg spends fumbling with the comb/nation is a major action; since Freiberg's action ranking is 4, it will take him from impulse 9 to impulse 12 to open the door. On impulse 9, the automated laser, now trained against a stationary target, hits Freiberg in the leg, and he collapses. The triumphant natives carry off both their idol and the notorious Dr. Freiberg.

Combat

Brute force and violent threats are as effective on Ringworld as anywhere in the universe but, to be effective, such policy demands thinkers behind the scenes who are never physically threatened, and doers before the guns who are content to die like flies. In the *Ringworld* game, most explorer thinkers and explorer doers are one and the same; that makes everyone vulnerable to laser fire, stunners, rocks, missiles, arrows, or whatever else the opposition throws. Explorers who lead violent lives probably will die after a few adventures, regardless of medical support; explorers who tailor their behaviors to fit the

situation can expect brushes with death, but are somewhat more likely to survive and return to wealth and fame in Known Space.

It is the general expectation of this game that subtle negotiation and good faith are usually the best ways to achieve the goals of explorers. Combat should be rare, but it is likely to remain necessary at times.

Combat Skills

Any skill used in an attempt to damage or overcome the hit points or characteristics of a target is a combat skill. *Ringworld* combat skills are not differentiated from other skills and are listed on the explorer sheet under several skills categories: Archaic Melee Weapons, Archaic Ranged Weapons, Unarmed Combat, and Variable Sword/Flashlight Laser are all included under the agility skills category; with Energy Handgun, Projectile Handgun, Energy Heavy Weapon, and Projectile Heavy Weapon under the perception skills category; and with Reaction Drive and Weapons System under the technical skills category. Other skills could become combat skills in particular situations (such as using Biology to develop destructive viruses). Finally, psionics abilities can have combat potential once activated, though this is discussed in the gamemaster's book.

Using Combat Skills

To use a combat skill, an explorer's player must state the intended target and the weapon being used. The statement occurs on the first impulse of the explorer's action ranking; then, at the final impulse of the explorer's action ranking, the player must roll D100 to determine whether the explorer successfully used the skill. If the roll succeeds, the explorer has inflicted damage on the target. All weapons do a particular type and amount of damage, as given in the weapons section. A success with a combat skill is commonly called a hit. Resolve combat using the action sequence.

Aiming Ranged Weapons

Good aim takes time. To fire any ranged weapon at full skill percentage at a new target, an explorer must spend an entire action ranking aiming and an additional impulse firing his weapon.

Primitive ranged weapons, such as bows, slings, and thrown spears, always require the firer's full action ranking to ready, aim, and fire, and to cross the distance to the target to take effect; snap shots cannot be made with primitive ranged weapons. Also, the next shot with such a weapon takes another major action to ready and release, unlike advanced weapons which, once aimed, can be fired again and again, taking only 1 impulse per shot.

Advanced personal weapons, such as firearms, lasers, and stunners, can be fired without taking time to aim, at a reduction in the percentage chance to hit. Explorers who snap off fire from completely unaimed weapons always fire at one-quarter of their skill percentages. Explorers using half of their action ranking to aim will fire at half of their skill percentages. This reduction is taken after any reductions or increases due to terrain, target size, etc., as decided by the gamemaster.

Firing at the same target more than once requires no aiming for advanced weapons if the target does not move more than 2 meters, and such fire can be made once per impulse.

Line of Sight for Ranged Weapons

It is not possible to aim and fire at an invisible target. The gamemaster always decides whether or not a particular shot is possible. By using miniature figures, line-of-sight problems become relatively easy to solve.

Melee Weapons

Melee weapons are weapons which are wielded directly by the user and can affect only beings or objects in direct contact with the weapon. In general they do damage by puncturing, slashing, or crushing. The range of a melee weapon is determined by its length, usually not more than a meter. It always takes a full action ranking to attack and hit with a melee weapon. An explorer's natural weapons such as fist and kick are considered to be melee weapons, and may even be quite effective if the explorer knows Unarmed Combat.

It may be possible for a target to parry a successful melee blow received. The player must declare that his explorer is parrying, and then successfully roll equal to or less than the explorer's percentage skill with the weapon or object with which he is parrying. If successful, then any damage is done to the weapon or shield instead of to the explorer. Any attempt to parry costs the parrying explorer one impulse.

The advanced melee weapons, the flashlight laser and variable sword, are major exceptions to this scheme. These weapons have much increased range, and the user can attack once per impulse by sweeping the beam or blade. The attack of the flashlight laser may be blocked by many surfaces, but only a stasis field or scrith can deflect the molecular blade of the variable sword, though some other materials can slow it.

Hit Locations

For every combat hit, a hit location roll is made, which determines where the victim must take the damage. This is done by rolling 1 D20 and consulting the chart below. If an explorer gets a special success with a ranged weapon, his player may be able to choose the location hit.

Human Hit Location Table

Melee Weapons

1D20	*location struck*
01-04	right leg
05-08	left leg
09-11	abdomen
12	chest
13-15	right arm
16-18	left arm
19-20	head

Ranged Weapons

1D20	*location struck*
01-03	right leg
04-06	left leg
07-10	abdomen
11-15	chest
16-17	right arm
18-19	left arm
20	head

Non-humans may have hit location distributions different than humans. Such hit location tables are shown in the creatures book.

Aiming at a Specific Location

An explorer can try to hit a target in a specific location by increasing the time spent aiming. For every impulse delayed beyond the explorer's action ranking, the player can adjust the actual hit location rolled by 1 after any successful shot. The player who wants his explorer to aim at a specific location must state in advanced that he or she is doing so, and the explorer must be able to see the location at which he or she is aiming for the entire time spent aiming. In any case, the hit location roll may not be modified by more than the explorer's DEX.

Range

Weapons in *Ringworld vary* in range. Four ranged classes of effect are possible. Every ranged weapon is rated for metric distances to which the range classes apply. Ranges vary; it is possible that the actual distance of one weapon's short range may roughly correspond to that for the long range of another.

Distance Modifiers for Ranged Weapons

range	*effect*
point-blank	half-again chance to hit
short range	normal chances to hit
medium range	half normal chances to hit
long range	one-fourth normal chances to hit

Point-blank range is the same for all ranged weapons: that number of meters equal to or less than the explorer's DEX. Firing point-blank at an unmoving target automatically hits and does maximum damage.

Moving and Aiming Simultaneously

An explorer may move at a rate of 3m or less per impulse and still be able to aim normally without penalty at short ranged or point-blank targets, or at very large medium- or long-ranged targets.

If a moving explorer attempts to fire at a medium- or long-range target that is not of very large size (as determined by the gamemaster), then he must fire on the move at half normal percentage if he aims while moving, and one-fourth normal percentage if he does not bother to aim.

Firing Weapons

Most non-automatic Known Space weapons, especially stunners and lasers, can be fired once per impulse. The rate of fire for each weapon is listed with the weapon description. Some rates of fire for automatic weapons are measured in bursts of 1-impulse duration. Regardless of a weapon's rate of fire, an explorer must select a single target per impulse ; it is up to the gamemaster to rule as to whether or not adjacent potential targets were hit.

Firing at Moving Targets

A moving target is any target traveling faster than 2 meters per impulse. An explorer's percentage chance to hit with a particular weapon is unaffected if the target moves directly toward or away from the firer. If the target moves at an angle from the firer, his chances to hit are halved. By taking an extra impulse to aim each shot, the explorer is usually able to fire at full percentage at a moving target, but this modifier can be adjusted by the gamemaster to fit specific conditions.

Firing at Protected Targets
The chance to hit a target behind protection is the same as that to hit an unprotected target. But if the hit location rolled is one of those which were behind the protection, then the weapon fire hits the protection instead of the target. If the weapon is powerful enough to pierce the protection, the excess damage still hits the target.

Example: Fred Head fires his laser at a City Builder who is behind a hullmetal wall covering her legs and abdomen. He hits his target. Fred's player rolls hit location 6, indicating Fred hit her left leg. Unfortunately, laser fire cannot penetrate hullmetal, so Fred fails to harm the City Builder.

Target of Opportunity
An explorer can, if he is doing nothing else, declare that he is waiting for a target of opportunity. One action ranking after the explorer has declared target of opportunity, he can fire at full percentage at any target appearing during the remainder of the action sequence. The target must be within a 90-degree arc centered on the front of the explorer's face. An explorer can declare that he is seeking a target of opportunity at any of his action rankings.

Once an explorer has aimed at or aimed at and fired at a target, he must again declare target of opportunity to regain the benefits of it. Puppeteers can declare target of opportunity for two 90-degree ranges, and can always keep up target of opportunity for one 90-degree range even while moving at normal speeds. Explorers of other species may not declare that they are seeking targets of opportunity while moving faster than 1m per impulse.

Firing Into a Crowd
An explorer firing into a crowd of targets can fire at normal percentage without aiming, but if a target is hit, it must be chosen randomly. With a special success roll, the player may choose his target or choose a hit location on a random target. If an explorer aims at a specific member of a crowd, resolve the fire normally. If he misses, the shot might hit another member of the crowd, as judged by the gamemaster.

Firing in Darkness
Humans aiming or firing in poor light should have their percentages to hit reduced by an amount appropriate to the gamemaster. Simulate complete darkness by uniformly dropping chances for success to about 10%. Even brief bits of light, such as the flash of a laser, might give an explorer something to aim at, though his chances could be sorely reduced.

Changing Weapons
Changing one's weapons takes two action rankings; one to put away the original weapon and a second to draw the new one. If the new weapon was not on the explorer's body, the gamemaster decides if the change takes longer to perform. If the original weapon is dropped, changing weapons only takes one action ranking.

Multiple Attacks
Unless otherwise stated, creatures with multiple attacks may attack only once per impulse. Any exceptions to this rule will be noted in the individual creature descriptions.

Moving Vehicle Fire Table
Varying modifiers may be made when explorers aim and fire hand weapons from a moving vehicle.

	explorer activity	
speed of vehicle	*explorer firing*	*explorer firing and driving*
equal to or less than 3m/im	takes 1 action ranking to aim and fire; normal chance to hit	takes 2 action rankings to aim and fire; normal chance to hit
over 3m/im	takes 1 action ranking to aim and fire; half chance to hit	takes 2 action rankings to aim and fire; half chance to hit

Dodge
An explorer's normal chance to dodge is on the character sheet, and is equal to his DEX x3%. Dodge may be performed whenever an explorer can see and wishes to avoid a melee weapon attack. Ranged weapons cannot be dodged, but both variable sword and flashlight laser can be dodged if they can be seen.

A dodge takes one impulse, during which no other action can be performed, unless the explorer's skill with the second action is over 100%. Then he or she can dodge normally and attempt the second action at a penalty of 100 percentiles.

During a single impulse, an explorer can dodge only once, and dodge only one attack.

Successfully dodging a melee hit means that the attack missed. It takes a special success in a dodge to avoid a special success weapons hit. An explorer cannot parry and dodge both during a single impulse unless the explorer's parry percentage exceeds 100% and the explorer takes the normal 100 percentile penalty.

Surprise
An explorer who has been surprised cannot react for a following number of impulses equal to his action ranking. He then acts normally.

Gamemaster's Discretion
Since many actions may be summarized in a single statement, the gamemaster must establish the number of impulses and/or action rankings actually required for a particular activity. A good rule of thumb is to count verbs.

Example: Lynn blandly tells the gamemaster, "Myron will fire once more, then reload his .650 Magnum and look for targets of opportunity." The patient gamemaster patiently sighs at the three verbs present in the sentence but politely replies that firing Myron's antique weapon will take up the next impulse. If Myron then wants to reload, that will be a major action, requiring Myron's entire action ranking, plus an additional impulse for each bullet which Myron loads (he is not using a clip). If Myron then wants to look for targets of opportunity, that must be stated at the beginning of the first impulse after Myron has finished reloading. The gamemaster suggests to Lynn that he keep track of when these various actions take place, so that the gamemaster won't have to worry about it. "You know, if everyone tells me everything constantly, the game flow is broken," smiles the gamemaster, "Besides, don't tell me all your plans or I could rule that Myron must be shouting out his intentions to the rest of his group, and that the Kzinti over the hill can hear him — and move in." Taken aback, Lynn perceives both the value of succinct language and the implied threat, and mends his careless ways.

Modifiers to Combat
All modifiers are cumulative. Each consecutive percentage modifier affects previous modifications.

Example: Morale Officer Sharki is firing at long range; by definition she fires at one-quarter of her full percentage of 160%, or 40%. She chooses to aim for only half the impulses of her action ranking, which lowers her modified percentage by half again. Now she fires with a 20% chance; only on a roll of 01-20 will she hit her target.

Damage

Explorers and all other characters and creatures take damage by losing hit points. On the explorer sheet, record damage by marking off a number of hit points equal to the result of the damage roll.

Taking Damage
Damage comes from catastrophes — successful weapon attacks, vehicle crashes, asphyxiation, fire, and so on. Damage reduces the target's hit points. An explorer's hit points measure his physical stamina and ability to survive injury, wounds, exposure, etc. Therefore, record damage taken by subtracting the rolled amount of damage from the explorer's current hit points on a point-for-point basis — one point of damage per hit point lost.

Unless otherwise indicated, subtract the points of damage both from the explorer's general hit points and from his hit points in the hit location where the damage was taken. It is important to record all damage taken.

Zero does count as a place on the hit point continuum: an explorer at -1 hit points needs to be healed by 2 points to raise his current total hit points to +1.

Results of Damage
An explorer reduced to a quarter or less of his original general hit points is unconscious. There is a space marked for this score on the explorer sheet. Round all fractions up when figuring the unconsciousness level of an explorer. An explorer reduced to zero or negative hit points is dying, and will be dead at the end of that number of impulses equal to his CON unless he receives treatment raising his hit points to at least +1 before then. Thus an

explorer with a CON of 12 will last 12 impulses at zero or less hit points before he is irrevocably dead.

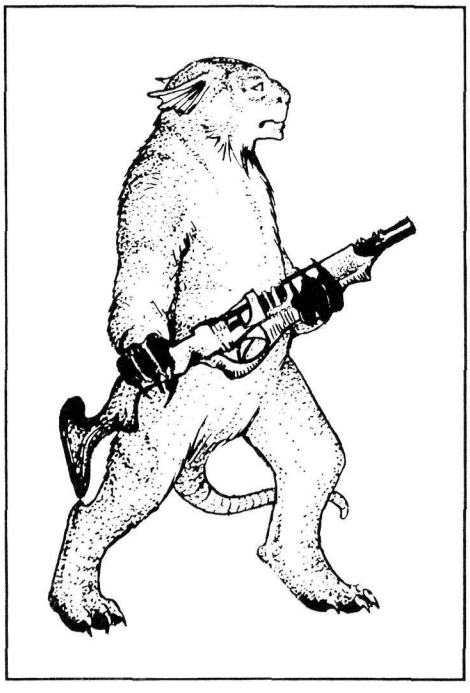
Loss of all hit points in one location causes adverse affects, varying with the location. Such damage might be sustained in a single mighty wound, or in a series of individually minor wounds. Any locational damage taken must be subtracted from the location as well as from general hit points.

An explorer who loses the use of his dominant arm and cannot get a replacement loses his gross motor manipulation skills, such as Handgun or Heavy Weapon. Using the remaining arm, gross motor skills requiring hand or arm movement are reduced to their base chances. Re-acquiring those percentiles proceeds according to normal training and experience rules. Similarly, the maximum movement speed of a one-legged explorer should be drastically reduced.

Damage Equal to or in Excess of the Hit Points for Individual Hit Locations

These notes will guide players and gamemasters for human and humanoid explorers and characters. The gamemaster must extrapolate from this for damage to aliens.

ABDOMEN: both legs are rendered useless and the explorer must fall. He may fight from the ground (at half normal chances for success if he or she is using a melee weapon) after a pause of one action ranking spent reorienting. The explorer may not move faster than 1



meter per impulse, crawling along on his or her arms. He will lose one additional hit point from blood loss every CON x1 impulses after the abdomen initially is brought to this state, unless his player can successfully roll the explorer's health roll at the end of that interval. The drain of hit points will stop permanently if the health roll result is CON x1 or less, if the explorer is treated by an autodoc, or if he receives successful Emergency Treatment.

ARM: the limb is useless. If the damaged explorer was holding something in that hand, it will fall unless it was attached to that arm. The explorer can continue to stand and act with whatever limbs are left.

CHEST: the explorer collapses, unconscious. By blood loss, the explorer loses one hit point per CON x1 impulses after the chest comes to this condition, unless his player successfully makes a health roll for the explorer at the end of that interval. The drain of one hit point per CON x1 impulses stops permanently if the health roll result is CON x1 or less, or if the explorer is treated by an autodoc, or if he receives successful Emergency Treatment.

HEAD: the explorer falls unconscious. He will lose one additional hit point every CON x1 impulses after the head has been brought to this state, unless his player successfully rolls the explorer's health roll at the end of that interval. The drain of hit points per CON x1 impulses stops permanently if the health roll result is CON x1 or less, if the explorer is treated by an autodoc, or if he receives successful Emergency Treatment.

LEG: the limb is useless. The explorer falls, requiring one action ranking to reorient himself. He may fight from the ground for the rest of the action sequence, at a penalty of half normal chance to hit with any melee weapon.

Locational Hit Point Losses More Than Twice Original Value

In calculating this position, simply change the value of the hit location from a positive to a negative number. Thus, a character with 8 points in each arm would reach twice hit point losses when an arm went to -8 hit points.

More Than Double Limb Location Losses

An explorer cannot take more than twice the hit location damage possible to an arm or leg. At this point, the limb is irrevocably maimed or severed. Further damage to that limb will not further affect the hit points of the limb, but will affect the general hit points of the explorer.

An explorer so damaged is in shock, and can do nothing until he or she is healed. If the damage was done at one pass from a melee weapon (such as a variable sword or an animal's claw) the limb is cleanly severed. Otherwise a limb so damaged is maimed or raggedly removed. An autodoc can preserve and possibly re-attach a cleanly severed limb, but can do nothing with a maimed limb except amputate it. If no substitute is available, the explorer must go limbless or wait in the autodoc or a stasis box until a proper limb is available.

More Than Double Head, Chest, or Abdomen Losses

If the chest or abdomen receive more than twice as many damage points as there are normally hit points in that location, the explorer will die if not treated by an autodoc within his CON x1 impulses from when the damage was received.

If the head received twice as many points of damage as its normal rating, it is severed, crushed, or otherwise irrevocably maimed, and death is instantaneous.

Healing

Healing can occur from the body's ability to naturally heal, or through being treated in an autodoc. Natural healing occurs at the rate of one hit point per five days of complete inactivity. Movement or activity while healing causes natural healing to take twice as long.

Natural healing cannot re-grow or re-attach a severed limb for humans or most alien races. General hit points can be healed to their original value, but the limb will be gone.

An autodoc is the favored method of healing for citizens of Known Space. An autodoc is a sophisticated machine capable of healing a person at a vastly accelerated rate. Types of autodocs and their healing rates are detailed in the technology book.

Successful use of the Emergency Treatment skill can heal 1 D3 damage; see that skill for more information.

Armor

Armor protects against damage. Each point of armor worn subtracts one point from any damage which the wearer may incur. Archaic armor has only this effect, but powered armor or armor made for special purposes may be available to Known Space explorers. Special functions are explained in individual descriptions in the Human Space technology book.

As might be imagined, armor protects only those hit locations which it covers. Certain weapons, such as the slaver disintegrator, can dissolve armor and make it useless. Certain types of armor are effective only against certain weapons.

Natural Hazards

Many forces of nature can injure an explorer. Dangers covered here include abrupt atmospheric pressure changes, aging, asphyxiation (including choking, smoke inhalation, and airlessness), burns and fires, disease, exposure, falls (and falling objects and collisions), hunger, poison, radiation, thirst, and zero atmospheric pressure.

Abrupt Pressure Changes

Explorers undergoing abrupt pressure changes take 1 D6 damage to general hit points for every half-atmosphere of pressure change, either increasing or decreasing. The first half-atmosphere does not count for this purpose. Thus, going from 1 atmosphere of pressure to 0 atmospheres costs an explorer 1 D6 damage to general hit points. "Abrupt" means no more than a few impulses in this context. For instance, the average cycling time for an airlock (10-1 5 impulses) would not constitute an abrupt pressure change.

Aging

Without boosterspice, explorers will begin to age. For each year of physiological age after the sixtieth (fortieth for explorers from heavy gravity worlds), the player must roll 2D6 on the Aging Table for the explorer. The result indicates a certain number of D6s to be rolled on the Aging Effects Table, which indicates

the point amounts to be subtracted from characteristics.

See the boosterspice description in the Known Space technology book to determine when the effects of a dose of boosterspice wear off.

Aging Table

2D6	*D6s rolled*
2	**4**
3	**3**
4	**2**
5	**1**
6-8	**0**
9	**1**
10	**2**
11	**3**
12	**4**

Aging Effects Table

1D6	*loss*
1	-1 STR
2	-1 CON
3	-1 INT
4	-1 DEX
5	-1 APP
6	-10 percentiles from rarely-used skill

Loss of points from most characteristics will require recalculation of some relationships and attributes on the explorer sheet. At a minimum, root skill maximums may need changing.

With the exception of APP and EDU, a human with a characteristic of 3 or less is crippled, bedridden, or otherwise incapacitated. Again with the exception of APP and EDU, an explorer reaching 0 in any remaining characteristic dies. An explorer with extremely lowered APP has simply become incredibly repulsive to see, listen to, be with, and so on. An explorer with an EDU of 0 is simply extremely uneducated and ignorant. EDUs of zero are common in primitive societies.

Asphyxiation

A creature deprived of the medium it needs to survive in suffers from asphyxiation. Humans need oxygen in a proportion of gases otherwise inert to them. Trinocs need a proportionate amount of methane. Earthly fishes need oxygen from water as well as water with a particular proportion of salts. And so on. All asphyxiation damage is done to the total hit points of the individual.

An explorer can hold his breath for his CON x5 in impulses. Each impulse thereafter (or if surprised without a chance to take a breath), the player must successfully roll his explorer's health roll or he must inhale.

A human explorer might be asphyxiated through choking (physical blockage of the air passage), by inhaling smoke which will lower the proportion of oxygen and administers impurities, by the lack of oxygen in a vacuum, by drowning in an unbreathable medium such as water, and so on.

INHALATION: damage per impulse of inhalation depends on the substance being inhaled: water does 1 D4, smoke does 1 D2, and especially dense smoke does 1 D3. Poisonous gases do poison damage instead, but act ten times as quickly as do ingested poisons.

CHOKING: choking is the physical blockage of the air passage to the lungs. Choking occurs either when some element foreign to the passage obstructs it, or when an enemy grasps an explorer and physically forces the air passage closed, whether he does this with his hands or a garrotte.

When an explorer begins to choke, his player attempts a luck roll. If this roll succeeds, the explorer is free from damage for a number of impulses equal to his CON x5. If the roll fails, he will be free from damage only for his CON x3 impulses. Each additional impulse after this, the player must succeed with a health roll, or begin to take damage. Once the health roll has been missed, the player cannot try again. After the roll has been missed, the explorer will simply take one point of damage every other impulse thereafter, until the choking stops.

If something has lodged in the victim's throat, it can only be dislodged by a successful Emergency Treatment roll on the part of another character.

If the explorer is being choked by another person, he can try to break free by overcoming the enemy's STR with his own on the resistance table. This roll can be attempted once at the end of the victim's action rankings until he either is freed or dies.

VACUUM: explorers without protection from vacuum suffer damage similar to choking damage, as well as suffering collapsed lungs and hemorrhages. See the effects under Zero Atmospheric Pressure below.

Burns, Fires, and High Temperatures

Fire will damage any body part it contacts. The extent of the damage varies with the duration of contact, the number of hit locations affected, and the intensity of the flame. The number of hit locations affected is determined by the fire's size — a small electrical fire on a control panel might affect only a single hit location, and a largish campfire only two or three, while an explorer thrown into a volcano or huge bonfire will take damage to all locations.

Clothing, hair, and other flammable material attached to an explorer might catch fire through contact. This must be decided on a case-by-case basis by the gamemaster. Metal and plastic equipment can be destroyed by flames, and heat-sensitive microcircuits almost certainly will be ruined. An explorer completely immersed in flame may even suffer asphyxiation damage, along with his other woes.

In *Ringworld,* heat is measured in increments approximately equal to 100 degrees centigrade, or 1 kilocalorie — enough to boil a liter of water at one atmosphere of pressure.

Fire Damage Table

fire scale	*damage/impulse*	*intensity*
1	1 point/5 im	small
2	2 points/3 im	moderate
3	2 points/im	steam, melts tin
4	1 D6 points/im	melts lead
5	2D6 points/im	melts zinc
7	4D6 points/im	melts aluminum
10	7D6 points/im	melts silver
16	11D6 points/im	melts iron
etc.		

To figure damage from a particular heat intensity, use the chart above; interpolate or extrapolate as needed. If the heat covers the entire body, then general hit points take the damage; if localized, the flame affects only those hit locations which it contacts.

Disease

As a rule, diseases must be handled individually by the gamemaster. A particular disease could have many effects, only some of which can be reflected directly in the game system. Generally speaking, both contact with the disease-causing organism or vector and a failed health roll are required to contract a disease. Especially virulent diseases may lower the explorer's resistance health roll. Here follow some possible effects.

LOSS OF A CHARACTERISTIC: perhaps a slow, steady drain, or a devastating drop, perhaps after a time of high fever and incapacitation. Remember that if a characteristic is reduced, any applicable root skill maximums must also be reduced.

DEATH: this result is, perhaps, over-obvious. A disease might kill quickly and invariably, or a successful health roll might remove danger. Some diseases might linger on, requiring the target's player to succeed with monthly or weekly health rolls, and possibly meanwhile infecting his fellow explorers.

REDUCTION OF SKILLS: a disease which caused trembling would reduce all agility skills, a disease which eroded memory could reduce knowledge skills, and so forth.

STERILITY OR GENETIC ALTERATION: even if the explorer were still capable of raising a family, the disease might prompt defects in his or her children.

OTHERS: maiming, future susceptibility to certain diseases, and other debilitating effects

Smallpox: a sample disease

This extinct disease makes a good example because of the familiarity of its ill effects. An unvaccinated explorer exposed to smallpox during the communicable period must receive a successful health roll or contract the disease. Most inhabitants of Known Space have never even heard of smallpox, much less been vaccinated against this anachronism.

The incubation period once infected is 1 D3 + 9 days, after which the explorer first shows symptoms, experiencing weakness and high fever. After 1D2+2 more days, lesions begin to appear on the victim's skin. The first week after the lesions appear is the period of maximum communicability, and any person who comes into contact with the victim during this time must succeed in a health roll or contract the disease as well. On the fifth day after the lesions appear, the victim's player must attempt another health roll; if it fails, he dies in 1 D3 days.

If the health roll succeeds, the disease lingers on for 3D6 days, finally leaving the victim immune to further attacks of smallpox, but possibly disfigured (subtract 1D10-1 from APP). If the health roll for recovery was a special success, the disease leaves no significant scarring.

dreamt up by the gamemaster all fall into this category.

The gamemaster book has a list of diseases which might be contracted on Ringworld; he is urged to generate his own diseases. Diseases are not necessarily aimed directly at the explorers. A gamemaster might inflict a disease upon a population of hominids, and challenge the explorers to beat the disease through research.

Exposure to Cold and Heat

Explorers exposed to extremely high or low temperatures can suffer severely from heat imbalance. The Cold Exposure table indicates the effects of cold upon a person without clothing or other protection.

Cold Exposure Table

centigrade temperature	*hit points lost per hour*
0 to -10	1
-11 to -20	1D3
-21 to -30	1D6
-31 to -40	1D10
-41 to -50	1D10+2
-51 to -60	1D10+4
-61 to -70	1D10+6
-71 to -80	1D10+8
-81 to -90	2D10+10
-91 to -100	3D10+15

For each 10 additional degrees of cold, subtract another 1D10 +5 general hit points per hour.

If the exposed explorer is also wet, subtract 20 from the temperature for purposes of the table. For each kilometer of wind speed over 5, subtract an additional degree from the effective temperature.

To figure cold damage, subtract the point damage from the target's general hit points. For each five general hit points subtracted, also subtract one hit point from the location hit points of the head, and each arm and leg.

Cold Protection Table

garment	*protection*
normal clothing	1
heavy clothing	2
parka	3
full winter dress	5
military winter gear	6
aquatic exploration suit	8
Eskimo-style clothing	10
winter exploration suit	12
vacuum suit	20
Pluto suit	complete protection

Treat clothing as armor against cold; regularly subtract this protection from any rolled damage. Thus, a character wearing Eskimo-style clothing will not take any cold damage unless the temperature is below -40 centigrade, and then only if the die roll indicates over 10 points of damage.

HEAT: in temperatures of +40 degrees centigrade or more, each explorer's player must succeed with a health roll once per game hour or the explorer collapses from the heat, losing one general hit point per hour thereafter unless properly attended.

For each degree centigrade over 40, subtract one percentile from the health roll, and for each 10 degrees centigrade over 40, subtract one additional general hit point hourly. If a player has a special failure when making his or her explorer's health roll, that explorer immediately takes 2D10 general hit point damage and collapses, thereafter continuing to lose an additional hit point per hour as usual. Always subtract heat exposure damage from general hit points.

Falls, Falling Objects, and Collisions

The following data is for Earth-normal gravities; multiply by the gravity factor if very different from Earth's. If the explorer wears protection such as impact armor, it will protect to some extent against this damage.

Explorer Damage From Falls

distance fallen in meters	*damage incurred*
0.1 to 1	none
1.1 to 3	1D6
3.1 to 6	2D6
6.1 to 9	3D6
9.1 to 12	4D6
etc.	etc.

Apply the same rolled damage both to general hit points and to a randomly rolled hit location, using the melee hit location table.

If an explorer falls on a pointed object, such as a stake, the damage of that object (usually 1 D10+1) is added to the damage from the fall.

For objects falling longer distances, for each 9 meters or fraction thereof the object falls after the 12th meter, add 1 D6 more to the damage done.

Apply any falling object damage against hit locations, as well as general hit points. Multiple locations may be hit by large objects. The gamemaster should determine this by rolling more than once on the hit location table. Large falling objects are likely to knock down a target as well as damage him.

Falling Object Hit Locations

1D20	*location*
01-04	chest
05-10	right arm
11-16	left arm
17-20	head

The falling objects damage table gives the damage done to those struck by such objects. The objects themselves take damage as per the normal Damage From Falls table. Thus, if a MAS 8 explorer fell 8 meters onto another explorer, the falling explorer would take 3D6 damage, and the explorer hit would take 2D6 damage.

General Collisions

This rule applies only to small objects and vehicles at maneuver speeds.

HEAD-ON COLLISIONS: add the MAS and speed (in kph) of each object and divide by 20, rounding off fractions normally. This is the damage in D6s each object will take. Each object will take the damage exerted by the other object.

Example: Herbie Venture is flying a MAS 50 flycycle at 50 kph. He hits a large Ringworld flying creature (MAS 10) head-on, winging along at 30 kph. The flying creature takes (50+50)/20 = 5D6 damage, and plummets toward the ground from the shock, while Herbie's flycycle takes (10+30)/20= 2D6 damage and is slightly dented.

COLLISIONS FROM THE SIDE: use the head-on damage rules and halve the damage taken by each party. Each participant in the collision will be thrown a distance in meters equal to the number of points of damage ac-

Points of Damage Dealt by Falling Objects

object MAS	*distance of fall in meters* 0.1 to 1	1.1 to 3	3.1 to 6	6.1 to 9	9.1 to 12	each +9
1-5	0	1D6	1D6	2D6	2D6	+1D6
6-10	1D3	1D6	2D6	2D6	3D6	+1D6
11-15	1D6	2D6	2D6	3D6	3D6	+1D6
16-20	2D6	2D6	3D6	3D6	4D6	+1D6
21-25	2D6	3D6	3D6	4D6	4D6	+1D6
26-30	3D6	3D6	4D6	4D6	5D6	+1D6
31-35	3D6	4D6	4D6	5D6	5D6	+1D6
36-40	4D6	4D6	5D6	5D6	5D6	+1D6
41-45	4D6	5D6	5D6	5D6	6D6	+1D6
46-50	5D6	5D6	5D6	6D6	6D6	+1D6
51-55	5D6	5D6	6D6	6D6	6D6	+1D6
56-60	5D6	6D6	6D6	6D6	7D6	+1D6
61-65	6D6	6D6	6D6	7D6	7D6	+1D6
66-70	6D6	6D6	7D6	7D6	7D6	+1D6
71-75	6D6	7D6	7D6	7D6	8D6	+1D6
76-80	7D6	7D6	7D6	8D6	8D6	+1D6
81-85	7D6	7D6	8D6	8D6	8D6	+1D6
86-90	7D6	8D6	8D6	8D6	9D6	+1D6
91-95	8D6	8D6	8D6	9D6	9D6	+1D6
96-100	8D6	8D6	9D6	9D6	9D6	+1D6

tually taken, in a direction chosen by the gamemaster.

Example: concerned that the creature he hit may be injured and in mortal agony, Herbie lands. Hurriedly searching through the brush, he runs his MAS of 12 at 6 kph. Suddenly from the side, an outraged malbatros (the creature Herbie originally hit), crashes into him. The malbatros has a MAS of 10 and springs at 15 kph. Herbie takes (10+15)/20, or 2D6 damage, while the malbatros takes (12+6)/20or 1D6 damage. Since the malbatros launched itself at Herbie, the gamemaster declares that this is a collision, and the damage roll is halved for each, since it was from the side. Herbie ends up taking 3 points of damage in his head and tumbles 3 meters away from the blow. Stunned, Herbie looks behind him to see an apparently unharmed malbatros of nearly his own size advancing and flapping its powerful wings.

REAR-ENDERS: subtract the lesser velocity from the greater velocity to establish the relative velocity. Add half of the relative velocity to each MAS, and then divide the total by 20 to determine how many D6s are done to each party.

Example: as the malbatros rushes forward again, the surprised Herbie leaps to his feet and turns to run away. Herbie, MAS 12, is at 3 kph; the malbatros, MAS 10, is at 7 kph, so their relative velocity is 4 kph. Half of 4 is 2. Herbie's player figures (12+2)/20 = 1D6 damage while the gamemaster (for the malbatros) figures (10+2)/20 = 1D6 damage also. Herbie's rolled damage is 1 to his abdomen (from the back, of course); he wobbles, shrieks, and continues racing to his flycycle.

COLLIDING WITH IMMOBILE OBJECTS: use the head-on collision procedure. The immobile object has a speed of zero, of course.

ELASTICITY: if a colliding object is particularly elastic, damage will be reduced, and the energy absorbed in movement away from the point of collision. The scale of the elasticity must be decided upon by the gamemaster.

RESTRAINING BELTS: vehicle passengers who use proper restraining belts take no collision damage until the actual damage exceeds the hit points of the vehicle. At that point, each explorer takes the full amount of the damage in excess of the hit points of the vehicle.

Hunger

Each day after the third that an explorer goes without food of at least 300 calories, he or she loses one general hit point.

Poison

The parameters of poisons are: potency, intensity, dosage, and speed of effect.

POTENCY: poison potency is always expressed as a whole number. The more deadly the poison, the higher the potency number. The victim must try to overcome the poison's potency with his CON on the resistance table. If his roll fails, the poison takes full effect. If he succeeds, reduce the effect of the poison by one level of intensity. If the roll is a special success, reduce the intensity of effect by two levels. If the roll is a special failure, increase the intensity by one level.

INTENSITY: the Poison Intensity Table describes the five levels of effect for poisons.

DOSAGE: the dosage of a poison is that amount which must be ingested in order for that poison to do normal damage. Each poison has a minimum dosage at which it becomes effective. The gamemaster determines the effective dosage. For each additional dose of a poison applied beyond the first, the intensity will increase by one level. Thus, two doses of an intensity B poison act as an intensity A poison. Dosage will reflect the way the poison is transmitted: poison injected by sting will be listed as dose per sting, poisonous plants will have so many doses per kilo of plant or number of leaves, etc.

SPEED OF EFFECT: the interval between the time the poison is administered and the time the poison begins to take effect is the poison's speed of effect. Speeds of effect are determined by the gamemaster. As a rule of thumb, any gaseous or injected form of a poison acts ten times as fast as an equivalent oral dose of the same poison.

Poison normally does not do damage to hit points, but makes the explorer incapable of acting or kills him or her.

Example: Fred Head, while pulling on his boots in the wilderness, discovers a poisonous insect inside one of them. Before he can get his foot out of the boot, he is stung 3 times. The gamemaster determines that the insect's venom has a potency of 12, an intensity of C, one dose per sting, and a speed of effect of five minutes. Fred's CON is 16, and he now attempts to resist poison's potency of 12 three times, succeeding twice and failing once. The two successes reduce two of the doses' intensities to D. However, two doses of D equal one intensity C. Since one of the doses was not resisted, he effectively has two intensity C doses, which equal a single intensity B effect. Five minutes after the stings, Fred becomes quite sick, vomiting and feeling faint. He will remain so for 2D10 days. The kindly gamemaster states that he will be incapable of keeping any food down, and so he will also take some hunger damage during this period.

Poison Intensity Table

intensity	*effect*
AA	death within a few impulses
A	death within a few hours, unless correct antidote administered
B	incapacitated for 2D10 days; possible permanent characteristic damage, as determined by gamemaster
C	incapacitating illness lasting for 2D10 hours, possibly also causing damage
D	mild nausea or diarrhea or rash, or similar inconvenience

Radiation Effects Table

level	*effects*
10	intensity AA poison effects rolled once per impulse; 4 points burn damage to general hit points per impulse; permanent blindness and sterility after one impulse
9	intensity AA poison effects rolled once per minute; 4 points burn damage to general hit points per minute; permanent blindness and sterility after one minute
8	intensity A poison effects rolled once per minute; 2 points burn damage to general hit points per minute; permanent blindness and sterility after five minutes
7	intensity A poison effects rolled once per UNS hour; 2 points burn damage to general hit points per hour; permanent blindness and sterility after one hour
6	intensity B poison effects rolled once per UNS hour; 1 point burn damage to general hit points per hour; temporary blindness after an hour; permanent blindness and sterility after one day
5	intensity B poison effects rolled once per UNS hour; 1 point burn damage to rolled ranged weapon hit location per day; temporary blindness after one day; if untreated, permanent blindness after ten days
4	intensity C poison effects rolled once per day; 1 point burn damage to rolled ranged weapon hit location per day; 1 D10 days temporary blindness after one day
3	intensity C poison effects rolled once per seven days; nausea and weakness
2	intensity D poison effects rolled once per seven days; no other effects
1	intensity D poison effects rolled once per 30 UNS days; no other effects

Radiation

The effects of radiation may combine the damage types of both poison and direct heat. For game purposes, there are ten levels of radiation effect. The table is graded on a logarithmic scale. Exact measurements of roentgens or RADS for each level have not been given. The level of radiation is matched against the victim's CON as per poison potency, while the intensity of the poison is given with each different level.

Thirst

For each hour after the twelfth during which an explorer is completely denied fluids, he loses one general hit point. The effect is suspended if the explorer can eat some substance which contains a reasonable amount of water — fruit, berries, grubs, etc.

Zero Atmospheric Pressure

Determine how long the explorer can hold his breath, as described in the asphyxiation rules. Once the explorer is forced to exhale, his lungs begin to collapse, doing 1 D6 +2 points of damage per impulse thereafter until the explorer can reach a pressurized environment, such as an autodoc or vacuum suit, or until he dies.

Additionally, zero or extremely low air pressure will cause a human to hemorrhage at a regular rate of 1 general hit point after 60 impulses, 2 points after 120 impulses, 4 points after 180 impulses, 8 points after 240 impulses, and so on.

Abruptly de-pressurizing may burst the explorer's eardrums, and his eyesight will be affected CON x2 impulses after depressurization.

Unprotected in a zero-pressure environment, the explorer will asphyxiate as well; see those rules. Probably he will also suffer (briefly) from cold, heat, or radiation when in the vacuum of space.

Game Constants

1 point of damage removes 1 hit point.

1 point of armor stops 1 point of damage.

EARTH & OTHER WORLDS

Earth in the 29th century is the central human world of an interstellar, interspecies civilization spanning thousands of solar systems. The local galactic region, explored by humans or neighboring aliens is called Known Space. Human Space — a far smaller volume within Known Space — contains Earth and all the major planets inhabited by Terran colonists. Earth itself is the home world of Dolphins and other sentient cetaceans as well as the home of humanity.

Citizens of Earth — usually called flatlanders — have a uniquely cosmopolitan perspective shaped by the events of the 900 years stretching from the 20th century to the Ringworld era. Flatlanders take for granted their fantastic technologies, planetary governments, and indefinitely-long lifespans. Interstellar trade and relations with extraterrestrials are an ordinary part of each day. Human nature has not changed, but the human condition has been altered by the interplay of technology and society, and by contacts with intelligent alien species. The character, concerns, and outlook of every 29th-century Earth-dweller reflect to some extent all that has gone before.

The Early Interplanetary Era

It is hard for Ringworld-era humans to imagine the raw, primitive diversity of archaic Earth, or to appreciate the terrible dangers threatening terrestrial civilization in the late 20th century. All of humanity existed within a fragile film of air, water, and earth, confined to the crust of a single rocky-iron world. Space exploration was in its infancy; robot reconnaissance of other planets in the Solar System had barely begun, grudgingly funded by wealthy nations. Only a few expeditions had touched the surface of the Moon.

Life was short, and often brutal. Apoccalyptic self-destruction seemed inevitable. While millions starved, warring industrial nations stood at the brink of nuclear annihilation rattling their ideological sabres. As population exploded, resources dwindled, arrogantly exploited by the economically privileged. Mass media misled, manipulated, and brainwashed millions into stupefying ignorance. For millions more, education was virtually non-existent. The planet seemed headed for global environmental catastrophe.

With difficulty, humanity survived. Terrestrial civilization grew and evolved, and finally reached the stars.

Stepping Stones Into Space

Throughout all history the irresistible lure of the cosmos had inspired ageless visions of worlds beyond Earth. Only in the late 20th century, though, did tangible reality begin to shape and finally transcend the epic dreams.

A distant and elusive tenth planet was christened Persephone, following confirmation of its discovery. Later, the first extra-Solar planetary systems were sighted — new families of planets orbiting nearby stars and shrouded in mystery.

Space exploration became a rewarding, practical, and entertaining adventure. Innovative medical experiments flown on early shuttle flights surprised scientists, overturning long-held theories of physiology and human behavior. Microgravity manufacturing, tracing its origins to the creation of zinc-aluminum alloy aboard Spacelab One, matured on the early orbital stations. Zero-gee industries soon became economically important to both Earth and Belt. Lunar bases, orbiting hotels, and the first privately-financed space habitats were established. Probes to comets and asteroids revealed the limitless possibilities of large-scale space-resource development. Chemical rockets gave way to a wide variety of atomic, ion, and solar-electric propulsion systems, and finally to powerful, compact fusion drives as humanity entered the realm of the planets.

The new wave of space pioneers followed divergent paths into the Solar System. Tough-minded, resourceful survivors of the early rush to the asteroids grew rich from mining and monopoles, and many settled permanently in their far-flung belt of "flying mountains."

In the same decades, Earth's superpowers and later the UN itself tried to stake out competing territories on unclaimed planets and moons, launching a series of "deep-space spectaculars." A string of ill-fated attempts to colonize Mars began in 1996. Manned missions to other worlds swiftly followed the Galileo and Messenger series of robot probes. Early visits to Jupiter's moons by both UN survey teams and Belters triggered a long-standing dispute. For a century, relations between Earth and Ceres Base grew more tense. UN expeditions as far as Neptune and Pluto tested touchy Nerva-K landers and other experimental spacecraft.

For the first time the adverse effects of spaceflight became widely recognized. Many Earth-dwellers discovered an inborn psychological and physical intolerance of space travel: the unexpectedly widespread syndrome commonly called "flatlander phobia." Belters in singleships faced their own hazards of the mind: even seasoned pilots could succumb to the "far look," a dangerous form of self-hypnosis induced by prolonged staring into the infinite inky depths of the universe.

Earth's World Government

The most critical problems facing 21st century Earth were solved ultimately not by early space exploration, but by the creation of a world order to keep the peace; to fight hunger, oppression, persecution, discrimination, and illiteracy; to promote social responsibility in the use of planetary resources; and to monitor the explosion of technology. Humanity survived because of the reorganization of the United Nations into a true world government.

The challenging logistics of spaceflight and economic wrestling with the Belt strengthened the UN, while premature planetary colonization misadventures only served to bring the host of more pressing global concerns into sharp focus. The peoples of Earth began to recognize their interdependence and kinship as a single sentient species. They saw that the interests of all humanity transcended short-sighted national policies. Governments gradually acknowledged their stake in a common future, and grudgingly sought for common ground. Multi-national corporations and financial institutions actively supported UN attempts to guarantee global stability, realizing it would be within their own best interests to do so. Citizens of all nations found new hope in the prospect of world federalism.

World organizations in previous times, when military might counted above all else, had been powerless to challenge the will of the superstates, to prevent aggression and the denial of human rights by ruthless dictators and fanatical ideologues. Stronger formulas had to be found, unwieldy though they might be. Beginning with the World Conventions of 1995 (marking the 50th anniversary of the founding of the UN), supra-nationalist representatives hammered out drafts of new articles incorporating the best elements of the Atlantic Charter, the existing UN Charter, the EuroCom economic pacts, and the socialist states' long-range development plans. Elaborate safeguards guaranteed the sovereign equality of member states, their peoples' rights of self-determination, and protections against the rise of any form of global tyranny. A new United Nations headquarters complex was built in Berlin, a city once symbolic of a world implacably divided.

Earth did not become a Utopia. But humanity endured. There were unforeseen abuses of UN authority. There were ghastly incidents of nuclear terrorism. The global challenge of the Superman Insurrection, the plot of a group of giant biotech conglomerates, was quashed. In the end, Earth narrowly avoided the catastrophic devastation of a third world war, and war as a tool of diplomacy was outlawed. In retrospect, the establishment of the strengthened UN was a monumental achievement, a remarkable tribute to human vision and courage.

The Development of the ARM

At one time the Amalgamation of Regional Militia (ARM) had been an international federation of civil-defense organizations; later it became the enforcement branch of the UN.

The need to monitor — and often to control — the expansion of new technology has long been recognized by human authorities. Following the world crises of the early 21st century, the regulation of technology became the responsibility of the ARM. Thousands of special ARM agents, drawn from many fields, trained for the difficult newduty.

New technologies create new customs, new laws, new ethics, new crimes. Existing technologies must be monitored, and all revolutionary breakthroughs investigated thoroughly. Insofar as is possible, their consequences must be anticipated. Some new discoveries must be kept secret, suppressed, or cautiously administered for the common public good. The ultimate technological authority entrusted to it by the Conventions gives the UN the leverage necessary to ensure international cooperation and to promote inter-world security.

ARM agents have always been chosen for intelligence and imagination tempered by discipline and dedication. They must demonstrate an unusual balance of self-reliance and social responsibility. Some possess extraordinary talents, such as psionic abilities. Field operatives have a remarkably free hand to pursue their investigations, enjoying the benefits of secrecy and anonymity as required.

Nevertheless, the Conventions firmly limit ARM autonomy. Agents must obtain Breach of Privacy permits from civic judges whenever their activities might compromise any citizen's rights under the Privacy and Information Practices law. Privacy is precious on the crowded Earth. ARM personnel are prohibited from political involvement, and are notoriously difficult to bribe or blackmail. Normally, ARM agents carry mercy weapons only.

ARM agents and other UN representatives have always operated away from Earth when necessary to safeguard Earth's interests. In the Ringworld era, their duties may take them on special missions to the farthest reaches of Known Space, and beyond.

Functions of the ARM

By the early 22nd century, the ARM had three basic responsibilities. It monitored world technology, especially new developments that might create dangerous weapons, disrupt the world economy, alter the balance of power among nations, generate global public health or environmental hazards, or threaten Earth's security. Secondly, it enforced the Fertility Laws, which kept Earth's population stable. Thirdly, it hunted organleggers. To understand Earth's history, one must understand the forces which created the ARM.

MONITORING OF TECHNOLOGY: the advent of fusion power — the true technological savior of early 21st century civilization — accelerated the development of Earth's global technological police force. Hydrogen fusion promised a clean, cheap, virtually inexhaustible energy source needing no radioactive fuels. The deuterium needed for linear magnetic-fusion plants could be readily extracted from sea water. Any nation could build a fusion plant. Yet, since a fusion reactor can be modified to breed fissionable materials, any nation was now able to build a hydrogen bomb. The dangers of nuclear oblivion grew sharply more imminent.

World-wide economic disruption also shadowed the growth of fusion power technology. The internal-combustion engine abruptly fell into long-overdue obsolescence. Fusion rocket motors, fusion sea water distilleries, fusion recycling plants, and fusion crematoria all created their own astonishing opportunities for misuse. Global pollution produced by burning fossil fuels declined, only to be replaced by widespread heat-pollution from fusion-powered industries and residences.

International law grappled with a multitude of new problems arising from the interplay of fusion technology and increasing human numbers. Airborne traffic, self-propelled or riding power-beams, no longer could be permitted manual operation. The lethal exhausts of spacecraft always had to be kept carefully pointed away from Earth.

The ARM came too late to control the early development of fusion power — but the agency has been much concerned with its regulation since. Many other advanced technologies, such as robotics, lasers, beam-weaponry, and biological engineering, have had similar histories. These too have become the legitimate concerns of the ARM.

THE FERTILITY LAWS: the population explosion threatened civilization on Earth as surely as the misuse of advanced technology. Human numbers grew inexorably during the 20th century, doubling regularly. As resources for basic needs dwindled, conflicts grew more frequent. Then, in the 1980s, India became the first nation to adopt population control as national policy. China quickly followed suit.

Earth's population stabilized at about 18 billion by the early 22nd century, following the passage of the Fertility Restriction Laws and their subsequent implementation by the ARM. The Fertility Board, an agency of the United Nations, made and enforced the birth control laws. For five centuries these remained virtually unchanged: a maximum of two children per couple, and tax incentives for one or no children. Biannual contraceptive shots were required. The Board issued parenthood licenses; by the presence of desirable or undesirable genes, extra children might be awarded to one couple and all children denied to another couple. Rarely, an unlimited parenthood license might be granted to a genius or offered as incentive for breakthroughs in certain areas.

The least penalty for willful unlicensed parenthood was sterilization. At times the so-called "mother hunts" became unwelcome but necessary ARM duties. As policy, the Fertility Laws enjoyed widespread public support. Protests erupted if people in one region produced many illegal babies. If any nation was allowed to abandon population control, most might do so, and the consequences could be terrible. Freedom from starvation and global slaughter, along with the longevity made possible by medical advances (especially organ transplants) made the Fertility Laws essential on Earth. In the Belt, they were practically unnecessary — and more than a few flatlanders forsook their Earth for the sake of having children.

ORGAN TRANSPLANTS: Organ transplant technology emerged as a powerful social force on Earth in the 21st century. As usual, human legal, ethical, social, economic, and moral codes rushed to catch up with accomplished fact.

As early as 1900 AD the first safe blood transplants ("transfusions") were performed, by 1960 blood banks were world wide. Bone skin, eye, liver, kidney, lung, and heart transplants were common by 1990, and it became possible to store living organs for any reasonable length of time. In 1989, it became legal to freeze humans not already medically dead. Freezer vaults filled to capacity with the intact corpsicles of the hopeful frozen dead. Leviticus Hale, in 1991, was the first human frozen for a non-terminal ailment (incurable paranoia).

Most people, however, regularly willed their remains to organ banks. No longer risky, astronomically-expensive sideshows, transplants became routine — helped by new anti-rejection drugs, gene-suppressor serums, and laser surgery. In contrast, progress slowed in the competing fields of artificial organ implant and tissue regeneration. The dominance of transplant technology, culminating in the establishment of the World Organ Bank was due largely to economic convenience. Human organs were reliable, cheap to produce, quick to install, and were in abundant supply on crowded Earth. Lack of legally-available donors had long been the main problem: laws forbidding the sale of body parts for profit had been passed as early as 1985.

In 1993, Vermont enacted the first of the organ bank laws. Thereafter, criminals condemned to death would be executed in hospitals — with surgeons on hand to save as much as possible for the organ banks. Jurists argued that the death of a condemned man could now save many lives, a piece at a time. Execution was no longer a crude, irreversible act of social vengeance. Capital punishment now clearly served the common good in Vermont - - and, soon, in California, Alabama, and New York; then Pakistan, Great Britain, Switzerland, Germany, France, Nigeria, the Soviet Union....

The world wide social consequences of transplant technology were at their worst by the late 21st century. With good doctors, intelligent caution, a sufficient flow of donor organs, and a little luck, any law-abiding taxpayer could hope to live indefinitely. Who would vote against eternal life? Not surprisingly, in this era, the death penalty was a deterrent — capital punishment was authorized for lesser and lesser offenses: fraud, embezzlement, unlicensed parenthood, four or more counts of false advertising, repeated traffic violations. Insanity no longer was an excuse for violating the law, for legally-imposable chemical cures for most forms of insanity now existed.

Courthouses and hospitals were built to adjoin one another. Mercy weapons and sonic stunners were issued to law-enforcement officers; these would incapacitate but not injure suspects. Jail cells were padded with soft, thick, rip-proof plastic to prevent wanton destruction of valuable medical resources by prisoners. Special medical teams carried out the executions. The drugged condemned was lowered into a freezing bath. Soon, his heart stopped. His body then passed down a disassembly line. The brain was flash-burned, but all the other parts went into cold storage, ready to be shipped anywhere in the world at short notice.

Demand still outstripped supply. Bold snatchings by the notorious organlegging rings made sensational news, attracting the attention of the ARM. Murder remained a local matter, but organlegging soon became an international crime of first rank. Many individuals and groups opposed to the organ transplant madness that gripped Earth emigrated to the Belt for a fresh start.

The Early Interstellar Era

The second great era of human history in the Ringworld millennium spans nearly three centuries. Many think of this period as Earth's golden age. The impact of the medical revolution that had warped human society lessened, and alternatives to transplant technology developed. Cetacean species were admitted to the UN, and the Dolphin viewpoint helped temper mankind. Holographic systems found wide applications in information and entertainment industries. Some human psionic talents matured into the realm of socially-useful skills. Pelton Industries began research that led to the first crude transfer booths. There were new vices — current addiction originated in this era.

Humanity grew aware of a much larger, vastly older, far more crowded and complex universe, filled with exotic technologies and alien species more strange and fabulous and terrifying than the mind of man had yet conceived.

The extra-solar planetary systems beckoned. New observational data continued to accumulate — much of it tantalizing, little of it definitive. Clearly, first-hand investigation was necessary. In an attempt to regain prestige, reduce overpopulation pressure, and

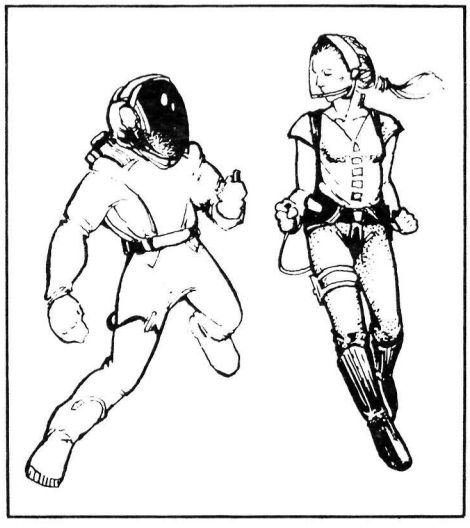
leapfrog over the economic dominion of the Belt, the UN turned its attention to the stars.

The Ramrobots

Surprisingly, the development of the first interstellar reconnaissance probes, the ramrobots, was one of the few areas of real UN-Belt cooperation — even at times when military conflict seemed imminent. The ramrobots were huge primitive Bussard ramjets which could attain relativistic velocities by scooping up interstellar hydrogen for fusion fuel. They were unmanned: their ramscoop-field generators created 300-km wide electromagnetic funnels lethal to humans, and the deadly actinic exhausts of their reversible-direction reaction motors were unshielded.

The UN owned the designs of many basic ramrobot systems, and had funded most of the crucial theoretical mathematics and physics research. But the magnetic monopoles mined by Belters, and the Belt's deep-space construction industries, tracking techniques, and asteroid-based launching accelerators were essential to the success of the ramrobots.

The first ramrobots were programmed to search out habitable planets orbiting nearby stars. Those known to have mysterious non-stellar companions, and the stars most like Sol, got top priority. Most ramrobots had lander sections programmed to touch down wherever conditions seemed most Earthlike.



All were programmed to report message-laser summaries of their findings back to Earth — by which time the first slow interstellar colony ships would be standing by ready to launch. Some ramrobots, damaged by interstellar dust grains, failed to decelerate. Flashing past their destination worlds, they relayed sketchy, overdue reports. Others vanished altogether. Those dispatched to Alpha Centauri, Tau Ceti, Epsilon Indi, Sirius, and Procyon sent back glowing, positive findings. There were places for humans to live in the stars.

The First Colonies

UN colony slowboats set forth. These ponderous, gleaming black-hulled ships looked magnificent in their day. Though bulky and massive, they had a grandly functional elegance. Their combined re-entry, cargo, and life-support modules were thick, flattened, hollow cylinders 100 meters in diameter and 110 meters high, resembling monstrous tuna-cans with beveled leading edges. Their trailing edges flared outward in a landing skirt. Sandwiched within the narrow, ring-shaped hull sections, colonists rode in frozen sleep (and later in stasis), watched over during the long voyages by small crews of four to ten pilots and starships systems specialists.

Slowboat voyages were always one-way; return trips were out of the question. If destinations proved less than ideal, colonists had to adapt. Nonetheless, millions of flatlanders wanted to sign aboard the slowboats, and the UN had to select and sponsor diverse groups. Great lotteries were held. National, cultural, racial, and religious commonalities pressed for special flights, and sometimes actually financed them. Cadres of wealthy dilettantes organized a few of the earliest ventures. By Belter standards, the colonists were foolish, deluded, wide-eyed innocent flatlanders unfit even for duty on Luna. But by the late 22nd century, half a dozen remote worlds held fledgling Earth colonies, with more on the way.

Interstellar colonization was a daring undertaking fraught with immense, unforseeable difficulties. It was expensive. Some of the slowboats failed to make turnover, flew on, and were lost in the unknown void. Furthermore, the ramrobots had told only partial truths about the Earthlike worlds they had found. Civilization on each had to improvise, to make drastic sacrifices, and to take desperate chances. Each colony soon took on its own unique character. Colonists on Jinx labored under 1.78 gees, for example, in the planet's two habitable bands. We Made It's seasonal 1000 kph winds meant bare-bones survival underground. Except for Mt. Lookitthat on Plateau, Tau Ceti 2's atmosphere was a searing, poisonous hell. Over the centuries, genetic drift, pre-selection, isolation, gravity, and other factors shaped humans in the colonies into distinct physical types. Separate colony dialects and languages emerged. Always UN supply ramrobots were too few, and too far between.

First Encounters

Throughout the 21st century, humanity had found no clear evidence of sentient life beyond the Solar System. Then, in 2106 AD, the simultaneous revelations of alien presences on Jinx and on Earth shocked the world. The Sea Statue, a peculiar mirror-surfaced 'sculpture' found by Dolphins off the coast of Brazil was brought to life accidentally by time-retardation experimenters, revealing that it was actually a highly-advanced time-stasis field containing a member of the long-extinct Thrint (soon nicknamed 'Slavers') species, which once had enslaved most of the galaxy. The Thrint was returned to stasis, with some difficulty, but his telepathically-imposed memories forced upon humanity a shocking new view of galactic history, and offered a glimpse of exotic, undreamed-of technologies. The Slaver disintegrator later became a common human mining tool, but the Slaver jump-drive is still a mystery.

Among the odd life-forms native to Jinx, the huge slug-like Bandersnatchi — former Slaver food animals — proved to be intelligent in the same year, and still possessed strange memories of the Slaver Empire. The Institute of Knowledge was founded on Jinx to study Bandersnatchi. Aware of the awesome weapons-potential of Slaver technology, the UN licenses and strictly regulates its application. Significant Slaver finds must be reported, and the Slaver stasis-boxes must be turned over to planetary authorities. ARM agents closely scrutinize all uses of Slaver technology and newly discovered artifacts.

In 2125 AD, hundreds of Belt miners spotted a rich, point-source of magnetic monopoles moving swiftly into the Solar System from the constellation Sagittarius. The intruder was an advanced alien ramship, and human governments made hasty preparations to welcome extraterrestrial ambassadors. But the ramship's sole pilot was a Pak Protector, a hideously-deformed, super-intelligent humanoid monstrosity from a world near the galactic core. The Pak had traveled 30,000 light years to save humanity, believing Earth to be inhabited by a lost colony of immature Pak Breeders. A Belter named Jack Brennan was captured by the Pak and exposed to a powerful chemical agent, which transformed Brennan into a human Protector-like creature. Brennan slew the Pak and disappeared in the alien ramship. Before fleeing, he warned UN representatives that the Pak are an ancient warlike species of xenophobes related to Earth's hominid ancestors, and would not flinch at exterminating whole species. The danger to humanity was real.

Today, the popular view is that Brennan's testimony and motives were doubtful. The alien drug had distorted his braincase. But the UN rebuilt Olympus Base on Mars to study the Pak cargo pod's gravity polarizer in situ. The dry corpse of the Pak went to the Smithsonian, alongside the Sea Statue, where they still may be viewed by the public.

The Man-Kzin Wars

Earth had known peace, at a price, for 250 years. The seas and skies were almost clean again. The manufacture, sale, possession, and use of lethal weapons had long been illegal. Breakthroughs in alloplasty and tissue regeneration virtually ended society's grim addiction to the organ banks. Safe, manned ramships began to ply regular routes to the colony worlds. Jinx grew strong, industrially and economically, and interstellar colony credits traded alongside the UN mark. Three great Terran spaceports (Topeka Base in Kansas, Calcutta Base in India, and Outback Field in Australia) handled Earth's interstellar traffic. Dozens of more compact facilities, such as Death Valley Port, serviced short-hop, military, and Earth-Luna passengers and freight. Though most flatlanders still looked upon activity in space as a mainly-Belter concern, humankind as a whole looked forward to the eventual day of first contact with a neighboring, spacefaring alien civilization. Everyone assumed such a meeting would be peaceful, and mutually beneficial. It was not.

The Kzinti, a fierce warrior species, launched a surprise attack in 2367 AD upon the virtually-defenseless Alpha Centauri system, easily subjugating Wunderland. Kzin warships were heavily-armed, driven by fusion-powered gravity polarizers, and capable of 0.8 lightspeed — yet Kzinti regularly engaged in hand-to-hand combat, and often ate the raw flesh of their victims. The first Man-Kzin war had begun.

News of the Kzin offensive reached Earth years later, partly due to lightspeed delay, partly due to Kzinti tactics in rendering useless Wunderland's corn-laser stations. The first Kzinti fleet swept into the Solar System soon afterward. Initially, the photon exhausts of reaction-drive ships and the powerful Belter asteroid-based lasers slowed Kzin progress, but eventually they would have triumphed. Only the advent of the faster-than-light

hyperdrive shunt for human spacecraft prevented Earth's enslavement. Passing the isolated underground colony of We Made It, a craft of the Outsiders stopped long enough to sell the secret of hyperdrive propulsion. The hyperdrive armadas of 2410-2420 finally drove the Kzinti invaders from Human Space, ending the war in a grinding defeat for Kzin's ruling Patriarchy.

Earth armed itself. Great laser cannon, built through the cores of asteroids, fortified the Belt. The UN began building first-line defense installations far from Sol, even in systems lacking Earthlike worlds, such as Epsilon Eridani, and in systems like L5-1668, where the planet Down had been wrested from the Kzinti. Quantum I hyperdrive ships made it all seem easy, moving at three days to the light year. We Made It became fabulously wealthy. Intersteller commerce as a whole began to boom, assisted by the advent of virtually instantaneous hyperwave communication technology. The Star, a unit currency originally based on Jinxian colony credits and We Made It military scrip, began to displace the UN mark as the standard in Human Space interworld transactions.

New colonization projects flourished. Dolphins migrated to worlds with oceans. The frontiers of Known Space expanded rapidly as scout ships flew to unexplored systems, sometimes for study or profit, often seeking relics of the Slaver empire, preserved in stasis. The mysterious Outsiders negotiated a lease on Nereid, Neptune's smaller moon, for a stopover base. And, most significantly, the Puppeteers — that highly-advanced race of interstellar entrepreneurs — revealed themselves to humanity. The Puppeteers'' all-encompassing General Products company set up major regional facilities on Jinx and We Made It. The first virtually-indestructible GP spacecraft hulls were sold.

There were new catastrophes. Home colony, which had failed in 2351, was uninhabitable and would be for centuries. The Kzinti returned; the second war (2449-2475) began with diversionary attacks on the Sigma Draconis system and Barnard's Starbase, followed by attempts to retake Down and a second major offensive against Earth. Again the Kzinti fought courageously, and lost, and once more Kzin space shrank in volume. Human forces liberated an entire sentient species from Kzinti slavery — the Kdatlyno: huge, nightmarish aliens blind to visible light but possessing a refined ultrasonic radar sense.

SELECTED INTERWORLD DISTANCES / TRIP-TIMES

	EARTH /BELT	WUNDERLAND	JINX	WE MADE IT	HOME	PLATEAU	DOWN	SILVEREYES	CANYON	GUMMIDGY
EARTH /BELT	✸									
WUNDERLAND	4.3 *13.0*									
JINX	8.7 *26.1*	9.6 *28.8*								
WE MADE IT	11.3 *33.9*	12.9 *38.7*	5.1 *15.4*							
HOME	11.4 *34.2*	9.3 *27.8*	15.0 *45.1*	19.8 *59.3*						
PLATEAU	11.8 *35.4*	13.4 40.2	12.3 *36.8*	16.4 *49.1*	11.3 *33.8*					
DOWN	12.0 *36.9*	13.9 *41.8*	5.6 *16.9*	1.2 *3.5*	20.5 *61.6*	16.7 *50.0*				
SILVEREYES	21.3 *63.9*	18.2 *54.7*	20.8 *62.4*	25.6 *76.9*	11.8 *35.4*	18.9 *56.7*	26.1 *78.4*			
CANYON	22.0 *66.0*	20.4 *61.1*	20.5 *61.5*	25.5 *76.4*	13.3 *39.8*	15.1 *45.2*	15.7 *77.1*	8.3 *24.9*		
GUMMIDGY	23.0 *69.0*	22.6 *67.7*	24.4 *79.3*	31.2 *93.5*	14.1 *42.4*	16.0 *47.9*	31.7 *95.0*	18.3 *55.0*	15.0 *45.0*	
MARGRAVE	34.7 *104.1*	33.4 *100.3*	41.2 *124.0*	41.6 *124.8*	38.1 *114.2*	45.2 *135.6*	42.7 *128.2*	45.3 *135.0*	50.7 *152.0*	47.5 *742.5*

*NOTES — Intersect the row of entries for the world of origination with that for the world of destination: the numbers at the intersection are their mututal distance in light years (*medium type*) and the average quantum I travel time in UNS days (italics) required to make the trip. These safe travel times may reflect hyperspace detours around brown dwarfs and/or other hazards. Examples: the trip from Margrave to Wunderland takes 100.3 days and covers 33.4 light years; the trip from Earth to Silvereyes takes 63.9 days and covers 21.3 light years. Always read Earth/-Belt origins/destinations on the most-leftward column. [Table thanks to John Hewitt and Walter Harris]*

Human warriors became settlers. Some systems, virtually outposts, maintained close ties to Earth. Older colonies grew and prospered, their economies fueled by new discoveries and exotic technologies sold to or licensed from aliens. Customs, concerns, and even physical types diverged sharply in Human Space. Jinx and We Made It rivalled Earth in importance beyond the Solar System. Tourists from Earth flocked to visit other worlds aboard the first great interstellar passenger liners. Home was finally resettled. On Silvereyes, colonists battled fungus, volcanoes, and fierce concentrations of Slaver sunflowers. Even Wunderland undertook far-flung exploration and development projects. Humanity encountered a new spacefaring alien species, the Pierin — weird aerial creatures with infrared vision and a bizarre mystico-religious philosophy. Boosterspice, a powerful, gene-tailored life extension drug developed by Jinxian researchers, became available on Earth.

There was a third Man-Kzin war, and a fourth — both won by humans. The third (2491-2531) was by far the worst. Some strategists have even argued that the second war was merely meant to obscure the Patriachy's preparations for the third. Amidst fearful devastation and horrifying weapons such as the Wunderland Treatymaker, the third war ended. Earth took and held the Kzin warbase planet, Canyon, and the Pierin recaptured their ancestral solar system. The fourth Man-Kzin war (2560-2584) was almost suicidal indeed, it began with a wave of kamikaze-style attacks on human ships guarding the Eridani worlds. In this final conflict as in the previous wars, two-thirds of Kzin's mightiest warriors were slain. Humans pressed home the counter-offensive to the heart of the Kzin empire. An uneasy peace has since endured, despite major incidents, the last of which occurred in 2651. The Kzinti have never understood why Earth did not attempt to exterminate them. They still refer to the last treaty as the Fourth Truce With Man.

Puppeteer Influence

By the end of the Man-Kzin wars, Puppeteer concerns controlled a substantial fraction of Known Space commerce. Ramships were obsolete. Earth had learned to build Kzin-style gravity polarizers and gravity-drag deceleration units, but new Puppeteer-designed reactionless thruster drives proved cheaper, safer, and as efficient for sub-light propulsion. General Products acquired interests in Pelton Industries, and introduced vastly-improved transfer booths. ARM agents attached to the UN Bureau of Alien Affairs struggled to assess and soften the impact of alien technologies on human society, and to stabilize interspecies relations. On Earth and elsewhere, Puppeteer business ethics (or lack of same) strongly influenced social and legal codes. In areas of individual and civil liberties not strictly regulated, most humans enjoyed great personal freedom. The Fertility Laws were amended by the Birthright Lotteries, which theoretically gave every citizen the chance to become a parent. Blackmail, bribery, and even kidnaping became legal under certain conditions. Supervised anarchy in 'free parks' on Earth became an important recreational outlet.

In the mid-27th century, the Puppeteers sponsored an expedition to the center of the galaxy, in a secret Quantum II hyperdrive ship. They learned that the galactic core had exploded, and the shock-front of radiation from it would sweep through Known Space in only 20,000 years. Quite abruptly, the Puppeteers began an exodus from Known Space, triggering an interstellar stock market crash which had severe economic consequences on every Known Space world. In the panic, Earth fared better than the colony worlds.

Humanity in the Ringworld Era

Human Space in 2850 AD is an irregular interstellar bubble roughly 40 light-years in diameter, containing 524 stars in 357 systems. This volume is non-spherical, resembling a vast, three-dimensional asymmetrical amoeba, with multifarious undulations and protuberances. Much of Human Space remains unsettled or even adequately mapped, despite centuries of far-reaching exploration, colonization, and deep-space military adventures.

There are slightly more than 30 billion humans alive, including Earth's population. A dozen major colony worlds hold a third of the total. The most distant major colony from Earth is Silvereyes, 21.3 light years from Sol. A number of bases and settlements exist in even more remote systems, but less than one percent of humanity's total has ventured beyond the central cluster of heavily-populated worlds.

Known Space contains Human Space as well as the planetary systems of the neighboring alien civilizations. Over 80 light years in diameter, Known Space's outer boundaries are not sharply defined. There are about 10,000 stars in Known Space, most of which humans have never visited. Since the Man-Kzin wars, two important new sentient aliens have joined the roster familiar to humans: the sessile, disturbingly-telepathic Grogs of Down, in Human Space; and the ugly, congenitally suspicious, methane-breathing Trinocs from the regions beyond the cold frontier world of Margrave.

Human Interworld Relations

Interworld relations in Known Space, among the colony planets themselves and with Earth, have changed much over the course of Known Space history. The colonies were isolated, remote, and vulnerable in the beginning, but by the onset of the Kzin wars had grown increasingly independent of Earth. The terrible Kzinti threat brought a new era of human unity and interworld cooperation. After the conclusion of the first Man-Kzin war, the hyperdrive opened the door to explosive colonial growth, increased interworld rivalry, and the development of a true interstellar community and commerce. The Interworld language, originally a rudimentary tongue for human convenience in times of military emergency, grew steadily in sophistication, finally coming into widespread use.

In recent centuries, the major colonies have strengthened considerably in size and economic power. All have recovered from the financial catastrophes of the late 2600s caused by the collapse of General Products and the departure of the Puppeteers. Frequently the colonies' diverse interests, external influences, and internal problems have differed from the concerns of Earth. Each world has delegates at meetings of the Interworld Council, where disputes are argued, issues of Interworld law are tested, and mutually-beneficial proposals are considered. True Interworld unity does not yet exist, but the UN has long supported the concept of a formally structured Federation of Human Worlds.

Generally speaking, the long-settled worlds close to Earth are most able to compete effectively with Earth in trade and influence, while the more distant colonies are often extremely dependent on UN support for survival and development. The governments of Wunderland and Plateau have close ties to UN interworld policies, while Jinx and We Made It are much less so, possibly due to their dominance of extra-Solar finance and commerce. Down and Canyon are well-supported by UN military funding, due to their strategic importance, but the lives and attitudes of settlers on these worlds are subject to few Earth-imposed restrictions.

Home (resettled in 2589) and Silvereyes are still relatively tranquil, sparsely populated, non-industrialized worlds, but for contrasting reasons. Homers view Earth with a certain nostalgia, and have tried to recreate some of the motherworld's lost values. Silvereyes looks to flatlanders for the Stars they will spend as tourists. A few remote worlds like Margrave have been administered mainly by interstellar development corporations, though Margrave's proximity to Trinoc Space ensures that it, at least, will have an increased UN presence in the future. Hazardous, exotic worlds like Gummidgy no doubt will continue to appeal only to a handful of permanent human residents.

The Solar System in the Ringworld Era

Humanity's original home system consists of the Sun (Sol), a dozen planets, hundreds of thousands of asteroids, and a vast outer halo of countless cometoids — the Oort Cloud. Over the centuries, four new major planets have been discovered beyond Pluto: Persephone, Caina, Antenora, and Ptolemea, in order of distance from the Sun. All these outer worlds are cold gas giants of respectable diameter: Persephone (97,400 km), Caina (39,100 km), Antenora (135,700 km), and Ptolemea (63,500 km). All but Persephone have satellites, and all travel in long, non-circular orbits well-inclined to the flattened plane of the inner planets. All lie outside the central hyperspace singularity created by Sol's mass, and thus are well past the Solar System's interstellar hyperwave relay stations. These four outermost planets and their moons are under joint UN/Belt jurisdiction. The cometary halo is scantly populated, though remote Belt mining operations and specialized UN research stations (such as the Quicksilver Group, established in distant orbit around Antenora to study hyperspace phenomena) have increased in importance over the past two centuries.

The inner Solar System has changed only moderately since the signing of the Free Belt Charter in 2109. By the charter, the UN was allowed the Earth/Moon system, Titan, rights in Saturn's rings, Mars and its moons, and mining and exploratory rights on Mercury. In later centuries, the UN regained considerable power, leading to a balanced division of Solar System bodies. Though Mercury is still Belt property, Earth maintains permanent installations there, such as the emergency power-sender which can beam energy directly to almost any point in the Solar System. Venus, now UN property, is in the early phases of a long-term terraforming project, and supports hundreds of thousands of hardy settlers in a few marginally-habitable regions.

The Moon, despite tempting proposals, has not been terraformed, and, despite centuries

of human use, preserves most of its rugged, primeval landscape. Away from UN bases, Lunar civilization always has had its own distinct character, neither Terran nor Belter, with no great regard for the conventions or restrictions either of the UN or Ceres. Earth-Moon space traffic consists mainly of Lunar freighters and round-the-Moon tourist specials.

Mars (UN property) has a permanent population of only 1.1 million, confined to a handful of sites. Large-scale terraforming was halted following protests against the probable extinction of the Red Planet's remaining exotic life forms.

Jupiter and its four Galilean moons (Io, Europa, Ganymede, and Callisto) are under joint UN/Belt administration, while the smaller jovian moons remain Belt property. Saturn, its rings, and its family of smaller moons belong to the Belt. The rings are protected from unrestricted ice-mining operations, and continue in their original grandeur. Saturn's large moon, Titan, always popular with flatlander tourists, belongs to the UN. A Trinoc embassy recently has been established there.

Uranus and its moons belong to the Belt, except for Titania and Oberon, which are administered by the UN. Neptune and its moons are UN property; Triton houses several major scientific, industrial, and military research stations, while on Nereid the Outsider base has become an unobtrusive institution, greatly expanded in 500 years.

The UN long ago ceded to the Belt its claims to frozen Pluto and to Pluto's binary companion, Charon.

Flatlanders

On 29th-century Earth, the term 'flatlander' is a synonym for 'native-born.' Once a mark of contempt used by Belters to denigrate Terran citizens who did not or could not travel in space, 'flatlander' now is cheerfully used by all Terrans to describe themselves. On Earth, it is often used with a suggestion of tough, ironic, pride. Without the resources, sophisticated technology, and heroic determination of flatlanders, the Kzinti would have enslaved all human worlds, and the secret of the hyperdrive would have been the aliens' ultimate prize The word flatlander now, for Earthers, conveys a certain solidity and stability which they often perceive as lacking in their overspecialized, inbred, colonist cousins.

Despite their cosmopolitan outlook, some flatlanders exhibit a condescending superiority toward offworlders, whom they consider amusingly grotesque in habit and physique. Flatlander xenophobia still sometimes manifests itself — some people from Earth just can't take aliens, seeing them as unnerving monstrosities.

Offworlders from long-established colonies still sometimes say 'flatlander' with a certain disdain — especially to indicate any lapse of spacewise common sense. They feel that flatlanders have an inborn over-confidence that leads to foolish and dangerous behavior anywhere beyond the benign environment of Earth. In the words of a We Made It pilot, flatlanders are "basically unstable, not paranoid enough to survive, and always a little bit helpless," away from Earth.

Visiting 29th-Century Earth

Offworlders visiting Earth for the first time expect to find a dull, badly-overcrowded planet with an unwieldy, authoritarian government, where 18.5 billions live long, bland, pointless lives of physical and cultural conformity in a perpetually-precarious balance between the world's renewable resources and foolish flatlander appetites. Such is the stereotype of Earth.

In many regions of Earth, urban centers do blend together. San Francisco and San Diego are the northern and southern ends of one sprawling coastal megalopolis; Los Angeles alone has over 60 million people. For 350 years, transfer booths have covered the Earth in a net of virtually instantaneous travel, melding a multinational physical type. Often place-names are the only reminders of the past — how thoroughly San Francisco, Topeka, London, Sydney, Qahira, Resht, Moskva, Calcutta, and Hong Kong have come to resemble one another!

Every city in the world has slidewalks, all moving at the same 1 5 kph speed. The stores along the slidewalks sell the same products. Everywhere the fads, fashions, and body-paint styles change simultaneously, in one monstrous, world-wide surge. Passing citizens all seem to dress alike and look alike — no longer citizens of the U.S.A., Germany, or Egypt, but mere flatlanders, complacently unconcerned with offworld events. Everyone speaks unnecessarily fast, noisy Interworld rather than Deutsche, English, Francais, or Espanol. All the charming arbitrary, ancient irrationalities of place, time, and custom blend into an overwhelming uniformity of world-wide city, like unending dull, gray paste. All this is true, yet ...

Earth is humanity's true home, the world on which men and Dolphins evolved, the archetype of all terrestrial planets, and the standard by which each one ultimately is judged. Earth is a kind, beautiful, blue-green world, a forgiving planet with just the right elemental mixture, a gentle and predictable environment, a benign radiation environment — the safest, most comfortable, most natural world in the universe for human beings, whether flatlander or offworlder.

New visitors accustomed to low gravity may find life at one gee difficult at first, but they adjust rapidly. The 24-hour day and the sunlight seem oddly right, and the sky is the right shade of blue. Preconceptions become irrelevant. Earth smells good. There is a haunting, familiar, used flavor to it, a glorious and ever-present taste of history and prehistory. An offworlder never forgets his first trip to Earth. Somewhere in each breath are molecules inhaled by Aristotle, Shakespeare, Pushkin, Confutze, Einstein. Traces of ancient industry linger in the air, sensed if not smelled: wood smoke, gasoline, coal fumes, tobacco, diesel fuel, breweries.

The cities are incredibly crowded — and not at all grim. Though rarely even approaching two meters in height, flatlanders come in all shapes and colors, and dress in strange and eldritch ways. Along the city slidewalks a topological explosion of swirling colors dazzles the eyes. Nowhere are the creature comforts more luxurious, the conveniences more reliable, and the services and entertainments more sophisticated and breathtakingly diverse than on Earth. Magnificent arcologies, built in a variety of shapes for residential volume as well as height, tower above the lesser cityscape, their many levels harboring an unexcelled panorama of human life. The science of soundproofing and the art of creating the illusion of space where space is limited make even the most cramped quarters seem livable. And flatlander food is still the best in Known Space.

For all its billions, Earth has open space. The arcologies allow regular patches of parkland amid the urban sprawl. Even in the most crowded nations are scattered tracts of agricultural land and preserved wilderness. The zoos of Earth are huge — the largest has ten transfer booths within it. The zoos display non-sentient alien life-forms as well as an increasing number of extinct terrestrial species, which have been recreated by geneticists working from frozen cell tissues.

Earth's population is roughly four times its 20th century density. Large tracts in Australia, Africa, northern Canada, Siberia, and in the Amazon basin remain unsettled. Restored and protected by many statutes, Earth's polar regions and oceans are also refreshingly unspoiled, though sea-floor bubble-towns exist and submerged hotels and Dolphin embassies are found world-wide.

Earth, for all its billions, is a fine place to visit or to live — and most flatlanders never leave. Human survival is easy on Earth, but achieving lasting success, great wealth, or true excellence is probably more difficult here than on any other human world. Incorrigible flatlanders point out that the poorest Terran citizen leads a more pleasant life than the magnates of many colony worlds. But for the restless, for those haunted by cosmic visions of exotic undiscovered worlds, true adventure beckons in the unexplored frontiers of Known Space.

Belt

On the night of January 1, 1801, the Sicilian astronomer Giuseppe Piazza, while making careful observations for a new star catalog, discovered Ceres, the first of the minor planets, *or asteroids.* Orbiting the Sun every 4.6 years at a mean distance of 257 million miles, Ceres seemed to fit nicely into the wide, curiously-empty gulf between Mars and Jupiter.

Unsatisfied by Ceres' apparently small size, an association of determined planet-hunters led by Baron von Zach continued searching for *a* larger "missing planet" — whose hypothetical existence had been suggested by Kepler in 1595, and by Titius and Bode during the 18th century. No such planet was ever found, but between 1802 and 1807 the planetoids Pallas, Juno, and Vesta were discovered. From the 1845 sighting of Astraea onwards, there followed a steadily-increasing stream of asteroid discoveries, pushing the total number known well into the tens of thousands by the early 21st century. As humanity spread out into the Belt, the origins

of this vast, fragmented asteroid swarm remained a mystery, although the multiple parent-body theory continued to be the most popular.

Ceres, the capital of the Belt, is the largest of the asteroids, with a diameter of 1032 km [637 miles], a 9.1 hour "day," and a feather-light surface gravity of 0.04 gee. Of the rest, only a thousand or so have diameters exceeding 50 kilometers, although (in the Ringworld era) millions of individual objects have been charted, mined, and/or settled. These are mainly "flying mountains" — slowly tumbling, drifting, irregularly-shaped chunks of metal, stone, and/or icy-carbonaceous material from 100 meters to 10 km in diameter. No asteroid has sufficient mass to retain even a thin atmosphere, and only a fraction are large enough to have assumed spherical shapes. (Even a 100-meter rock masses millions of tons, nonetheless!) Most asteroids lie in the main Belt, orbiting at two to four times the distance of the Earth from the Sun, in the same plane and direction as the planets. Large asteroids rarely pass within a million kilometers of one another. From Earth, only Vesta becomes dimly visible to the unaided eye.

A third of the main-Belt asteroids are grouped in 100 distinct bands, called the Hirayama Families, whose members share similar orbital elements. Ten great gaps in the Belt (Kirkwood gaps) are swept nearly clean by Jupiter's gravitational resonances. In the orbit of Jupiter itself are two important clusters of dark, reddish asteroids, the Trojans, which occupy stable zones of equilibrium 60 ahead of Jupiter (the Achilles Group) and trailing 60° behind (the Patroclus Group). There are thousands of minor planets in each Trojan group. Other asteroid families have odd, eccentric, and often highly-inclined orbits which carry them far from the main Belt. Among the most familiar of these are the Amor and Apollo asteroids, which cross the orbits of Mars and Earth, respectively. Icarus, discovered in 1949, drops inside the orbit of Mercury, passing within 17 million miles of the Sun at perihelion. In the outer Solar System there are lesser gas-giant Trojan groups, and a diffuse trans-Saturnian belt containing Chiron. In the Ringworld era, remote operations in the cometary belt have become increasingly significant, while discoveries of inner-system asteroids with unusual orbits still occasionally occur.

The Value of the Belt; Early History

Probes to Earth-grazing planetoids late in the 20th century proved the practicality of resource-retrieval operations in deep space, and hinted at the wealth of the asteroids. In general, the composition of the Belt roughly parallels that of a differentiated terrestrial planet, although the combined mass of the asteroids is far less than Mars. Many are primarily solid nickel-iron, mineral-rich stony-iron mixtures, or rocky-crustal bodies; but about 60% are chemically-primitive carbonaceous chondroids containing significant fractions of frozen volatiles — including water, carbon, nitrogen, and primordial organic molecules. These elements and compounds, essential consumables for life in space, are almost wholly absent from the surface of the Moon, and are very expensive to transport from Earth'ssurfaceinquantity.

Early expeditions to the Belt used ships built in orbit about the Moon from lunar materials, a pioneering deep-space construction enterprise. The first manned "circumnavigation of the Belt" lasted a decade, included visits to Vesta, Juno, Astraea, and a score of other major asteroids, and led to the almost-immediate founding of Ceres Base. A steady stream of independent-minded Moonbase personnel followed. Startling discoveries of drifting mountains harboring thousand-ton veins of silver, gold, and platinum, and of a hidden trove of magnetic monopoles scattered through the core of a nickel-iron asteroid, triggered a rush to the Belt of starry-eyed prospectors and adventurers with "monopole fever." Fortunes were made by many of those who learned caution before the Belt killed them. Their incredible stories of survival in space are still told by modern Belters: the voyage of Four Gee Jennison, the tales of Airlock Atwood and Monopole Mike, the exploits of Eric the Cyborg, the *Ringjammer's* hazardous journeys, and the Church of Rodney's sales to gullible flatlanders of phony mineral rights to phantom asteroids. The "Far Look," a peculiar form of self-hypnosis caused by prolonged staring into the depths of space, claimed more than its share of newcomers and old-timers alike.

By the year 2100, Belters, numbering less than one million, held title to most of the inner Solar System. One-gee drives using crystal-zinc fusion tubes had replaced the chemical, fission-battery, and/or ion drives of the early decades of settlement. Ships became smaller, more dependable, far more versatile, cheaper, much faster, and infinitely more numerous. The Belt was already a web of telescopes, maser relays, and tracking beacons — guaranteeing accurate, up-to-the-second data in computing safe, efficient orbits for miners, bulk cargo carriers, rescue pilots, and goldskin cops from Ceres, Pallas, Juno, Vesta, and Astraea. Great astronomical telescopes were built in the Trojans, and observation stations were set up on Eros and other "Earth-grazing" asteroids. Bases were established on Io, Europa, Ganymede, and Callisto, and scoop-mining of Jupiter's atmosphere began. From the molten-tin mines of Mercury to the ice-mines of Saturn, Belt industries flourished. Always respectful of their alien surroundings, Belters treated their machines as if their lives depended on them. In the Belt, the Finagle-Murphy Laws are only half a joke.

The image of Belters as tough-minded, self-sufficient, flawlessly-competent loners, deftly maneuvering their singleships among the flying mountains against a stark backdrop of stars dates from this early epoch. Regardless of occupation, most Belters logged years of training in flying spacecraft, though this was never mandatory. Talented, underemployed flatlanders stuck in boring jobs flowed into the Belt, as did many displeased with Earth's crowds and social problems. Survival in the Belt certainly required independent thinking, intelligence, resourceful action, foresight, deliberate caution, and common sense. Honesty and absolute equality of opportunity, responsibility, and pay was the rule. Life expectancy was very short for foolish Belters. Indeed, Belters came to view as self-evident that those humans who succeeded in colonizing space clearly were more intelligent than those who stayed on Earth. Trojan scopes kept watch for evidence of outsiders — then the Belt-slang for the hypothetical first sentient aliens to contact the human race — and Belters took it for granted that aliens would think better of humanity if they met Belters first. The Belt got through the organ bank period with a clear conscience, by *deciding* not to turn their criminals into donors. Though illegal, smuggling was never immoral in the Belt: the Ceres government merely imposed a 100% tax on confiscated cargoes, and offered commissions, when necessary, to bounty hunters. The UN ignored questionable connections with Luna: Earth always paid top dollar for monopoles, or relics for the Museum of Spaceflight, whatever the source.

Belter Ways; Later History

In the intermittent, negligible gravity, Belters grew willowy, with narrow frames and sprawling, slender limbs. Many resembled under-muscled basketball players, although a steady influx of flatlanders of every description mitigated the tendency to extreme physiques. In general, old-time Belters looked 15 to 20 years younger than their chronological ages: the light gravity even left the corners of their eyes unwrinkled well into their 60s. Males and females alike usually wore long or short variants of the "Belter crest" haircut, a 2-to-5-cm-wide strip running from forehead to crown to nape of neck along a polished, darkly space-tanned scalp. Most Belters decorated their suits. The interior of his or her suit was the only place many a Belter could call home, and the one personal possession that had to be kept in perfect condition. Visually-striking suit designs featured beautiful, even flamboyant images ranging from nude spouses to Dali's *The Madonna of Port Lligat* to a Viking ship with snarling dragon prow floating half-submerged in the bright milky swirl of a spiral galaxy. In regions of the Belt where air and temperature were controlled, many Belters practiced nudity all their lives. Singleship miners, of course, were only one aspect of Belt industry, which included chemists, nuclear physicists, astrophysicists, politicians, geologists, file clerks, merchants, computer programmers, and so on. Belter speech grew crisp and quick, with a precise, clear accent - a result of reliance on various communication systems.

As the Belt prospered, tensions mounted with Earth. The UN always had assumed that the resources of the asteroids "belonged" to Earth, that the Belt should be rearranged and dismantled purely for the benefit of Earth, and that the Belt's volatiles should be exploited in massive terraforming projects aimed at transforming Mercury, Venus, the Moon, and Mars into "new Earths" having benignly terrestrial climates. Flatlanders expected Earth-grazing asteroids to be moved or destroyed, not homesteaded. The concept that the Belt now belonged to the Belters was hard to swallow. But Earth still needed the raw materials and services the Belt could supply, and the UN realized that Earth's growing social, technological, and population problems would not be solved by gratuitous exploitation of Belt resources. Even more to the point, armed with anti-radar and tens of thousands of touchy fusion drives, the Belt could defend its interests handily.

Tariffs and treaties proliferated. All interplanetary take-offs, routes, destinations, course changes, cargoes, personnel, and detailed time/position flight plans had to be cleared with Ceres. There were new fees for solar weather forecasts, tracking, routing and passage, refueling, rescue and salvage, maser message relays, and Belt telescope data. At times, incidents of boarding, search, and seizure became serious. Ramrobot funding, targeting, and launches from the linear accelerator on Juno created a continual squabble. Fortunately, the Earth-Belt conflict remained at the

level of industrial warfare. The *Free Belt Charter* was signed in 2109, following the Sea Statue incident and the failure of economic sanctions against the Belt during a new dispute over use of the Jovian moons. The UN was allowed to keep Earth, the Moon, Titan, rights on Mercury and in Saturn's rings, plus Mars and its moons — which at the time Belters looked upon as a useless, gravity-soddened wasteland. Earth's subsequent massive, often hasty, and often ill-conceived interstellar colonization program has since been correctly understood as an extended effort to leapfrog the dominion of the Belt.

Ironically, two factors crucial to the early independence of the Belt were terraforming projects — the construction of Confinement and of Farmer's asteroids. Confinement freed the Belt of its most important tie to Earth: the physiological necessity for women to gestate and to bear children in a gravitational field. Early explorers had run across a roughly cylindrical block of solid nickel iron (S-2376) 3 km long and half that thick, orbiting not far from Ceres. Confinement Project workers drilled a hole along the asteroid's axis, filled it with plastic bags of water, capped both ends, and bathed it with light from solar mirrors. When the heat reached it, the water exploded into steam. After S-2376 had cooled, the result was a cylindrical nickel-iron bubble 19 km long by 9.5 km in diameter. The workers then rotated the bubble to provide a half-gee of spin-gravity, filled the great interior with air and with kilotons more of expensive water, and covered the inner floor with a mixture of pulverized stony-meteorite material and compost seeded with select bacteria. A special fusion tube ran down the long axis, nearly 5 km up from everywhere, engineered permeable to a normal range of visible light. A gentle bulge in the middle created the wedding-ring lake which now girdles the little inside-out world. Sunshades a mile across were set to guard the poles from light, so that snow could condense there, fall of its own weight, melt, and run in rivers to the lake. With over 500 square kilometers of usable land, Confinement now houses 100,000 people in comfort—mostly women, mostly transient, and mostly pregnant. The construction of Confinement took a quarter of a century. Farmer's asteroid, a 16-km-diameter bubble-formed world similar to Confinement, grew most of the Belt's food supply for a century following its construction.

The Belt population increased greatly: in the Ringworld era it is 1.2 billion. Bubble worlds have proliferated, some equipped with drives for mobility. Dome and fissure cities have spread throughout the larger asteroids. The best lodes in the main Belt have nearly been exhausted, and few Belters now fly singleships, except for pleasure. Mining is more difficult, but deep space operations have become quite productive in the outer Solar System, and in the remote Oort cloud of cometary nuclei. Most Belters, though, live in main-Belt asteroids, or in sophisticated space habitats, each with its own unique flavor and history. Low-gravity industries flourish, but Belters of every imaginable occupation may be encountered. Belt food exports to Earth are now substantial. Tourism to the inner Belt is so popular that space traffic must be restricted. There is a three-month wait to virtually any alluring destination, and the Palace Hotel on Vesta is always booked up years in advance.

The terrible events of the Man-Kzin wars brought about a new era of Earth-Belt cooperation, although their separate governments and distinct cultures have endured (Belters still tend to make few unnecessary gestures, for example). To Belters, Earth-dwellers will always be mere flatlanders. Belters love their flying mountains, carved-out rocks, picturesque surface domes, and spinning inside-out bubble-worlds. Most of all they love space itself: the stars blazing like diamonds on black velvet, golden Saturn or blue Neptune for lighthouses, the Milky Way an unforgettable, jeweled bracelet for all the universe. Belters were the first to settle Wunderland's Serpent Stream, and have explored, even migrated to many far-flung systems where major human colonies do not yet exist.

Large Asteroids

Name	*Number*	*Diameter (km)*	*Location*	*Population (in millions)*
Ceres	1	1032	mid-Belt	37.4
Pallas	2	616	mid-Belt	24.8
Vesta	4	579	inner Belt	27.5
Hygeia	10	443	outer/mid-Beit	21.6
Interamnia	704	345	outer/mid-Beit	17.1
Davida	511	337	outer/mid-Beit	13.2
Cybele	65	311	outer Belt	23.9
Europa	52	301	outer/mid-Beit	15.4
Patientia	451	284	outer/mid-Beit	11.1
Euphrosyne	31	276	outer/mid-Beit	6.3
Bamberga	324	258	mid-Belt	12.8
Camilla	107	255	outer Belt	4.4
Juno	3	252	mid-Belt	15.7
Psyche	16	249	mid-Belt	16.6
Themis	24	248	outer/mid-Beit	9.3
Fortuna	19	245	inner Belt	14.5
Dembowska	349	151	mid-Belt	3.2
Astraea	5	127	inner/mid-Beit	7.6
Hektor (binary asteroid)	624	304	Leading Trojans	8.4
Patroclus	617	172	Trailing Trojans	5.1

Belter Miniworlds

Name	*Diameter in Kilometers*	*Population*
Atawulf	10	8,000 to 80,000
Blister	36	180,000
Chateau	31	750,000
Eros	19 x 30	125,800
Ghost Dance	38	575,000
Giverny	29	1,400,000
Habor Lights	3	137,000
Ixa	13	14,000
Jackpot	11	35,000
Nudge	24	90,000
O'Leary	45	1,200,000
Pastora	35	1,300,000
Planters Island	30	320,000
Pueblo	27	5,100,000
Raindrop	16	57,000
Rampion	40	2,100,000
Scoop	7	5,500
Tavolo	20	2,503,400
Vargas	33	1,900,000
Xasis	21	230,000

This table is in two parts. The first, Large Asteroids, consists of 20 selected long-settled and heavily-populated asteroids. All of these worlds exist. As their populations reveals, in size they are each equivalent to a 20th century Earthly state or nation. An explorer of almost any background or occupation might hail from any of these worlds. Readers are reminded that many actual asteroids of fair size are not in this list.

The second list, Belter Miniworlds, is composed mainly of asteroids which so far have escaped detection by 20th century astronomers. They are developed as examples of habitats possible not only to the Belt but as what might exist in the Serpent Stream, or orbit above Down or Gummidgy, or what might drift in some remote Oort cloud. These smaller worlds are briefly described; their diversity is more easily characterized than vast worlds like Ceres or Hygeia.

Conventionally, asteroids are numbered in order of their discovery, and that has been followed in the Large Asteroids list. Asteroids are commonly referred to by both number and name.

Atawulf
A jagged, roughly-tetrahedral, Everest-sized flying mountain, Atawulf was long ago mined-out and left with a vast hollow core. Later its shell was cut in two, allowing the halves to open as needed, then to close again with a precise seal. Over the centuries the interior has been put to many uses: as a drydock, as fleet camouflage, and (most often) as a shirt-sleeve environment for prototype assembly-work on large space structures.

Blister
Equipped with modest fusion drives and thrusters, Blister has a highly-eccentric, frequently-adjusted orbit which takes it to regular rendezvous with Mercury, Venus, the Moon, and the Belt. Converted for slow freight-hauling and fuel-processing, the asteroid now holds a diverse population of permanent residents. Blister occasionally picks up hazardous cargo to be dropped into the sun.

Chateau
A beautiful three-dimensional spiderweb of 54 1-to-5 km planetoids bound together in a light geodesic array, Chateau originally was a kind of space-gypsy trailer park. It is now a highly-regarded Belter colony, offering dwellers an exotic variety of habitats, services, and high-tech career opportunities.

Eros
19 x 30 km. This roughly-cylindrical, Manhattan-sized, Earth-approaching asteroid is a vitally important relay and tracking station, communications center, military, rescue and refueling base. Discovered in 1898, Eros now has 125,800 permanent residents.

Ghost Dance
Located in the outer-Belt, this icy carbonaceous asteroid is still rich in water-bearing minerals and hydrocarbons — consumed sparingly by its citizens in a variety of specialized manufacturing ventures and fine handicrafts. A stately procession of snow-sculpted supernatural apparitions, meant to evoke the hunger-induced hallucinations experienced by its first settlers, graces the exterior of Ghost Dance.

Giverny
Initially funded by the Sinclair Foundation, with UN/Belt participation, Giverny was created as a haven for the arts, literature, architecture, and the human sciences. The atmosphere is old — European: relaxed, but intensely inspirational. Giverny caters to visitors on low-key sabbaticals as well as serious contemplaters, to pay its way.

Harbor Lights
Originally acquired by Monopole Mike from representatives of the notorious El Dorado Ltd., Harbor Lights panned out as a worthless ball of pulverized silicates. Enraged, Monopole Mike detonated a spare fusion tube at its center. The explosion melted and expanded the asteroid, but did not destroy it. Much later, after extensive laser-polishing, Harbor Lights became a transparent, sparkling shell of fused, pseudo-volcanic quartz containing several fabulous honeymooner resorts. Harbor Lights, Inc., is operated by natives of nearby Washout, which it orbits.

Ixa
Once one of the smaller Leading Trojans, Ixa is armed with laser cannon, a large fusion power plant and drive, and a huge (but unpredictable) stasis-field generator — all relics of the Man-Kzin wars. Though Ixa's lasers are now used to launch light-sail pleasure craft and for interstellar communication, most inhabitants of the dark, reddish asteroid are UN/Belt military staff, support personnel, and their families.

Jackpot
Its rich lodes long since exhausted, Jackpot is now owned by the Ceres government. A cavernous landing-bay and a grand convention complex/mobile financial center occupy nearly have of the asteroid; much of the rest is devoted to accommodations worthy of a fine luxury liner. Equipped with high-efficiency thrusters, Jackpot does leisurely high-echelon cruise work on occasion, and is sometimes hired for special uses.

Nudge
A full-service commercial spaceport and stopover asteroid, Nudge is often found well above the main-Belt plane. It features several used-spacecraft sales-and-leasing concerns, expedition outfitters, hotels, restaurants, and an emergency drive. Some 90,000 technical, support, and service personnel are permanent residents.

O'Leary
This remarkable structure consists of 205-km cylindrical asteroids tethered in a Klemperer rosette rotating about a 21-km twin-tapered fat-spindle parent body. Prominent intellectual communities here include noted Belt historians, deep-space economists, specialists in small-world terraforming, and consultants in non-planetary habitats for remote solar systems.

Pastora
A spheroidal bubble-world of moderate population, Pastora originally was privately financed by colonists unwilling to apply for breeding licenses under Earth's restrictive Fertility Laws. Now self-supporting and independent. Solar power is important here. Parts of Pastora are intensely-cultivated.

Planters Island
This agricultural bubble-world resembles Farmers asteroid. It is located near Patroclus in the Trailing Trojans, and has long been known for its exotic foodstuffs, rare spices, and fine brandies.

Pueblo
This high-density Belter community is a labyrinth of isolated and interconnecting dome and fissure cities scattered across its surface and through its exhausted mining veins. Pueblo's partially-terraformed exterior tracts are shielded by inflated plastic bubbles. Part-time, cooperatively-shared accommodations are common.

Raindrop
A 16-km-diamter sphere of seawater with a 3-km solid core, Raindrop is used for low-gravity hydrodynamic research, as a space marine-biology laboratory and ecological preserve, and as a reservoir, tourist attraction, and source of seafood. Enveloped by a transparent bubble, Raindrop features half a dozen 1-km submersible stations.

Rampion
This is corporate headquarters for Rampion Industries, IntraBelt Mining (Inner System Division), and other specialists in the extraction, refining, and processing of space resources. Rampion is not for flatlanders — everything on the planetoid has a Belter feel: efficient, multipurpose, functionally-elegant.

Scoop
A 7-km nickel-steel asteroid, aerodynamically-streamlined and fitted with drives, Scoop was originally designed for general-purpose scoop-mining. It now can ferry 2500 tourists through Jupiter's atmosphere on each of its periodic passes. Scoop comfortably supports a permanent population of over twice that number.

Tavolo
A multi-tiered, flat-sided, artificial ring-shaped structure, Tavolo is constructed entirely from asteroidal materials. Its thick, slow-spinning outer disk and fat central cylinder give it the look of an enormous wheel lost by some ancient flatlander groundcar. Both residential and industrial, Tavolo also houses a campus of the University of Technology.

Vargas
This bubble-formed resort, gambling spa, and entertainment center caters both to the Belter and to the flatlander tourist trade. Hotel complexes float above the terraformed interior of Vargas; others, sunk through its shell, look out on starry vistas above the asteroid's intentionally-rugged, picturesque surface.

Xasis
On this irregularly-shaped, olivine-rich, stony-iron slab are several isolated low-gravity bio-engineering laboratories, as well as the no-longer-essential but ever-popular Flanagan's Fauna Reserve, now administered by the Belt Zoological Society. Most of Xasis' cities are domed-over craters.

Canyon

Canyon is the second of seven planets in the system of p Eridani A, an orange-yellow K2 sun at the edge of Human Space 22 light years from Sol. Formerly a Kzinti world, called Warhead, it was annexed at the close of the Third Man-Kzin War (2531), Canyon is the gateway to the inner Eridani systems: e Eridani, 40 Eridani, and Epsilon Eridani, on the way to Earth. It marks the southernmost contour of Kzin Space, and has been of invaluable strategic importance historically in enforcing the UN restrictions on Kzinti expansionism. Officially, the Patriarchy recognizes Earth's dominion, but privately most Kzinti regard Canyon as a foreign outpost within their territory. At the time of Ringworld,

few flatlanders emigrate to Canyon, but many find it fascinating to visit.

Canyon does not quite follow the usual rules for planets. The probability of finding a habitable planet in the p Eridani system had always been considered low — but Canyon is hardly an Earthlike world. It is small, not much bigger than Mars, with a diameter of 7715 km [4795 miles] . Its density is high enough, though, to produce a surface gravity of 0.45 gee. The day is 27.1 hours long; there is no moon. Canyon orbits its sun at a distance of 113,756,000 km [70.7 million miles] in a year of 262 UNS days [232 local days] . The crust of the planet is a rich source of radioactives and high grade heavy-metal ores. In the cometary halo of the Canyon system, magnetic monopoles abound. There is a second star in the system, p Eridani B, several times fainter than Canyon's sun. The companion has a period of 480 UNS years, never approaching the inner system more closely than Pluto approaches Earth. P Eri B has two inhospitable planets of its own.

Until a few hundred years ago, the thin atmosphere of Canyon was barely able to sustain primitive photosynthetic plant life. The air pressure and oxygen content were far too low for humans or Kzinti. No native animal species had ever developed, but a variety of extremely hardy organisms resembling exotic green-and-violet lichens flourished in the temperate belt. The Kzinti Empire had swallowed the planet long before the Wars with Man, staffing it with the aid of domes and compressors. The colony eventually became a major garrison with a substantial military-industrial support complex. They had named it Warhead for its proximity to the unconquered Pierin worlds. Canyon's native life had already begun to suffer, but the worst was yet to come.

The Treatymaker

Human civilization on Canyon is a direct legacy of the Third Truce, brought about by the "Wunderland Treatymaker." This awesome weapon was a gigantic version of the Slaver disintegrator commonly used as a mining tool. With financial backing from Earth, Wunderland's government built the enormous dual-beam charge-suppression device and transported it all the way to the Warhead system. It was fired only once. The two beams touched down thirty miles apart on the surface, bracketing the main Kzinti factory installations and spaceport. A solid bar of lightning chewed twelve miles deep into the planet, exposing magma over a region the size and shape of Baja California on Earth. A few domes protected by stasis fields were swallowed by lava welling up in the center of the great gash before the rock congealed. The eventual result was a sunken sea surrounded by rugged, sheer cliffs many miles high, with a long narrow island running most of the length of the midsea. In the canyon there is comfortable air pressure — and a thriving pocket-sized human civilization. Outside, the bleak, nearly-airless Canyonscape resembles a lunar wasteland. Loss of water vapor from Canyon's atmosphere and gigatons of dust dropping on its surface eliminated most marginal native species. Some survivors have grown luxuriously, though, creating cascades of hanging herbage dripping from the rims down the canyon walls. On the surface there is a large, indifferently-tended botanical preserve for the remaining varieties of the indigenous flora: the Lichen Gardens.

The gash on Canyon runs roughly east-west at 12° north latitude, and the ocean at its floor has been stocked with a productive, well-integrated marine ecology. Organisms genetically-tailored from half a dozen worlds co-exist and flourish there, supplying oxygen and ample food.

Running down the center of Long Island is a belt of colorful vegetation with the wild look of a Kzin hunting park. Human visitors relish the atmosphere of primeval adventure supplied by the imported Kzinti life which is now common throughout the canyon, blending its glaring oranges, pinks, and yellows into the terraformed biosphere. Canyon has become as popular with Kzinti as with human tourists. Against the miles-high cliffs of cut stone are the silver threads of old elevators, obsolete for travel since the advent of transfer booths, but still popular with sightseers for the spectacular views. Many residences and businesses are set hundreds of meters up the north and south faces of the canyon, most featuring adequately grand balconies. Humans and occasional Kzinti enjoy climbing the rocky cliffs for sheer sport in the low gravity.

The population of Canyon fluctuates at around eight and a half million, depending on the tourist trade, mining industries, and military assignments near the system. Native Canyonites are definitive low-gravity types: pale (though seldom albino), soft in the muscle, often topping two meters tall. Generally sophisticated, well-educated and cosmopolitan, they are comfortable in confined, high-density habitats, such as the wheel cities above Down. Canyon is hardly a lawless world — but its police tend to ask few questions of Canyon-dwellers who mind their own business. There is a thriving black market, seldom visible to outsiders. There are a number of reclusive inhabitants whose past histories are sometimes best left undemystified. On Canyon's barren moonscape it is still possible for a careful pilot to land a spacecraft undetected and hide it from anything but a thorough search with deep-radar. Canyon's curious fascination for its alien tourists may be partly due to the domes buried beneath the lava of Long Island: some Kzinti may well have ancestors here, alive in frozen time.

Down

Down, the home world of the Grogs, circles the red dwarf star L5 1668, 12.3 light years from Sol. Down was taken from the Kzinti at the end of the first Man-Kzin war. The planet is larger than Earth, with a diameter of 14,700 km [9136 miles] . Its surface gravity is 1.15 gee, high enough to tire offworlders with weak physiques. Down's sun is less than one percent as luminous as Sol: in terrestrial skies, L5 1668 is a ninth-magnitude star, well below the limit of human naked-eye seeing, quite close to brilliant Procyon. In space, Down lies just over one light year from We Made It.

The small family of planets orbiting L5 1668 was detected by Belt telescopes in the mid-21st century, but it was then felt unreasonable to expect any would be habitable. Early UN ramrobots were not casually wasted on remote, insignificant red dwarf systems; and two later-generation exploration probes targeted for L5 1668 failed to report, apparently suffering malfunctions. In the 23rd century, several of the manned scoutcraft which disappeared beyond Procyon may well have encountered Kzinti near Down.

The planet Down huddles close to its faint, cool M-type primary — falling to 20.7 million km [about 13 million miles] from the star's surface at perihelion. Its year is almost exactly 67 UNS days [56 local days] long. With its large moon, Shiela, Down is a rare example of a terrestrial couplet world in a red dwarf system. Without Sheila, tidal forces long ago would have stopped Down's rotation with respect to its sun. Instead, Down manages to spin on its axis once every 28.7 hours. Sheila has a diameter of 4769 km [2964 miles], and describes a tidally-locked eccentric orbit with a period of 17 UNS days. A couplet's world's companion is also essential in keeping a Down-like planet warm enough for life: it generates geothermal energy, and helps maintain an extenisve terrestrial atmosphere more efficient than Earth's at trapping infrared radiation.

The history of Down is entwined with the events of the First Man-Kzin War. Even before the outbreak of that terrible, half-century conflict, Kzin ships based on Down began to harass human star-travelers. An unarmed colony ramship approaching We Made It had been obliged to direct its photon drive at a hostile alien warcraft of then-unknown origin, slicing it in half. By the time of the Patriarchy's surprise attack on Wunderland, Down was the longest-established Kzin military outpost within easy striking distance of all of Earth's developing interstellar colonies. Formerly of interest only to a few frustrated astronomers, L5 1668 suddenly became a beacon of death aimed at the Solar System. Ultimately, the Outsider sale of the hyperdrive shunt came about at a most opportune time for humanity, and in an ideal location. Crashlander marines from We-Made-It, having liberated Wunderland, were the first to engage the Kzin fleet in the Battle of Down.

Known Space Low-Life Locales

Where are the Tatooines and Mos Eisleys of Known Space? Practically anywhere you like!

An interstellar civilization of any size cannot be policed without instantaneous communication, instantaneous interstellar travel, and lots and lots of police, and without that civilization managing to keep such technology and information from the bad guys.

In Known Space, low-life hangouts can be on every major world, including Earth — not all places will have transfer booths, and there are still lots of interesting places few people want to live in: Antarctica, bubble-towns on the ocean floor, etc. The most logical places, of course, are remote and/or sparsely populated: Canyon, the West End of Jinx, an underground enclave on We Made It, Margrave, even the outbacks of Down (depending on the grogophobia of the explorers). Wunderland has an extremely diverse spectrum of political and social communities. Belts are very appropriate for the types of independent entrepreneurs being considered here, especially the Serpent Stream or somewhere in the outer icy asteroids of the Beta Hydri (Silvereyes) system. Any off-island of Silvereyes (perhaps Minda, near the Pierin starport) would be satisfactory, or a moon of Godzilla, in Home's system?

In the Solar System, both the Moon and the planet Mars are very sparsely settled. The moons of Jupiter and Saturn are logical spots. Any mined-out and abandoned asteroid (maybe pushed out to a more distant solar orbit for reasons of safety) might be a splendid hide-out. Beyond Pluto, there are four major ice-giants. Of these only Persephone has no moon. There are innumerable unmapped, widely-separated chunks of matter (comet nuclei and such) forming a vast halo (the Oort Cloud) around Sol — and probably most stars. Venus, slowly being terraformed, is another good refuge. They might be in Saturn's or in Uranus' rings, in a floating station in the atmosphere of Jupiter, Venus, Saturn, or Neptune, on a privately-owned asteroid, a derelict ship, etc.

Keep in mind that the number of stars goes up as the cube of the distance from any point. There are a lot of stars in Known Space that few people or aliens have any reason to frequent. The major human colony worlds, and their stars, are hardly typical. Despite their great differences from Earth, physically, culturally, and historically, they are the planets most like Earth which humans have found. That is why they are heavily-populated human worlds. No doubt there are industrial station, relay/refueling stations (interstellar truck-stops), and so forth in unsavory locales.

Finally, most of Known Space is not Human Space. There is also Kzin Space, Trinoc Space, Kdat Space, Pierin Space, etc., for adventure, where that which is otherwise unobtainable can be found. Though every species protects and polices its own members to some degree, some will not interfere with the peaceful business of aliens within their jurisdictions.

Every solar system, whether or not it contains an Earthlike planet, harbors complex, diverse, and interesting environments waiting for player-characters to encounter.

Outback Field (where the first Ringworld expedition assembled) had always been the largest, least-crowded, and most-relaxed of Earth's three interstellar spaceports. Australia's wastes were otherwise unused. Outback primarily handled bulky freighter traffic, hazardous cargoes, and colony flights requiring hazardous cargo, and colony flights requiring years of preparation. The Man-Kzin wars altered it, and Australia, forever. In 2375, Outback Field was the only fully-equipped starport from which fusion-powered warships could be safely launched as rapidly as they were built. Many flatlanders leaving Earth to fight the Kzinti knew that the scorched Precambrian sands of Outback would be the last soil they ever touched. A relatively-high proportion of Australians and Asians flew in the hyperdrive armadas that ended the war; and the first human battlecraft reaching the surface of Down was crewed entirely by Australian assault commandos ("We're going *down,"* their pilot reported as the ship began its dive). In 2425, Down became the first Kzinti world annexed by humanity. Parts of the planet still bear great scars of the ancient conflict.

Humans in the Down System

In the Ringworld era, Down is a tranquil red-desert world. It looks a little like the Mars of Lowell and Bradbury, long before the advent of space travel. Much of its landscape remains as it evolved, at the request of its sentient, telepathic natives, the Grogs. Treaties exist with these sessile aliens regarding the importation of terrestrial flora and fauna. Most human development is confined to small, concentrated, widely-separated urban oases, occasionally connected by sub-surface transit-tubes and canals.

The planetary capital is Downtown, on the Ho river. It has less than a million residents. Nearby is the Institute for Xenobiological Research, the center for specialized Grog/human studies. Along the shorelines of rivers and seas, intensely-cultivated patches produce hardy, rapid-growing, gene-tailored crops. Arrays of ultraviolet-emitting disk-lights float serenely above the fields in the dim red sunlight. Dolphins run the fishing industries. A flourishing population of marsupial life-forms, including many species once nearly extinct, covers most of Down's isolated southern-equatorial continent, expertly managed by Grog zoologists. There are surprisingly-rural human communities in remote regions of Down, some still retaining a distinctly friendly self-reliant Australasian flavor. Downers of obvious Jinxian or Crashlander heritage are common. To the ancestors of these latter immigrants, Down must have looked like paradise.

Most of L5 1668's human colonists live in the high-density wheel-cities orbiting far above Down. The total population of these impressive space habitats is about 360 million, some ten times that of the planet's surface. Top-secret defense and intelligence complexes are intentionally omitted from the census — Down is a strategic focal-point for UN extra-Solar System affairs, and for certain lines of classified research. Interworld News Service has its central headquarters above Down, as does CrystalGrav Ltd. With a thriving communications industry, the atmosphere of the wheel-cities is active, diverse, and cosmopolitan. L5 1668's low mass gives starships easy access to hyperspace.

Surface-dweller and wheel-city worker alike see the 'Grog problem' as a flatlander delusion. They work harmoniously with Grogs in all the fields of mutual interest, and feel that safeguards against Grog mind control are no longer necessary. Downers ridicule Earth-bound extremists who still, from time to time, clamor for the extermination of the Grogs.

Downers are, however, very suspicious of Kzinti. The Patriarchy made repeated attempts to retake the L5 1668 system. Today, Kzin tourists are extraordinarily rare on the surface of Down, and are usually less than welcome anywhere in the vicinity of the planet.

Gummidgy

A colorful, primitive world, Gummidgy teems with exotic, flagrantly-alien flora and fauna. Most of its landscape is wild and unspoiled. Though Gummidgy is technically an Earthlike planet, its biosphere is distinctly non-terrestrial. The world's dayside bathes in the rich, glaring-white sunlight of Fomalhaut, its hot primary star. Enough savage, invisible ultraviolet penetrates the dry oxygen atmosphere to blind (and eventually to kill) unprotected humans. Visitors and colonists alike have pitch-black skin, their pigmentation altered by tannin pills or minor gene-tailoring. Translucent unsealed weather-domes shield the inhabitants of McOndie Base, the capital and only spaceport, and all other permanent settlements on the planet's unforgiving, sparsely-populated surface. Gummidgy's natives would choose to live nowhere else, however; their eyes often hold the dazzled, dreamy look of the spacewise xenophile — thoroughly at home in an utterly strange land, seduced by its wonders and without regret. The cold blue worlds of Human Space seem gloomy and tame.

Gummidgy is the only planet-sized body orbiting Fomalhaut, one of the brightest stars in Earth's skies. It lies just beyond the central cluster of heavily-populated human systems, 23 light years from Sol. Fomalhaut is nearly twice the mass and size, and over 14 times more luminous than Earth's sun. This brilliant A-type star belongs to a new class of peculiar, short-period pulsating variables resembling dwarf cepheids. It brightens rapidly every 1.5 UNS hours, briefly increasing its luminosity by well over 50% at maximum. The effect is scarcely noticeable on the planet's surface: the intense white sunlight merely takes on a tinge of actinic bluish-white at regular intervals. Though there seems no danger of a stellar detonation, the variability of Fomalhaut is still closely-scrutinized by scientists on Gummidgy. According to all observations, the star shone as steadily as Sirius until early in the 23rd century. Its pulsations remain an astronomical anomaly in the Ringworld era, despite the hundreds of GP1-hulled probes sent deep into the inferno of Fomalhaut's core. Starseeds have often set sail in the Gummidgy system, taking advantage of the rich harvest of high-energy photons to execute course changes. Fomalhaut may lie on one of

their fabulous migration routes, or perhaps its peculiar behavior now attracts them.

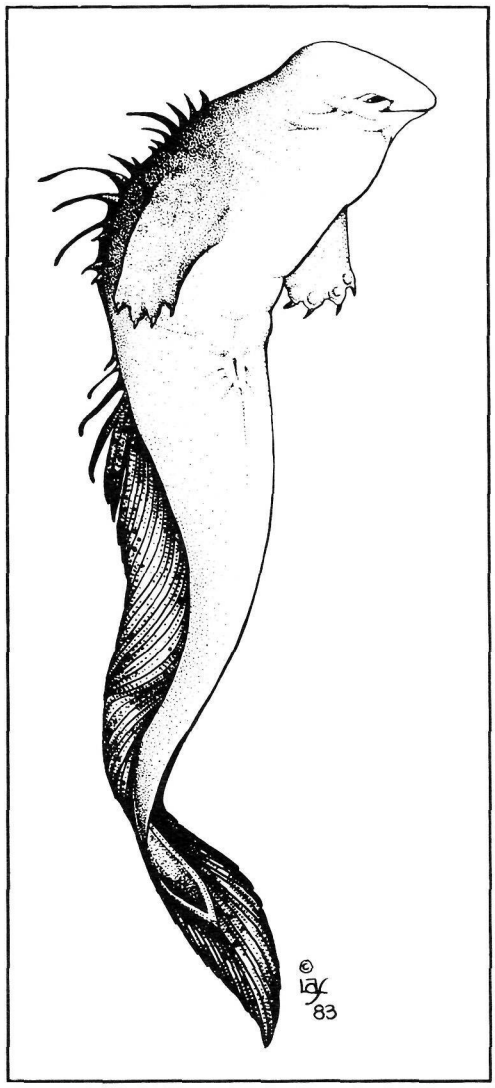
The inner planetoids of the Fomalhaut system are little more than half-molten rocks. Gummidgy is the outermost world, orbiting cautiously at 571,930,000 km [355,457,000 miles] over a year of 2031 UNS days [2671 local days]. The planet spins on its axis every $18^{1/4}$ hours. Most Gummidgy-dwellers accomodate its short day by having only two meals, brunch and dinner. The gravity is a comfortable 0.95 gee; the planet's diameter is 12,151 km [7552 UNS miles] . From space, Gummidgy looks deceptively Earthlike: blue-on-blue beneath a broken layer of white, with a single diminutive moon glowing beyond an arc of horizon. The moon, Typhon, is about 190,000 km [120,000 miles] distant, with a diameter of 2912 km [1810 miles] . Gummidgy and Typhon show nothing of the sprawling urban civilization marking the Earth-Moon system. Including the residents of several fair-sized orbital stations, the population of Gummidgy is only 19 million.

From 20 miles up, Gummidgy looks like a global planetary park. There is little polar ice, and few barren deserts. Snowfields blanket only the highest elevations of several magnificent ranges of young mountains. Few large rivers are visible, and no swamplands. All the riotous colors of the world's bizarre vegetation blur into a uniform rich-brown. The oldest and largest by far of Gummidgy's four major oceans is Circle Sea, as round as a tenth-star coin and covering a third of the planet. The impact which formed it must have been tremendous, enough to have substantially shifted the planet's orbit. Theorists have speculated that Gummidgy may have originated elsewhere long ago — perhaps around the modest K-type sun known as GC 31978 (Fomalhaut B) less than a light year away. The Circle Sea impact may have set the primordial planet adrift in the interstellar void, or it may have slowed the world enough for Fomalhaut to capture it.

The name Gummidgy derives from the human pronunciation of a Kdatlyno place-name — the Kdatlyno equivalent of perdition. The Kdat tradition of an early colony ship which came to grief on Gummidgy has been substantiated by deep-radar archaeology. Humanity's discovery of the planet was made by a ram-robot probe sent to investigate Fomalhaut's developing variability. The name Fomalhaut is ancient Arabic for "mouth of the fish," referring to the tiny constellation Piscis Austrinis, which was incorporated within Aquarius in the *UNS Sky Atlas.* On Ringworld-era star charts, Fomalhaut's designation is Alpha Aquarii. Occasionally it is also called CY Aquarii, a common code name for the Gummidgy system widely used in popular writings dating from the Man-Kzin wars. CY Aquarii itself is an extremely-distant variable star; it has a light-curve similar to Fomalhaut's, and lies in the same quadrant of sky as seen from Earth. Gummidgy's moon, Typhon, is named for a creature in Greek mythology which resembles one of Circle Sea's more monstrous denizens.

On Gummidgy

Most of the profusion of life on Gummidgy is poisonous or non-nutritive to humans unless carefully processed. Though its biochemistry is non-Terran in many respects, Gummidgy's vegetation has an efficient photosynthetic cycle which uses compounds basically similar to chlorophyll. Nourished for a billion years by an over-supply of ultraviolet light, the plant-forms have grown incredibly lush, multi-colored, and infinitely varied. Much of Gummidgy's ecosystem resembles a dry rain forest, in which the dominant hues are yellows, blue-greens, scarlets, magentas, and chocolate browns. Everywhere animals, fungi, and strange parasites flourish. The air itself, rich with oxygen and alien smells, is filled with life:



bird-forms, insect-forms, and a constant rain of dust, spores, feathery seeds, bits of leaves, and bird dung. Below a thick layer of detritus, the thin, spongy topsoil is usually gritty and water-poor.

There are vast stretches of blue-green veldt on Gummidgy, endless plains covered with tall fern-grass. Dry and brittle enough to crackle underfoot, the ferns are dark blue-green only near the tips of the plants, giving way to lighter coloring on the stalks. Animals cropping or crossing these plains leave highly-visible trails. Great forests, their wandering borderlines sharply-demarcated from the veldt, show as a riot of color — a tangled patchwork of alien vegetation made up of many species of large plants vying for light, shade, and sustenance. There are flowering magenta trees with thick, sprawling roots and huge purple blossoms serviced by birds the size of storks. On almost every branch a sessile, carnivorous orchid-thing waits patiently for its dinner to fly by. Single species dominate in some areas: big scarlet puffballs, gnarled magenta-bushes, fields of scarlet tubing a meter thick, interlocking and writhing like snakes in a pit, four or five deep. A colorful woody plant very like elbow-root grows on Gummidgy in rows of triangles, rising up at 45° to sprout a crown of yellow leaves, and dropping back again at the same angle to sprout a cluster of roots.

Gummidgy's animal life is fabulous, and experts have cataloged less than five percent of the planet's species. On the veldt, many varieties of wary herbivores crop the fern-grass, often equipped with novel means for discouraging predators: for instance, several common herbivores, normally neutral grey, can shift coloration to impressively-brilliant camouflage hues, and do so as rapidly as an Earthly octopus. One ferocious plains carnivore is a big, hopping beast which looks like a combination of kangaroo and sabre-tooth tiger. Another carnivore, the reacher, prefers to sit motionless, mimicking a puffball — until it can suddenly tear away a 12-centimeter-wide strip of flesh from a hapless victim. (The fact that human flesh is poisonous to Gummidgy life does not stop Gummidgy predators from sampling it.) There are carnivorous flying-snakes, with huge leathery delta wings and a mouth set well back along the body, and two small fins near the head end. Related to the relatively-harmless orchid-thing are much more dangerous species of flower-birds, not at all sessile. In open land, graceful streamlined beasts resembling white greyhounds (but much faster) are seen, reminiscent perhaps of Tnuctipun-bred viprin. A monkey-like creature with a cupped hand for throwing rocks is the closest animal to a terrestrial primate on the planet. Sea life is equally diverse and even less well-known, the Gummidgy Destroyer and the legendary Typhon notwithstanding.

Nightfall on Gummidgy is extraordinary. Sunset is blue, green, and orange, not crimson-pink. Atmospheric electric discharges can occur in a clear sky; spectacular, swirling auroras are usually visible to the equator throughout the long seasons. Many of Gummidgy's flora and fauna exhibit bio-luminescent phenomena, often filling the night-darkened landscape with ghostly apparitions.

Home

Home is a beautiful Earthlike colony world circling the soft-orange star Epsilon Indi, 11.4 light years from Earth. It is the second of five planets in a system which includes one gas giant ("Godzilla," Epsilon Indi V) and over 200 major asteroids in randomly-distributed orbits.

Home, Epsilon Indi 2, is slightly larger than Earth, with an equatorial diameter of 14,129 km [8781 miles] . Its mass is 1.3 that of Earth, its surface gravity is 1.08 gee. Home has a 23-hour 10-minute day, while its year is 181 local days. The atmospheric composition closely resembles that of

Earth, but the pressure is slightly lower — perhaps due to ancient gas-stripping by the single dense moon, Metaluna. Though the satellite's diameter is only 1955 km [1215 miles], its surface gravity is 0.2 gee. Metaluna orbits Home at an average distance of 252,613 km [157,000 miles] in a month of just over fourteen Home days. It is usually referred to simply as 'the Moon' by Homers.

Discovery of the Epsilon Indi planetary family was reported via ramrobot exploration probe in the year 2094. Home was first settled in 2189 by a combination of slowboats and ramrobot supply ships. Originally, the colonists had planned to call their new world Flatland; but by the end of their interstellar journey they were understandably no longer amused at the thought of their descendants being known as "Flatlanders." Home looked like Earth, certainly: deep blue swirled with the white frosting of clouds, the outlines of four major continents almost invisible, caps of polar ice. The first colonists knew, however, that their ancestral world was now inconceivably, irrevocably remote, and would remain so forever. They had arrived "Home" and would never leave.

By the mid-24th century, there was a good industrial civilization on Home. The Total population had risen to 3,200,000 and the colonized area had increased to six million square miles. The capital, Claytown, was the only major urban center, with a population of 370,000. It was situated on the Silver River near the ocean, not far from the original landing site — which had become Home's spaceport. Cities and towns elsewhere had tended to form in the forks of rivers, while the farming communities all clustered near the sea. There was little land life of any kind, but Home's plentiful sea life provided ample opportunities for aquaculture and fertilization of farmlands near the water. Extensive mining operations developed, all confined to Home itself. Communication with Earth formed a principal industry, and was less sporadic than the cursory traffic from certain other colony worlds. New industries sprang up continuously from this interchange. Facilities were primitive in relation to state-of-the-art flatland technology, but there was lots of room for inefficiency, and you did not need to be a proven genius to obtain a license to breed.

The travelogs, novels, biographies, and natural histories beamed back to Earth from the first era of Home colonization are fascinating, haunting, and in many ways admirable. Flatlander customs, attitudes, values, and vanities had vanished rapidly, to be replaced by a blossoming culture not predicated on overcrowding. Homers became very appreciative and protective of their natural environment. Land life became virtually sacred as they sought to create a fruitful, harmonious balance with the artificial imported terrestrial ecology. Two of Home's major continents were left totally untouched. Death took on new meaning, viewed as part of the natural cycle. Each colonist's passing became an important occasion: crematoriums were never used, and elaborate commemorative burial traditions flourished from the earliest days. Home managed to avoid the worst societal consequences of advanced organ bank technology through this shift in philosophical outlook.

In 2351, the Home colony failed catastrophically—wiped out to the last man, woman, and child by a virulent plague of uncertain origin. At about the same time, Epsilon Indi itself began to show slight irregularities in output, plus bizarre radiation anomalies. Civilization on Home lay ruined and dead, and for over two centuries the planet was judged to be unsafe for human habitation. By the end of the Second Man-Kzin War, however, Epsilon Indi's instabilities seemed to have disappeared completely, with the exception of a powerful series of solar flares observed in the late 2400's. Gradually, interest in the Home system rekindled. Probes were dispatched, a research station was established. The biosphere was carefully studied, and checked out safe. The sea life seemed virtually unaffected. Home was officially re-colonized in 2589 — exactly four hundred years after the first slowboats had arrived.

The new colonists of Home came from many worlds: Earth, Jinx, Plateau, We Made It. Though they brought with them the habits and viewpoints of their disparate cultures, most immigrants were deeply aware of the ancient traditions of Home. Many strove to reestablish the spirit and indigenous values of the early Homers. Growth and development proceeded cautiously. In the Ringworld era, the population of Home reached 851 million, with plenty of room for more.

The Kzinti were wrongly accused of having obliterated the first Home colony, before their rigid codes of honor were understood, but the Epsilon Indi system was never attacked by Kzin. Today, aliens of many species may be encountered occasionally in the wild outback of Home, relaxing in the bucolic spaces.

Home's Belt industrialization has proceeded more carefully than in the Solar System. There is considerably less total material, and the asteroids are not concentrated in a single band. The largest of the asteroid bases are called simply First, Second, and Third. In a halo orbit near Godzilla's trailing trojan point is a major tourist attraction — a vast translucent sphere of glittering ice crystals, like some festive X-mas tree ornament of thoroughly cosmic proportions.

Jinx

The largest, most technologically-advanced, and most highly-industrialized human colony world, Jinx was the second colony established by early UN slowboats. Three ships in the Lazy Eight series which were bound for Jinx disappeared during the first decades of emigration, earning the planet its name. By 2106 there were nevertheless several hundred colonists on Jinx, and life there was taking on its own distinctive character. Over the next century, ties with Earth inexorably loosened. Jinx proclaimed itself independent of UN political control in 2200; but by then the official declaration was hardly more than a formality. The population of Jinx in the time of Ringworld exceeds 2.1 billion, and Jinxians live, work, travel, and play everywhere in Known Space.

Sirius and Jinx

The Sirius star system had never been expected to harbor habitable, Earthlike planets. Sirius A is just 8.7 light years distant and appears as the brightest star in the sky of Earth. It is not of solar type. Its luminosity is 23 times greater than the sun's, and its lifetime is far shorter — less than one billion years. Its faint companion, Sirius B, is a hot white dwarf star of one solar mass, with a diameter of only 30,571 km [about 19,000 miles] . Sirius B must have undergone red giant evolution in the astronomically recent past, perhaps transferring to Sirius A a fraction of its mass. Jinx' discovery by a scientific exploration ramrobot came as a real surprise — but it is not surprising that Jinx turned out to be a quite peculiar world. Offworlders consider the planet Jinx no prize, except in size. The Sirius system has eight planets, a distant, diffuse asteroid band, and a respectable cometary halo.

Binary (also called Primary) is the third planet from Sirius A; Jinx is its only major moon. A banded orange giant more massive than Jupiter, Binary is smaller and warmer. with a degenerate core. It orbits Sirius at 638,773,000 km [397 million miles] , a distance typical for outer asteroids in Sol's Belt. Jinx itself is nearly six times heavier than Earth, with a rotation period over four days long locked tidally to its orbital period about Binary. The same face, the East End, is always turned to the gas giant. In the most populous regions of Jinx, the surface gravity is 1.78 gee, which many flatlanders are unable to tolerate for long periods without floating travel couches.

Jinx is a colorful planet, resembling a banded Easter egg. Of all the factors which shaped it, the most important were its lack of radioactive materials and the tides from Binary. The tidal drag that stopped Jinx' spin also pulled it into an irregular ellipsoid, and drove it outward. It became more nearly spherical. Jinx' unusually solid rocky lithosphere and semi-solid nickel-iron core resisted later change, however, retaining much of their original egg-shape. As her ocean and atmosphere evolved, they were forced to assume a zonal distribution. The ocean became a broad ring of extremely salty water running through the poles of rotation. The atmosphere above the sea and lowland shorelines is thick and dense, with central temperatures higher than 200°F. The ocean is forever hidden beneath a shroud of permanent fleecy cloud thousands of kilometers wide. The habitable bands are on either side of the ocean, and show the varying blues, browns, and greens of an Earth-like world. There is a bright glare from rings of glittering ice-fields at the limits of the breathable atmosphere; and finally the Ends of Jinx, in near-vacuum, show bone-white tinged with yellow, overlain with a tracery of sharp black lunar shadows. The Ends are the points nearest to and furthest from Binary: almost 1000 km "higher" than the ocean, they have only thin vestiges of harsh clear air. For all practical purposes, the Ends of Jinx stick right out of the planet's atmosphere.

Ringworld-Era Jinx

The capital of Jinx is Sirius Mater (Jinxians have reputations as punsters). It is on the Eastern continent, nearly 5000 km [3000 miles] from the ocean, in a rich triangle of cultivated parkland at the fork of two major rivers. Sirius Mater has over 17 million permanent residents. The air pressure and the gravity are uncomfortable for non-Jinxians, and the ultraviolet from Sirius A can be hazardous on especially-clear days. The looming orange vastness of Binary can be disturbing, giving one the feeling that it may fall on Jinx at any moment. Extreme temperature changes during the long days and nights are an additional annoyance. Jinx' 1.78 gees discourage elegance and ingenuity in architectural design. Massive, squat structures dominate, though the recently-rebuilt Camelot Hotel, crowned by its famous Camelot Bar, is one of the tallest buildings in Known Space. Many offworlders stay in the Camelot because it has one-gee generated-gravity throughout, as well as convenient access to the neighboring Institute of Knowledge, the finest museum and research complex in Human Space.

High-gravity agriculture and animal husbandry have always made Jinx' food exports wonderfully exotic. Jinxian sausage is a delicacy found in the automatic kitchens of most spacecraft. Heavy manufacturing has kept the planet's economy powerful even during the worst stock market reversals. Though General Products maintained a major regional facility in Sirius Mater, one of the most formidable human warliners, the Jinxian Battlecruiser, did not rely on a GP hull. The Bank of Jinx is the largest single financial institution outside of the Solar System. The "star," long the fundamental unit of interworld currency, is based on the value of early Jinxian colony credits.

The East End of Jinx resembles any heavily-industrialized moon, with distilleries and many other vacuum enterprises. The West Band and West (or Farside) End are sparsely-populated and far less civilized than the regions facing Binary. The West Band has not entirely outgrown its reputation as a safe haven for outlaws, smugglers, and pirates. The organ bank problem was never an important social factor on Jinx; there was too much empty land for felons to flee to — and the Jinxian dueling tradition (settling affairs of honor with light sonic stunners) seems to reflect a tacit admiration for the misfits and adventurers of those early days. The West End, often bathed only in the vivid blue moonlight of Sirius B, is the site of Jinx' huge Farside End spaceport.

Relentless selection pressure favors those individuals best-equipped to deal with the stresses of a high-gee environment. Most natives are compactly-constructed, archetypal heavy-planet dwellers: short, wide, and bull-strong; a few are huge, square, and massive enough to teach tact to an armed Kzin. Their musculature is as smooth and as solid as an elephant's; their arms and legs are thick as pillars. Selection has also demanded strong internal constitutions, quick reflexes, good balance, and accurate judgment in movement. Though they have developed a reputation for impulsiveness, and they certainly seem to swear a lot, Jinxians are hardly the clumsy, dull-witted buffoons portrayed in frequent flatlander jokes. Probably such jibes are a reaction to Jinxian amusement at the plight of flatlanders incapacitated by 1.78 gees. The strain takes a toll on native hearts, though, shortening lifespans even when boosterspice is used. Jinxians love low gravity, despite their pride, and many migrate to lighter worlds — where their pitch-dark Sirius tans must be maintained with ultraviolet lamps and tannin pills.

The Institute of Knowledge has been of vital importance in Known Space history. The Institute was founded originally to study the gigantic slug-like Bandersnatchi, first encountered by early colonists along the inhospitable shorelines of Jinx. (These non-mutating sentients have browsed there since the fall of the Slaver Empire.) Boosterspice was genetically-tailored from ragweed RNA in an Institute-sponsored laboratory. Communication with Bandersnatchi, the study of Tnuctipun language and technology, and Slaver artifacts in stasis have been nearly-exclusive Institute provinces of study. It has played a crucial role in understanding, displaying, and popularizing alien arts, sciences, and ways. Theoreticians concerned with cosmology, gravity, or hyperspace have benefited incalculably from institute-sponsored expeditions to neutron stars, protosuns, and collapsars. Helium II life-forms (such as those on Sirius VIII) have been a particular specialty. There are Institute xenobiological field stations on many human colony worlds.

Margrave

The frontier world Margrave is dryer and cooler than Earth; it is just emerging from a long interval of global ice ages. The planetary family to which it belongs is half a billion years younger than the Solar System. Margrave is the fourth of ten planets known to be circling the star 27 Serpens (Lambda Serpentis), a GO yellow sun 34.7 light years from Earth, in roughly the opposite direction from the Eridani systems. There is an unusually large amount of interplanetary dust in Margrave's system, two asteroid bands, and a substantial cometary halo. Although Margrave has no large moon, geologic evidence suggests that one was present perhaps as recently as a few hundred thousand years ago. The planet's orbit has an eccentricity of 0.11, with a 616 UNS day year [701 local days]. Margrave's day is just over 21 hours long; its surface gravity is 0.87 gee. The trip from Earth to Margrave takes 14 UNS weeks in hyperdrive.

Very little of the Serpens system has been carefully explored, and its considerable resources remain largely undeveloped. Margrave is presently administered by the Wunderland Hercules Company, under contract from the Earth-Wunderland Alliance. Margrave lies at the edge of Known Space, a dozen light years beyond the central sphere of human colonization. This isolated system is politically significant because it is relatively close to Trinoc Space, which officially begins seven light years past Margrave. The controversial UN-Trinoc treaty of 2836 stressed a strengthened development-and-defense plane in that direction, clearly hampering attempts at covert adventurism in the region by Kzin militarists. That agreement superseded secret centuries-old non-aggression contracts negotiated long before the existence of the Trinocs became publicly known. The population of Margrave is thought to be less than half a million (there is no census, other than company records) but will no doubt increase dramatically over the next century.

Much of Margrave resembles the northern wilderness latitudes of Earth — Siberia, Canada, the Alaskan interior. Flatlanders find comfortably temperate climates only along its equatorial belt. Many regions above 50° latitude are covered by extensive glaciation. Two of the five major continents are completely frozen-over. Two others, only partially ice-locked, project into the single large sea which runs four-fifths of the way around the planet. Interrupting the oceanic band is a fifth principal landmass, Paradise, 6758 km [4200 miles] across at its widest. The climate is variable, unpredictable, and often extreme, differing wildly from place to place, day to day, and season to season. On Paradise, there are vast expanses of thickly forested terrain, young mountain ranges, numerous lakes, swift icy rivers and crashing falls.

At the junction of two major river-systems, the Champagne and the Blackwater, is Victoria, Margrave's capital and only spaceport. Triangle Lake and the outlying Wiggly River logging regions lie 1500 km to the northeast.

Animal life on Margrave is fairly diverse, generally rugged, and sometimes formidable. A giant bird-like predator resembling a roc is perhaps the most exotic form, the largest flying creature yet encountered. Polar bears and certain other Earth species have been imported as part of a limited ecological development program.

Early settlers emigrated to Margrave from the sub-arctic regions of several worlds, interbreeding to produce a blend of Eskimo and feather-light Wunderlander. Most natives of Margrave do not have, however, remarkably distinctive physical characteristics. Many are newly-arrived, without long-established families on the planet. Immigrant and native alike tend to be self-assured, tough, independent, and resourceful, and crave wide-open, underpopulated territories. They respect inhospitable environments and seek out the psychological compensations which isolation and long winters provide. Many were extremely uncomfortable on the crowded urban worlds they left, sharing an almost instinctive distaste for flatland fads and the banal homogeneity of middle-class culture. A few are openly lawless and rowdy hell-raisers; travelers should note that the possession of weapons without specific authorization is still permitted on Margrave. It is fair to say that natives of Margrave often enjoy the company of nature at least as well as that of fellow humans. The inhabitants of civilized worlds occasionally refer to Margravers as loggers or (less politely) as jacks.

The J. Margrave Jutland Expedition

Margrave was discovered in 2427 by J. Margrave Julland, the brilliant hermetic psionics engineer, whose cheap, fool-proof mass indicator was mass-produced for the ships of

the hyperdrive armadas which ended the First Man-Kzin War. The original Outsider mass indicator had been costly, tricky, and inefficiently tailored to human psionic range.

Julland and several close friends decided to flight-test an improved model on a year-and-a-half long voyage of exploration, intending to visit Vega, 72 Herculis, and two other systems. The expensive trip was privately-financed: apparently an exotic extended vacation with a fair chance of paying for itself in the long run. Official involvement in the voyage of *La Geodyssy* was later disavowed both by the UN and by Julland Associates. The group's corn-laser report on the Vega ruins was a popular sensation — but for reasons not clear, the party changed course after leaving Vega, and no further communications were received.

Julland's fascination with the odd catalog *Standard Stars at Standard Distances,* Adrienne Fenwick's eccentric compilation, does not adequately explain the decision to journey to the Serpens system. The fourth planet conned Earth-like; they set down on it with a malfunctioning fusion motor. Damaged or possibly sabotaged, the ship had no hope of leaving the surface, and of course there was no nearby hyperwave relay station outside the star's gravity well. One rescue ship sent to Vega drove on past the next scheduled star in Julland's flight proposal, but a search of all the systems within range of *La Geodyssy* was out of the question. Com-laser messages picked up 30 years later brought rescuers directly to Margrave. There the ship was found more or less intact, but Julland and his party were never located. According to their log, they survived eight Margrave winters, still confident of rescue, but then the entries abruptly ceased.

The unexplained disappearance of the J. Margrave Julland expedition remains a controversial mystery.

Plateau

In 2061, Interstellar Ramscoop Robot No. 4 discovered Tau Ceti I, a planet which (according to its pre-programmed criteria) had a habitable zone suitable for human life. Dutifully following instructions, it beamed a laser pulse back toward the Solar System reporting its success. When the message reached Earth 11.8 years later, the first great era of interstellar colonization was underway. The *Planck, a* huge fusion-powered slowboat, was dispatched to Tau Ceti with a crew of six men and women. In cold-sleep stasis rode 50 volunteer colonists.

Twenty-nine years later, the *Planck* arrived at the planet that Ramrobot No. 4 had considered Earthlike. Tau Ceti I was a brilliant silver ball hanging serenely in the heavens. Ominously missing were the familiar rich brown and blue-green hues of the world the slowboat had left so long ago. The shipboard sensors and spectrographs had been working perfectly, the crew realized with horror, as the *Planck* dropped into orbit. This was a planet virtually indistinguishable from Venus. Sample probes confirmed the worst. The world's atmosphere was lethal to humans, and would even destroy the *Planck* itself: hot, poisonous, and corrosive. The surface temperature exceeded 450 C. in spots, and the pressure was high enough to crush the *Planck's* hull. Captain Parlette, the crew, and the sleeping passengers were circling a searing, hostile, lifeless planet. There was no rescue, they knew, and would be no escape. Colony slowboats were not built to make round trips.

After four hours of hopeless searching, the *Planck's* pilot caught a fleeting glimpse of something vast and formless, obscured by mist and high clouds. Then the radar picked it out - projecting above the deadly lower atmosphere rose an immense flat-topped mountain. "Lookitthat!" gasped the pilot, christening the great peak for eternity. Thus was the Tau Ceti colony's new home first sighted.

Ramrobot No. 4 had, against all odds, locked its sensors directly on Mt. Lookitthat. The air on the mountain was thin and cool. Instruments determined it to be breathable, its composition surprisingly Earthlike. Tests showed that the barren summit rocks might, if processed into soil, support the carefully selected terrestrial ecology the slowboat brought. The ship touched down cautiously on the highest of the mountain's large southern plateaus to found their colony.

The Covenant of Planetfall

When the 50 sleeping colonists awoke, they found themselves in a dictatorship. Perhaps, during three decades of claustrophobic toil aboard the *Planck,* the three growing crew families had come to hate the idle, frozen tranquillity of their passengers; perhaps the crew chose their course of action before lift-off, or only in the final weeks of starflight. Once the *Planck* had touched down safely, the crew proclaimed the Covenant of Planetfall, establishing a supreme governing directorate, the Council of the Crew. Ideally intended to enhance everyone's chances of survival, the Covenant in practice divided the citizens of Plateau into distinct classes, Crew and Colonist. One at a time, the sleepers were revived. Each was offered the choice of signing the Covenant or of becoming the first organ-transplant donor on Mr. Lookitthat. There were few who fought the Crew. The Crew kept absolute authority on Plateau, controlling the *Planck's* fusion plant, the comlaser, the medical facilities, the weaponry, and the land. When a second slowboat, the *Arthur C. Clarke,* arrived 40 years later, its passengers were given the same choice.

For centuries Plateau had no prisons or convicts. Its extraordinarily-simple legal code was enforced by the Implementation, Mt. Lookitthat's powerful security police. Well-behaved, industrious colonists could expect a long, healthy life prolonged (as supplies allowed) by transplants from the Hospital's organ banks. Dissidents, misfits, and troublemakers were a rich source of transplant material, and covert operations snared a continuing supply of dissidents.

The social and economic gulf between Crew and Colonist grew ever wider, accented by fashion, habit, and habitat. Distinct physical differences appeared — the result of restricted marriage, a tiny initial gene pool, and grossly dissimilar diets. The Crew became tall, with slender physiques, and graceful limbs. Their softly-angular faces, lovely in their strangeness, displayed oddly-hooked long noses with delicately-flared nostrils and pronounced cheekbones. Male and female Crew alike wore their fingernails 2-3cm long, at the tips of long, bony fingers. Looking undermuscled, pale, and fragile, an ideal Crew nonetheless was perfectly nourished, trim, and often surprisingly robust. Colonists showed a wider variety of physical types, but were generally smaller in stature, heavier set, swarthier, with rougher, less-sharply-defined feature. At times, using cosmetics or surgery, Colonists strove to emulate Crew.

The Crew's absolute domination of civilization endured for three centuries — until population pressure, breakthroughs in alloplasty, tissue regeneration, and other technologies finally undermined Crew rule. In 2397, an almost-bloodless revolution tumbled the *Planck* over the Void Edge into the mists. The Covenant of Planetfall was abolished. The Coalition of New Law granted Colonists theoretical equality to Crew. For the first time, Colonists had rights to own machinery, to travel without restriction, to dress as they wished, to receive full medical treatment, and dozens of lesser concessions. Although civil and legal equality came fairly rapidly, class distinctions remained for centuries more in strongly-accented speech, fashions, personal style, and physical appearance.

Plateau and the Tau Ceti System

Plateau is the innermost of four planets circling Tau Ceti. The outer two, Kali and Rudra, are medium-sized gas giants, each with a retinue of over a dozen moons. The third planet inward is Janus, a small and rocky mining world. Janus is airless, and has no satellite.

Plateau orbits Tau Ceti at a mean distance of 106,501,000 km, with a year of 241 UNS days (195 local days). It spins on its axis every 29.4 hours. Plateau is smaller than Earth, and less dense. Its surface gravity is .81 gee; its equatorial diameter is 12,309 km. Like Venus, Plateau is a moonless world.

Tau Ceti is an easily-visible third-magnitude star in the skies of Earth. It is 11.8 light years away — a yellow, main-sequence G8 sun with 85% the mass of Sol and about half the luminosity. Because it is similar to Sol and is relatively nearby, Tau Ceti was particularly attractive to prospective colonists from Earth. Their fine primary star provides Plateau-dwellers with daylight almost indistinguishable from terrestrial sunlight. Though frequently covered by mist or clouds, the plateaus of Mt. Lookitthat vary little in climate or seasons. The planet's axial tilt is less than 2 degrees, making every day and night of nearly equal length. The winds are mild.

Far below the mountain top, Plateau's lower atmosphere is thick with carbon monoxide, carbon dioxide, and sulfur-bearing gases, mixed with nitrogen, oxygen, and traces of many vaporized compounds. The surface beneath is a perpetual, searing, calm.

Mr. Lookitthat is a geologically recent topographical formation, perhaps no older than a million years. Planetologists agree that it is an extrusion of viscous magma which broke through a weak portion of the crust, erupting slowly, rising, cooling, then rising again for millennia. This formed a roughly-cylindrical pillar some 65 km high, with fluted vertical sides and a jagged, fissured surface with an area about half that of California.

Mt. Lookitthat closely resembles certain continental features of Venus. Its formation may have been triggered by an asteroid impact which created a hot-spot in the mantle.

The top of Mt. Lookitthat, though mostly flat, is an intricately striated, differentiated maze of plateaus split by cliffs and chasms, rising gradually toward the north and central regions. The northern end is high enough to hold a permanently-sliding glacier, and the cold highland plateaus are covered in snow and ice. Runoff water flows generally south in streams and rivers to join the Muddy or the Long Fall, which have carved deep canyons for themselves through the temperate lands. At the Void Edge, both canyons end in spectacular waterfalls — the highest in Known Space.

The largest habitable plateaus were named rather hastily by the *Planck's* crew just before planetfall. Nine of those Greek-letter designations are still in use. Alpha plateau is the highest and broadest, with an area of 46,620 square km. It was once the exclusive property of Crew. Next largest is Beta, then Gamma, Delta, Epsilon, Zeta, Eta, Theta, and finally Iota. The many dozens of smaller plateaus have received more colorful names: ice-sculpted Crowsnest; chilly Hood, teeming with herds of deer and caribou; the Isle of Pines, densely wooded in jade and emerald forest; resplendent New Serendip, rich in fruit and nut crops; Keller and Greely, thermally-powered and heavily populated; warm, breezy Caravelle, and the strangely-smooth, grassy Ol' Flattop. Some plateaus are flat, with straight, vertical cliffs. Most of these are in the south. In the north, the surface is all tilted blocks and strange lakes with deep, pointed bottoms — a craggy, beautiful landscape.

Contemporary Plateau

Rising from Plateau's dazzling silver disk to greet visitors' inbound spacecraft, Mt. Lookitthat first appears as a myriad of islands tightly clustered in an endless archipelago of impenetrable fog. A little closer, just before touchdown at Parlette Port on Pandora, the view resembles a panorama of Old Europe. But Plateau's city-states are unwalled, except along certain precipices where children (or tourists) might play near the Void Edge.

Citizens of Plateau still call themselves "mountaineers," while offworlders often use the more formal "plateaunians." Limited by law and the nature of the planet, Mt. Lookitthat's permanent population is 105 million. Three great orbital stations hold a million more. Due to restricted immigration, many vestiges of the ancient Crew and Colonist classes have survived in physical traits as well as customs, though Plateau's culture now is uniformly, self-consciously, egalitarian.

Mountaineers are regarded generally as friendly, peaceful and exuberant, yet efficient and clear-headed. If pressed, they can be quite competitive. Mountain humor is quick and incisive, though eccentric. Strong family ties are important on Mt. Lookitthat. There is a complex network of extended, almost tribal families who maintain spacious elegant residences — but even modest homes on Plateau seem mansions by flatlander standards. When the Crew ruled, religion did not exist on Plateau. Now, however, society accommodates the various faiths of offworlders, and even tolerates a small indigenous sect of religious clairvoyants who trace inspiration to visions seen in "Plateau Trance" — autohypnosis sometimes induced by a long dreamy look down into the void mist.

Mr. Lookitthat produces nearly everything the colony needs to survive. Its prosperity stems from its specialist export trade, the expertise of its populace, and the tourist business. In an unusual arrangement, each citizen owns shares in the planetary economy. Exports include fine polished gemwood furnishings and other hand-crafted items; limited quantities of exceptional wines, coffees, teas, and spices; exotic cheeses; compact, alternative energy systems; and a variety of gene-tailored products. Plateau's green-science industries — far advanced beyond the early days of agricultural coral, indoor grass, mining worms, and house-cleaners, are strictly self-regulated. Though they often annoy the ARM, Mt. Lookitthat's gene-tailoring facilities have greatly stimulated Human Space commerce, and proven invaluable in meeting rapidly the challenges of colony world plagues and pestilences (beginning with Plateau's own Great Plague of 2290).

Law, physical science, and medical science flourish on Plateau. A renowned center for Interworld legal specialists, Mt. Lookitthat is the home of several notoriously flamboyant jurists. Common elsewhere in Known Space, truth drugs and other forced-testimony strategems are outlawed on Plateau. There is no death penalty, but, despite this, little serious crime. On Sagan Plateau, the Geoplanetary Science Institute attracts astronomers and researchers from every human world. Recent conferences discussed organic terraforming techniques being developed for use on Venus and similar worlds, though not presently for Plateau. On tiny artificial Omega Plateau, the Millard Kane Medical Center caters to booster-spice allergies and other unusual disorders — and researches aging in aliens and humans.

Plateau boasts more than its share of sports champions, usually graduates of Laney Mattson Academy (Gamma). Masters of individual sports — javelin, fencing, etc. — often follow Crew traditions, while others excel at rowdy former-Colonist team sports. Mt. Lookitthat's passenger and taxi pilots pride themselves at their aerial expertise. Aldo Chan O'Brien's Celestial Circus, based on Plateau, brings its fabulous shows to every human system, and has even performed for the Patriarch on Kzin. Each year a worldwide celebration comemorates the overthrow of the Covenant.

Tourists flock to Plateau for sightseeing and a variety of other entertainments. Several hundred fabulous hotels lie *a* transport-booth jump away from the main port in Campbelltown, the planetary capitol. Luxury properties can always be leased from enterprising natives. Resorts located near the Void Edge provide awesome views of the endless mists below, and the cyclopean fluted slopes descending into them. On Alpha, the *Arthur C. Clarke,* used once against the Kzinti, is preserved as a museum. Eta Plateau's resorts are almost exclusively casinos, spas, and open gambling clubs; though many are thoroughly respectable, they extract over a million Stars daily from patrons who chalk up their losses to 'plateau trance' or the infernal Mist Demons.

Silvereyes

Silvereyes is the most distant of the major colony worlds in human space. It is the third planet of eleven in the Beta Hydri system, 21.3 light years from Sol toward galactic south. Beta Hydri is an isolated Sol-type star of spectral class GO, 2.7 times brighter than the sun. In Earth's sky, it shines at magnitude +2.8, just at the edge of the Lesser Magellanic Cloud. The location of Beta Hydri makes it the farthest human system from Ringworld. Discovery of its planetary family was reported via ramrobot probe in 2111, but because of Silvereyes' unusual nature, colonization was postponed until second-generation probes had carefully examined its peculiarities. The first colony slowboats arrived in 2220.

Oceans cover 88% of Silvereyes' surface. It is a pelagic planet with no vast dryland masses resembling the continents of Earth. The largest habitable regions are more like islands, spaced far apart. Most are round or oval, though a few are star-shaped. Their sizes range from about 320 km [200 miles] to nearly 2900 km [1800 miles] in diameter. The ten major lands are Altaira (the largest), Jade, Minda, Starfish, Fiji, Pancake, Pearl, Cyclops, Cinder, and Doom. When the planet was first conned, most of the lands were nearly covered with mirror-blossomed slaver sunflowers. Bright reflections from Beta Hydri gave the world the appearance of having at least two shining silver eyes. For centuries, only Altaira, Jade, and Minda could be kept relatively free of sunflowers, and to the present day the sparkling face of Silvereyes is an unforgettable sight for starliner tourists.

The island-masses of Silvereyes were formed over the eons by a series of oceanic shield-volcanoes. Some features, such as Pancake, have eroded into smooth flatlands; but others gradually slope up into tall volcanic cones far inland. Doom is still active; Cinder is dormant — with a necklace of sunflowers. Rising hot air from smoldering calderas (and from the sunflower patches themselves) brings in a steady moisture-laden breeze from the coastlines, carrying along with it a variety of airborne life-forms and organic detritus.

Like South African *kopjes,* the islands of Silvereyes are biologically distinct from one another as well as physically separate. Sunflowers do not migrate easily across the oceanic expanses, but once established they rapidly spread through the lava-blackened interiors of new-formed lands. Shorelines, especially to windward, are usually unsuitable for sunflowers because of the excessive precipitation, dense fogs, and salt water. A zone of thick coastal vegetation, blending into humid subtropical rainforest rings the central regions of islands relatively undisturbed by colonists, such as Cyclops. Not surprisingly, a unique ecology fiercely competitive with sunflowers has evolved on Silvereyes. At the borders of the rainforests are populations of voracious, nocturnal sandworms which feed on sunflower root tendrils, so called "volcano trees" whose fat moist stalks exude clouds of acidic pitch-filled smoke when attacked by the mirror-plants, tough threadlike "tourniquet vines" which constrict and sever sunflower stems and

other peculiar species. The most ubiquitous form of native land-life is a curious invertebrate resembling a cross between a hopping crustacean and a jeboa. If there ever were Bandersnatchion Silvereyes, they have long since disappeared.

The present human population of Silvereyes is about 172 million, nearly half of whom live on Altaira. Its capital city, Dawn, has 12 million. Tourism is one of the major industries of Silvereyes, and the beautiful Amanda Lakes region of Altaira is a favorite spot for vacationers and honeymooners from throughout Known Space. Magnificently-restored antique hydrogen-turbine flying boats ferry them from place to place at a leisurely pace, while natives favor transfer booths, as on every other major colony world. Each of the main islands has its own distinct economic base, its own unique flavor, special character, and particular points of interest. On Starfish, the Jinx Institute of Knowledge has a xenobiological field-station. On Minda, there is a starport leased by the Pierin — humanity's gateway to the Zeta Reticuli sector. Silvereyes' considerable marine ranches are managed largely by dolphins; there are extensive floating forests of krilp, a photosynthetic colony-organism half-animal and half-marine plant.

Silvereyes has a surface gravity closer to Earth's than any other Known Space world, 1.04 gees. Its day is 32.2 hours long, and its year is 687 UNS days [512 local days]. The weather cycles are quite regular, with severe but predictable typhoon seasons in each hemisphere. The polar caps are smaller than Earth's, changing more in size over the long seasons. Sunflowers, volcanoes and Tsunamis create occasional climatic disturbances. There is little thought of ridding Silvereyes of its sunflowers — not out of concern for the tourist trade, but because studies indicate that they have become essential in maintaining the heat balance of the ecosphere. Two moons, Felix and Calico, have diameters of 1152 km [716 miles] and 2560 km [1591 miles], orbiting the planet at radii of 153,016 km [95,100 miles] and 275,139 km [171,000 miles] respectively. There is a distant belt of icy asteroids in the Beta Hydri system under development by various unrelated concerns.

Natives of Silvereyes, called "islanders," have rich dark-brown skin, a prominent ridge of eyebrow, and a permanent squint developed over centuries in the glare of the oceans beneath Beta Hydri. A fair proportion are experienced mariners and all-weather pilots, seasoned and sophisticated. Silvereyes is popular with outworlders from Wunderland, Plateau, and Jinx, many of whom are engaged in the tourist trade. The physical appearance of such newcomers does not indicate the characteristic features of the old-line native stock. They (like their islander prototypes) can be shrewdly self-serving entrepreneurs, cynically eager to please; but on the outer islands people are straightforward, outgoing, friendly — and sometimes unself consciously exotic.

The journey from Earth to Silvereyes takes two months in hyperdrive. There are a dozen colonies more distant — long-established bases and settlements such as Canyon and Margrave. Many of these lie well beyond the irregular cluster of heavily-developed worlds known as Human Space. In the Ringworld era, though, less than one percent of humanity's total population is scattered farther from Earth than Silvereyes.

We Made It

The double suns of Procyon lie 11.3 light years from Earth. Procyon A is an F5 main-sequence star, 5.8 times more luminous than Sol, with three planets. Among the stars in Earth's sky visible to the naked eye, only Alpha Centauri, Sirius, Epsilon Eridani, and 61 Cygni are closer. Procyon B is a white dwarf 15,000 times fainter than its primary. The companion, also known as Nan Ho, has two-thirds the mass of Sol but a diameter only twice that of Earth. Orbiting Nan Ho is a single terrestrial world, frozen and long dead. Procyon B completes one circuit of its moderately-eccentric orbit every 40.65 years, and the least interstar separation is roughly the distance from Earth to Saturn. The systems of Sirius and Procyon are similar in many respects, but Procyon has far less total mass. In space, the systems are neighbors, five light years apart — just two weeks by quantum I hyperdrive.

We Made It is the midworld of Procyon A, 314 million km [195 million miles] distant from its primary. It is a small, heavy terrestrial planet with a fairly dense, often dusty oxygen atmosphere and a surface gravity of only 0.59 gee. The length of day is 20.4 UNS hours; the year is 1004 local days (853 UNS days). Long-term cycles of variation govern the orbital eccentricity and the tilt of We Made It's spin axis. At present, We Made It is a "fallen planet" — in summer and winter, its axis of rotation runs almost directly through Procyon. Summer in most latitudes is perpetual oblique daylight; winter is eternal night. Hellish hurricane-force winds scour the surface throughout these seasons, as the sunward hemisphere's polar cap nearly vanishes and the darkened one swells. Ground-level windspeeds of 800 km an hour [500 miles per hour] are typical, though gullible flatlander tourists may expect gales three times more ferocious. Spring and fall, the long-shadowed, bright-twilight seasons, are pleasantly warm and temperate, but dry. Much of the planet's landscape is flat, sandblasted desert, utterly lifeless. We Made It was settled because Ramrobot no. 9, programmed to find a habitable, Earthlike point on Procyon 2, had elected to land on a mild spring day near one of We Made It's viscous, algae-choked "oceans."

The Colonists

Hints of actual conditions on other worlds, and news of the first chilling colony-ship failures reached Earth just before the launching of the slowboat for Procyon 2. For many, the dream of interstellar colonization suddenly lost its luster: it was going to be hard work, and very risky. The prospective passengers for Procyon canceled *en masse,* despite assurances of new fail-safe systems, radiation shielding, and auxiliary ion drives. To prove its point, the UN hastily substituted a shipload of 'defectives' — all highly-qualified, intelligent, motivated, resourceful persons, and every one of them denied parenthood on Earth under the recently-tightened Fertility Laws for minor physical traits, such as albinism or flat feet. They christened their ship the *Ion Maiden,* after a popular comic fantasy-heroine of the early 21st century. The *Ion Maiden's* trip became the stuff of legend. Well-chronicled (and often luridly over-dramatized) are the details of her harrowing voyage: her inability to make planetfall because of the savage winds and a punctured hull; her last-minute maneuvers which bought a desperate loop back toward the world; the crashlanding on We Made It's big moon; the loss of the corn-laser; the heroic ingenuity, controversial decisions, and luck which meant survival and refueling on Desert Isle (as the icy moon was ironically named); and the chancy hop down to a second and final crashlanding on We Made It in late fall.

The struggle to endure and to build a civilization on We Made It over the next two centuries dwarfs the saga of the first ship's arrival. Society naturally developed underground, near what passed for an ocean. Forty-three extremely tenacious varieties of algae, mostly brown and green, regally dominated the liquid water on the planet. At first, the soupy *glurr* afforded the colonists sustenance (and salvation). Later, refined for processing by homegrown food-synthesizers, the stuff became a municipal utility. Cleverly channeled, the savage power of the surface wind itself helped gradually to transform the original warrens into respectable buried cities. When spring came, the colonists raced upstairs to taste the new sunlight and celebrate the calm, clear air. The organ-bank problem was severe for a time, and crashlanders learned to be careful. Fortunately, no repressive social system arose as on Plateau. Building independently on cannibalized shipdoc technology, crashlanders pioneered in jury-rigged, mind-linked prosthetics, cultured organs, and long-term tissue regeneration techniques. Despite all-too-infrequent supply ramrobots, few additional slowboats, and occasional disasters due to fire, flooding, or land subsidence, the colony expanded and strengthened.

In the low gravity, crashlanders grew tall and spindly. An influx of slender settlers from Earth's Belt hastened the process. Long-boned builds of 72-75 kg [160-165 pounds] and 2.25 meters became the rule. Flatlanders still disdain their crashlander cousins as attenuated, freakish, mantis-like weaklings. Yet crashlanders are agile, adept, and extraordinarily limber, easily able to bend their legs pretzel-fashion to perform amazing feats of toe-dexterity. The almost-translucent pallor of their undarkened skins is often barely distinguishable from that of the red-eyed, white-haired albinos who once made up 40% of We Made It's population. All old-line crashlanders need tannin pills above ground on any planet whose sun is brighter than Down's. The native language took on a heavy accent, thick with stressed esses. It is soft and melodious compared to a flatlander's harsh bellow, and usually spoken in a clear tenor or alto voice.

We Made It's severe isolation ended almost overnight, in 2406 an Outsider merchant ship arrived at the colony offering for sale the secret of the quantum I hyperdrive shunt. The Mayor negotiated a credit deal — and a sudden industrial revolution was at hand. Two years later, a hyperdrive ship arrived in the Solar System. Earth was facing a full-scale Kzinti invasion — and the crashlanders were

amazed at their heroes' welcome. Subsequently spearheading the liberation of Wunderland, the defense of Jinx, and the conquest of Down, crashlander marines fought as brilliantly hand-to-hand as in space, saving their own world as well from alien conquest.

The Maturity of We Made It

After the war, We Made It blossomed, rags to riches. Its fame spread as its wealth grew; its underground ambiance appealed to the cosmopolitan and the exotic. Artists, entrepreneurs, and eccentrics flocked to the colony, as well as a stream of highly-skilled flatlander "fertility-defectives." Multilevel tiers of spacious residences and shops rose up the terraced walls of grand subterranean boulevards. Ultrafast magnetic transits sped through evacuated intercity tubes. Far across the planet isolated enclaves dug in. The ceilings of Crashlanding City Park and other centers were opened to the sky, protected by sonic folds, and (later) by vast transparent shields made-to-order by General Products' local facility. The collected remains of the *Ion Maiden,* partially restored, were placed amid a huge, detailed reconstruction of the original crash-site, the Crashlanding Memorial. The hollow sculpted pillar supporting the memorial, itself a subtle masterpiece of classic asymmetricism, rises a kilometer to ground level from the middle of Crashlanding City Park. Nearly ten thousand darkened steps spiral up within the pillar: one for each day of the colony ship's flight. Wild, Earth-landscaped hills splash gracefully against the monument's base.

Ties with Earth grew stronger as We Made It prospered. Flatlander tourists waited years for berths aboard the first star-going commercial liners of Transtar, Arcturus, Nakamura, Orion, and Rid'yah. Revenues mounted from licensing arrangements for the manufacture of We Made It drives, Parliss life systems, and Kitchen Magic autochef programs. Puppeteer-influenced business ethics led to codification of the legal blackmail laws. The per capita income rose to the highest on any human world, and the Bank of We Made It soon rivalled the Bank of Jinx. Cults flourished, reaping immense profits from the export marketing of their outre philosophies. The Center for Noetic Studies soon became the extra-Solar System mecca for research in applied psionics and the sciences of the mind. Classic works of catatonic and cataleptic music were written and performed motionlessly — motor-nerve- and mind-linked. Bizarre drugs could be obtained easily. A fabulous service economy flourished, almost overshadowing the mighty industrial economy that grew ever more dependent on secret technologies of alien origin.

Ultimately over-extended. We Made It rode fast and high until the stock market crash triggered by General Products' abrupt departure from Known Space. (Beowulf Schaeffer, crashlander pilot/adventurer/author, had flown to the galactic core in a Puppeteer-built hypership to confirm the core explosion. The Puppeteer exodus began immediately afterward.) It took a long time for the interstellar market to come apart — but when the bubble burst, reality descended harshly. Jumpers forced closure of the Memorial, and utterly-ruined businessmen disappeared into the nightmare of the We Made It summer, their bodies never recovered. The government even had to reinstate a debtors prison for the financially irresponsible. Once more, though, the colony survived, arduously regaining its solvency and strength in the interstellar economy. The crashlanders' innate talent, often-brilliant technical ingenuity, resourceful spirit, and space-wise common sense in the end prevailed.

Crashlanders Today

In the Ringworld era, the population of We Made It is close to 950 million. About 10% are albinos of long lineage, many of whom keep very much alive the free-thinking, free-wheeling perspectives of their golden-age forebears. Crashlanding Port is again among the greatest of human starports. Great public sings on the cliffs above Crashlanding City inaugurate uproarious festival holidays when the winds of winter and summer die down. In spring and fall, the deserts bloom (at least near the oceans) with beautiful, efficient gene-tailored crops, and subterranean food-farms still flourish regardless of season. Several dozen old contour-dome cities, lavishly restored, peek out on forbidding vistas for the edification of offworlder tourists. The world's innovative industrial economy again competes favorably with even that of Jinx. Desert Isle resembles any big, industrialized moon, except that, for aesthetic reasons, most of its factories are underground.

We Made It continues as the colony worlds' center for the soft sciences and the creative arts. (Some say a Kdatlyno touch-sculpture can be truly be appreciated by humans — insofar as that is possible — only deep within one of We Made It's dark, labyrinthine alien-art galleries.)

Many writers, historians, humorists, musicians, cartoonists, philosophers, and speculative psychologists now call We Made It home. Among the major concerns founded here are Holofex Enterprises and Baja Noetics. In out-of-the-way retreats, experimental communities and odd cults still exist, including a secret religious order that prohibits the taking of boosterspice. Its leaders use some other means of life-extension, rumor has it.

Throughout Human Space, stereotypes of crashlanders as indolent, undisciplined spendthrifts and political anarchists still persist. Unrealized by most casual critics are the sound technological literacy and acute analytical awareness underlying the culture's flexible, independent character. Given their intelligence, curiosity, empathy, and an almost instinctive 'feel' for the unforeseen, inherent dangers in alien environments, crashlanders make good explorers. They know when to run, not fight, and the mind-wrenching sight of naked hyperspace bothers relatively few. For their shallow, Earth-centered naivete and blind lack of caution, natives of We Made It often accurately assess flatlanders as crazy fools.

The attitude of many contemporary crashlanders is reflected in their ancient credo, inscribed as part of the great frieze along the cliff tops of Crashlanding City Park:

When first we arrived, there was nothing
but sand and sea, wind and sky;
Know that all you behold is here because
We Made It.

Wunderland

The first of the human interstellar colonies was established in 2091 on Wunderland, culminating a 30-year slowboat voyage. Wunderland is the third of five planets circling Alpha Centauri, just 4.3 light years from Earth. Technically a triple-star system, Alpha Centauri A, B, and C are Sol's closest stellar neighbors. Wunderland orbits the A-component, a yellow-white star 1.5 times brighter than the sun, at a distance of 197,907,000 km [123 million miles] . The smallest truly terrestrial world known, Wunderland's diameter is 9780 km [6078 miles], and its surface gravity is a light 0.61 gee. The length of day is 26.7 UNS hours, and the year is 529 UNS days [476 Wunderland days] long. Glirida is the planet's sole natural moon, a captured asteroid only 82 km [51 miles] in diameter. In the Ringworld era, the population of the Wunderland system has soared to 3.25 billion.

The B-component of the Centauri system is an orange star 40% as bright as the sun. It follows an eccentric path with an orbital period of 80 UNS years. Alpha Centauri B is never nearer to Wunderland than is Earth to Saturn, but for half of each year it commands the night sky. Then its radiance varies with its position, from several dozen to several hundred times the full moon of Earth. Half a Wunderland year later, the two suns appear close together in the sky, and there is a stellar-eclipse season. On clear nights when both components have set, starry darkness prevails. The constellations look nearly identical to those of Earth, with Sol a very bright star extending the zigzag 'w' of Cassiopeia. The C-component of Centauri is Proxima, a faint red dwarf star one-sixth of a light year distant. There are no giant Jovian planets in the Wunderland system, but there is a substantial asteroid belt, the Serpent Stream. The Serpent Stream rocks are unevenly distributed. Bunched together in a crescent-shaped swarm, they follow a highly non-circular path whose resonant period is determined by the orbit of the orange B-star.

The history of Wunderland is rich and complex. In the time of Ringworld its culture is a diverse blend of the provincial and cosmopolitan — paradoxically pluralistic for a society whose ruling classes were once the closest thing to royalty in Human Space. Occasionally the world is rife with political intrigue and conflict.

In its early days, Wunderland was a beautiful pastoral paradise, its population thinly spread across the major continent. Corn-laser communication with Earth, and thereby governmental power, was controlled by 19 elite aristocratic families, whose resources had financed the original settlement. These clans became the equivalent of an hereditary nobility, their members often ascetic, mannered eccentrics with pretentious hyphenated surnames. Others became distinguished scholars, with an erudite distaste for direct action. Politically, the aristocrats were moralistic, conservative, and authoritarian. They used their wealth to enforce their rule, to sponsor new colonists of their lineage, and to import priceless antiques, art treasures, and other

fineries from Earth. The city-states of Wunderland grew around the sites of their magnificent estates, plantations, and baronial villas.

Wunderland is a relatively benign world — especially in contrast to Plateau, We Made It, or Jinx, and so UN slowboats continued to arrive frequently and regularly. They were filled with colonists of many disparate cultural backgrounds and political persuasions. Often these were highly-motivated cohesive social groups; seldom did they include the tough, wary independent types attracted to the challenging rigors of inhospitable planets. The Belters who settled the Serpent Stream, of course, constituted a notable exception, and their rift with the Wunderland government has existed to some degree almost from the beginning.

A wide variety of industries from sea farming to zero-gee manufacturing allowed Wunderland's fairly rapid economic independence from Earth; but for centuries most of its wealth was channeled through the lineal descendants of the upper classes. Whenever opposition factions showed signs of unifying for revolution, additional financial and military assistance could generally be counted on from Earth. The UN, in the interest of stability, was always certain to side against ultra-radical conspirators clamoring for a "Free Wunderland," or against the later dissident Isolationist Party.

Further Diversity

The first sentient non-humans to settle on Wunderland were Dolphins. The second to arrive were the Kzinti, who discovered and conquered it in 2367, initiating the First Man-Kzin War. Wunderland was freed in the middle of the conflict by Crashlander marines from We Made It. Soon afterward, the hyperdrive armada from Earth consolidated the victory. During the years of Kzinti occupation, Wunderlanders could have fared far worse. The Kzinti were spread thin, taking minimal resistance for granted. The aristocracy nevertheless suffered terribly. Many proud families, whose sons were killed and eaten in duels, later became implacable Kzin exterminationists.

The Belters fought fiercely; but after the war they became the first humans to develop a working relationship of mutual, grudging admiration and respect for Kzinti. They allowed the surviving crew of a badly damaged Kzinti supply ship to remain in the Serpent Stream, unofficially creating a neutral territory for resourceful refugees with nowhere else to go. (The Kzin ship, based on Down, was considered destroyed, whether or not it returned to the Patriarch's attack fleet.) Later, Kdaptist heretics came to settle in the unforgiving environment of the asteroid swarm, where they still co-exist with Serpent Belters.

Although Wunderland was never again seriously threatened by Kzin military adventurism, the Third Man-Kzin War was brought to an end by the "Wunderland Treatymaker," a gigantic modified Slaver disintegrator used to annihilate the warbase on Canyon. Construction of the weapon, with UN assistance, strengthened the government politically, financially, and militarily, and gave the nobility a chance to settle old scores with the Kzin Patriarchy.

Wunderland has retained the flavor of its early social diversity over the centuries. Certain cultures and conflicts of archaic Earth have been surprisingly well-preserved, or revived and accentuated. Wunderlander, the "dead language" of the first families, is still heard from time to time. It sounds like old German spoken with a heavy Scandinavian accent.

Fat, balloon-like low-gravity types characterize many Wunderlanders of modest parentage, but tall, willowy, light-planet builds distinguish the purest descendants of the old lineages; their disturbingly mobile ears come sharply alert in response to impulses and to sudden stimuli. The continual influx of colonists from other worlds has moderated the tendency of slender, stick-figure physiques to predominate. The autocratic attitudes of the nobility were offset too, by their dignified sensitivity, honorable ethical beliefs, eccentricism, and intelligence. In later centuries, they came to tolerate and appreciate (to a degree) the variety and dissonance of Wunderland, contributing innovations of their own.

Asymmetricism, once the major artistic tradition of the colony worlds, had its first popular expression in the asymmetric beards worn by Wunderland's aristocrats. (It is still unwise to insult those who sport asymmetric beards.) Personal style has never been subject to governmental regulation, the licensing of nudists, theists, militant ideologues, and the like is unheard of. Wunderland's legal system often has been exemplarily flexible; the testimony of Grogs as expert lie-detectors was first allowed in Munchen, the capital city.

Aliens frequently visit the Centauri system, and many live on Wunderland. Flourishing major industries supply services and automatic equipment tailored to alien physiology and chemistry — such as the compact food-recycler kitchens found aboard all passenger starships. Tourists from all the human worlds come to hunt the fearsome shadowfish, or just to gape at a spectacular double sunset. Adventurers and pirates still occasionally smuggle in weapons and supplies to would-be revolutionaries. And Wunderland's fabulous traditional liquor, Verguuz, remains one of the most memorable in Known Space. It has been described as tasting like a hand grenade with a minted sugar casing.

CREATING A KZIN EXPLORER

Players using this section should also read the accompanying essay on Kzin society, history, and so forth. Creators of Kzin explorers should be familiar with human explorer creation.

•Kzinti Name: Kzinti explorers do not begin with a full name; this must be earned during play. Some, by benefit of noble birth or some minor achievement made before play, can start the game with a partial name. If the gamemaster has specific plans for a Kzinti explorer's name, that supersedes this table.

1D100	*name*
01-90	occupation-name only (Speaker-To-Animals, Telepath, etc.)
91-00	partial name + occupation-name (Chuft-Captain, Kzhass-Student-of-Laser-light, etc.)

Make up your own occupation name after you have completed the pursuits section of explorer generation. The names of the various pursuits are *not* identical to Kzinti occupation names, or even similar in most cases.

•Gender: all Known Space Kzinti explorers must be male. At your option, a Ringworld Kzin may be female and intelligent.

•Kzinti Homeworld: a Kzin explorer most likely hails from Kzin itself, the Patriarchal seat and most cosmopolitan of all Kzin worlds. Other planets still exist in the Kzin empire, as do space stations, etc.

1D100	***planet***	*gravity*
01-80	Kzin	normal
81-87	First Conquest	normal
88-90	Hurtling Rocks	light
91-96	Water Conquered	normal
97-00	**Wind Carries Harsh Discipline**	**heavy**

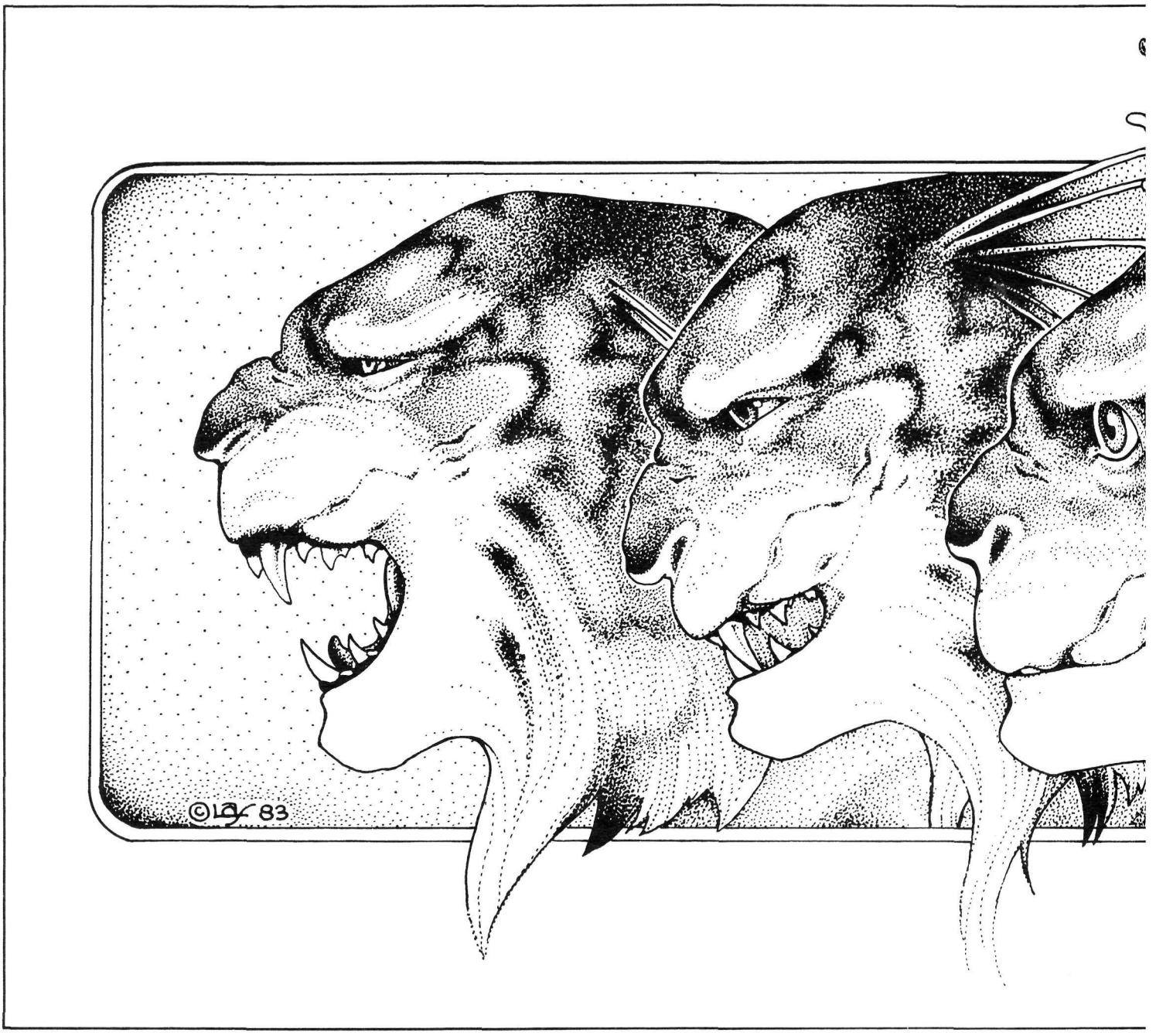
•Gravity Modifications to Characteristics: Kzinti from light gravity homeworlds subtract 3 from MAS and STR each and add 3 to DEX. Kzinti from heavy gravity homeworlds subtract 3 from CON and add 3 to both MAS and STR.

Kzinti Colonies

FIRST CONQUEST: the first world reached by Kzin interstellar explorers happens to be the world best-suited for Kzin habitation, with the exception of Kzin itself. This cool, dry planet has an average surface temperature of 6 degrees centigrade. A sparse population of hardy, water-efficient organisms exists, some of which are terribly vicious (making exciting hunting). The Kzinti exterminated the quadrupedal omnivores (possibly sentient) who once ruled the world.

HURTLING ROCKS: an asteroid belt in the same system as Wind Carries Harsh Discipline. The Kzinti here mine metals and monopoles. No human is ever allowed to visit this belt, which sparks wild rumors.

WATER CONQUERED: water covers 89% of the surface here; vast rainforests and steaming jungles thrive on the many archipelagoes. These renowned primeval jungles offer the best hunting in the Patriarchy. Water Conquered is hot, averaging 21 degrees centigrade, harsh for a Kzin. Kzinti settlement huddles at the



relatively cooler poles, except for a few equatorial exile or hunting stations, and several large prisons. Some Kzinti settlements are vast moored assemblies of barges: on the open sea, precipitation is less.

WIND CARRIES HARSH DISCIPLINE: a small, dense world with many mineral resources. It also has a hot roiling hydrogen-methane atmosphere, forcing the Kzinti miners to live in great domed cities, the construction of which was the greatest non-military achievement of the Patriarchy.

•**Education:** a Kzin without a name receives 5 years of education, only. Upon earning a partial name, he receives another 1D10 years of EDU. Upon earning a full name, he can receive EDU until he feels satisfied with his education. EDU can never exceed a Kzin's chronological age minus 13.

•**Damage Modifier, General Hit Points, Attribute Rolls, Hit Locations, with Hit**

•**Kzinti Defects:** Kzinti medical technology equals humanity's, though Kzin disdain the constant enervating use of autodocs.

1D100	*defect*
01-50	no defect
51-53	boosterspice allergy
54	addiction
55-80	hyperspace blind spot phobia
81-95	missing limb
96-99	roll twice
00	potential telepath

Kzinti Defects

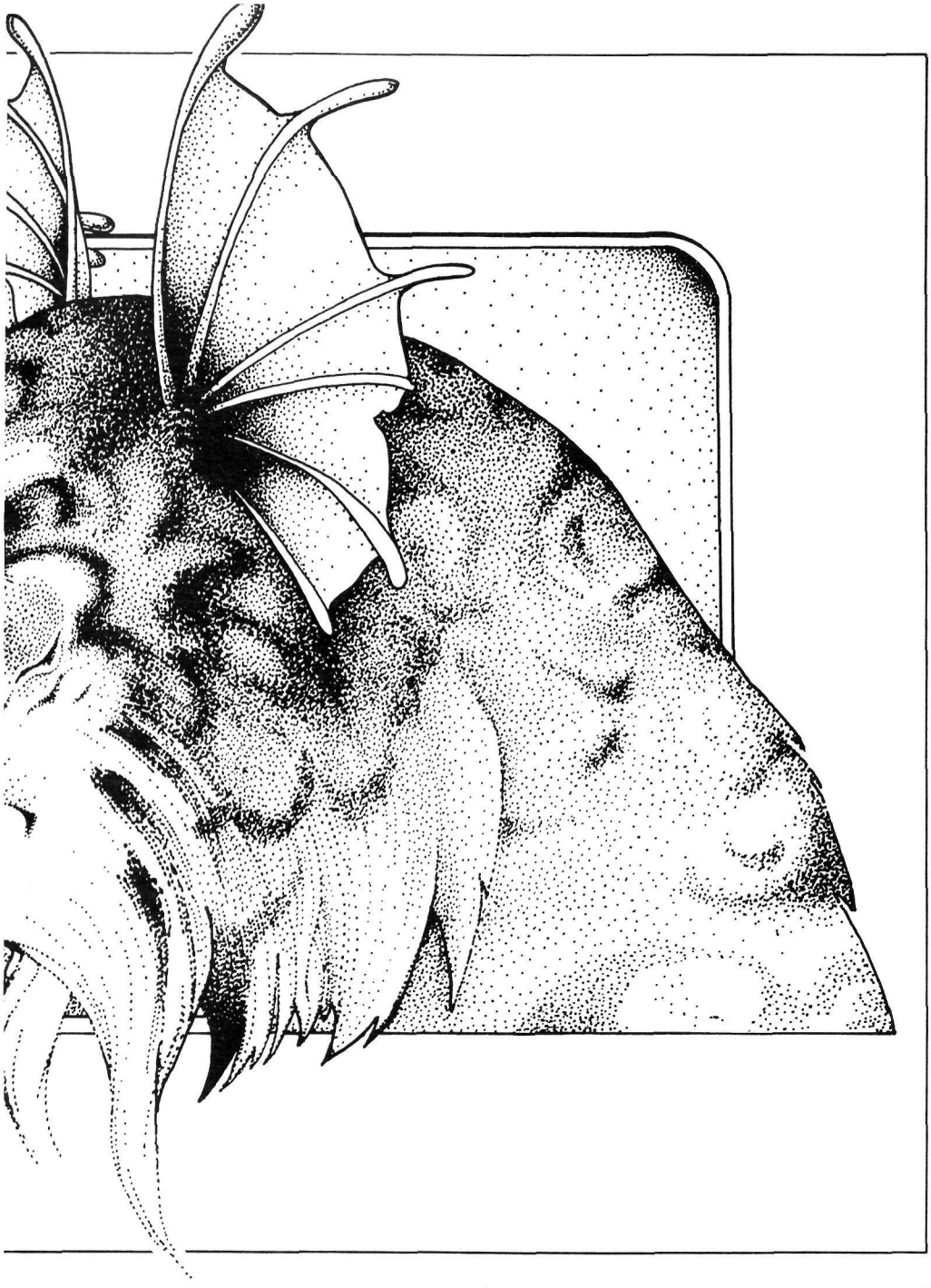
BOOSTERSPICE ALLERGY: *a* Kzinti equivalent to boosterspice exists, though it erases battle scars and so is ignored by many Kzinti. A Kzin with this defect could not take Kzinti boosterspice even if he wished to; often a meaningless defect, but perhaps important during play.

ADDICTION: unlike humans, Kzinti look upon addiction as a supreme shame. A Kzin explorer with this defect probably resides on a human world and avoids contact with his own species.

HYPERSPACE BLIND SPOT PHOBIA: the Kzin hyperspace phobic is able to suppress the usual catatonia with a successful luck roll, but will become manic, aggressive, and more dangerous when affected by hyperspace.

MISSING LIMB: such a Kzin may be transplant-resistant, or proud of the wound which cost him the limb. Choose which limb was lost. Kzinti with missing limbs are seldom too proud to wear a prosthesis; the standard Kzinti prosthesis has a DEX of 10 and 8 hit points.

POTENTIAL TELEPATH: your explorer is susceptible to the telepathy drug, though this may be unknown to him. Both the shame and the usefulness of telepathy drug addiction are profound.



Points per Location, and Action Ranking: all figured as per humans.

•Speed: Kzinti move normally at a speed of 5 meters per impulse. When running all-out a Kzin can reach a speed of 10 meters per impulse. See the game system chapter and the Athletics/Run skill for more information.

•Characteristics:

characteristic		*normal roll*
Strength	(STR)	5D6 + 12
Mass	(MAS)	4D6 + 10
Constitution	(CON)	2D6 + 6
Intelligence	(INT)	3D6
Power	(POW)	2D6 + 6
Dexterity	(DEX)	2D6 + 12
Appearance	(APP)	2D6 + 6
Education	(EDU)	special (see below)

•Physiological Age: without boosterspice, Kzinti physiological age is the same as chronological age, Known Space Kzinti begin to feel the effects of aging at age 80. See the Human Aging Table for effects.

•Chronological Age: since Kzinti rarely use boosterspice, their chronological ages stay low. Kzinti mature earlier than humans, and this is reflected on the table below

1D8	*age in UNS years*
1	1D10 + 8
2	1D10 + 18
3	1D10 + 28
4	1D10 + 38
5	1D10 + 48
6	1 D6 + 58
7	1 D6 + 64
8	1 D6 + 70

•Psionics: Kzinti have shown no individual psionic abilities other than telepathy. If your explorer has the potential telepath defect, the gamemaster may ask you to fill in this section at some point.

• Kzinti Occupation Points and Pursuits: a Kzin begins education at age 3, stopping at age 8 for 10 years of military training. A Kzin who is younger than 19 is still in military service. After that, if he has not yet earned a name, he goes directly into a pursuit track, which once started, may not be changed before play begins. Once a partial name is earned, he can get up to 10 more years of Education, though he can refuse the full term.

derivation	*occupation points generated*
education	(EDU - 10) x 20
military training	200 points *
pursuits	(Age - [EDU + 13]) x 20
special interests	INT x 10

* if Kzin is less than 18 years old, he receives his (Age - 8) x 20 occupation points in military training instead of the full 200.

•Occupation Points From Education: few Kzinti ever get more than the most basic sort of education. Those Kzinti with more than 10 years of education always specialize in a particular skill or associated skills during education. Pick 1 D3 skills from the human education list, and all the Kzin explorer's education occupation points must go into those skills only.

•Occupation Points from Military Training: each Kzin explorer over 18 years of age has 200 occupation points to spend on any of the following skills: Athletics, Emergency Treatment, Handgun (Energy), Handgun (Projectile), Heavy Weapon (Energy), Heavy Weapon (Projectile), Listen, Observe, Personal Flyer, Scent, Search, Strategy, Track, Unarmed Combat, Variable Sword, Weapons System.

•Occupation Points from Pursuits: a Kzin explorer has a restricted number of pursuit tracks, and will have followed only one pursuit before coming to Ringworld.

1D100	*pursuit*
01-05	criminal
06-25	explorer
26-55	functionary
56-70	pilot
71-75	prisoner
76-99	soldier
00	zealot

•Individual Skills for Pursuits: all the skills for these pursuits are identical to those for humans, though the gamemaster may add or subtract skills at his option. Notes follow.

CRIMINAL: a criminal against the Patriarchy, he may have fled to Human Space. Human governments may or may not consider him a criminal. Perhaps he goes to Ringworld to evade agents of the Patriarchy, to carve out his own empire, or perhaps he is part of a deal with the UN.

EXPLORER: a Kzin explorer surveys and helps study new worlds on or beyond the fringes of Known Space for the Patriarchy. Kzin explorers accompanying human expeditions to Ringworld work for the Patriarchy.

FUNCTIONARY: such an individual is likely to be a diplomat who specializes in relations with humanity.

PILOT: Kzinti pilots serve the same functions as do human pilots, but are likelier to have armament installed on their ships.

PRISONER: this Kzin was imprisoned by a human government. The Kzinti kill, rather than incarcerate, criminals. The prisoner may have been released on condition that he join the expedition to Ringworld.

SOLDIER: a loyal warrior of the Patriarch, sent to Ringworld for a purpose of the Patriarchy to be decided between the player and the gamemaster.

ZEALOT: he might be a heretical Kdaptist, a Kzin anarchist, or a maniacal supporter of the Patriarch and the destiny of the Kzin. A few are refugees in Human Space. They may wish to go to Ringworld to escape the Patriarchy or to found a new Kzin empire.

• **Occupation Points from Special Interests:** your Kzin receives his INT x 10 in occupation points applicable to any entry on the skill list.

•**Converting Occupation Points to Percentiles:** occupation points convert as per humans, and the standard sacrifice of 10 occupation points will convert a root skill maximum into its xenologically-qualified counterpart (or up to the Xenology maximum).

•**Root Skill Maximums:** as per humans.

•**Xenology Qualifier Maximums:** use the table for humans, but substitute humans for the Kzin entry, and subtract 25 percentiles from all cetacean entries.

•**Wealth:** any Kzin not currently in the employ of the Patriarchy (except for a prisoner, who has no wealth) has 1D100 + 100 stars. Players of Kzinti in the employ of the Patriarchy must consult with the gamemaster for financial information.

•**Beginning Equipment:** two suits of clothing or other weather-protective gear; one energy handgun (player's choice — not available to prisoners, though); choice of one item from the human equipment lists.

•**Kzinti Physiology:** a Kzin suffers the same effects from damage as does a human, with the exception that a Kzin who would normally be unconscious may, with a successful health roll, remain conscious. In such a case the Kzin will take twice as much damage from any blood loss.

•**Kzinti Attacks:** a Kzin has fearful natural weapons for combat. On each action ranking, he can slash and grab with each clawed hand on the same impulse, doing 1 D8+2 damage with each hand that hits. If the Kzin successfully attacks with both claws, he holds his victim and automatically does 1 D8+2 total damage each impulse he hangs on. A Kzin holding a victim can bite that target as well, on the Kzin's next action ranking. The bite does 1 D6 damage and the Kzin's player can choose the location bitten.

•**Kzinti Armor:** Kzinti lack natural armor, and have a wide assortment of modern and powered armors. They dislike armor which decreases their DEX.

•**Kzinti Unarmed Combat Skill:** if the skill roll for any successful attack with hand or bite is lower than the Kzin's Unarmed Combat skill, the Kzin does double damage on that attack. This does not apply to the automatic damage done by a Kzin when hanging on after both claws have struck home on an action ranking.

A Kzin can use this skill to parry melee weapons attacks upon a successful D100 roll equal to or less than the Kzin's Unarmed Combat skill. This blocks 10 points of damage, and the parrying limb sustains no damage in parrying. Damage in excess of 10 points still applies and a hit location must be rolled normally. Variable swords and flashlight-lasers cannot be thus parried.

About Kzinti

In challenging a Kzin, a simple scream of rage is sufficient. You scream and you leap.

The Kzinti are a race of fierce carnivorous bipeds, whose ancestors were large, cat-like plains predators. Averaging about 2.4 meters tall, the males easily may weigh 200-225 kilos. Except for the ears and the long, pink, rat-like tails, a thick coat of rich orange-red fur covers their muscular bodies. The exact coloring of the coat varies from Kzin to Kzin, while occasional yellow or white stripes and black markings on the face and torso help to identify individuals.

The odd, multi-pointed ears can expand and spread like translucent pink Chinese parasols, or fold flat into depressions in the fur during combat. The human-looking eyes are round, with round yellow pupils. Kzinti mouths are full of sharp, needle-like teeth, useful for tearing into the fresh, blood-raw meat that is their preferred diet. The nose is broad and flattened; their sense of smell is acute. A substantial cranial bulge renders the overall shape of the head nearly triangular.

Kzinti are thick all over — arms, legs, and meter-wide torso. Their straight legs are short in proportion to the rest of their bodies. The backs of their big, four-digit hands are furred, but the palms and fingers are covered with a tough, leathery black padding. Their fingertips conceal long sharp claws, always kept polished to a deep, glossy black.

From a distance, Kzinti may resemble huge, fat, orange-tabby cats, but a closer look reveals that these are formidable and dangerous aliens. Their tempers are usually short. Their pink tails lash restlessly whenever a human passes too close, and carefully-tended Kzinti claws are apt to slide out above black fingertips.

Kzinti Outlook and Culture

Though honorable, courageous, and intelligent, Kzinti also are impatient, incautious, and aggressive — with a tendency to act on impulse without sufficient preparation or forethought. Sometimes their traditions demand such behavior. Nevertheless, they are excellent tacticians, intuitively grasping the advantages and defensive limitations present in direct confrontations.

Most Kzinti believe it is their species' ultimate natural duty to conquer and rule at least the entire Milky Way galaxy. For several thousand years they built an interstellar empire which, at its height, was more than three times the Ringworld-era size of Human Space. Sentients such as the Kdatlyno and the Pierin, who sought only peaceful contact, became Kzinti slaves and meat-animals, and their worlds became Kzin colonies and military-industrial bases. Though their arrogance and chauvinism was tempered by a string of defeats in the Man-Kzin wars (2367-2651 A.D.), Kzinti still contemptuously regard most aliens (especially herbivores), as disgusting cowards, future thralls, or potential meals. Kzinti are actively interested in obtaining artifacts from Slaver stasis-boxes or acquiring any other powerful technologies (total-conversion drives, indestructible warship hulls, etc.) that would once again transmute their expansionist dreams into irresistible force.

Kzin society is led by a feudal-style aristocracy. The ruler of the Kzinti empire is known as the Patriarch, and the government as a whole is called the Patriarchy. The ruling family, roughly 'royal' in the human sense, bears a *-Rrit* suffix, as in *Kchula-Rrit.* Other hereditary titles and names identify noble families of lesser stature, corresponding to dukes, barons, lords, and so forth. Tradition requires, despite any legacy of birth, that a Kzin's true name must be earned, not automatically bestowed regardless of competence, as in most human cultures. Courageous acts of great benefit to the empire are most honored, and even one of low status may win a hereditary name to pass on to his descendants if his deeds are sufficiently heroic. A Kzin of noble family may also achieve a full name if he vanquishes his father in combat (an unlikely event). Most Kzinti are styled by profession: Speaker-to-Animals, Slaverstudent, Telepath, etc. Designs tattooed on their ears often mark occupations of low-born apprentices. Partial names such as Chuft-Captain represent an intermediate-level recognition of noble birth, substantial service, or conspicuous gallantry which yet does not deserve the grant of a full name. With the full name comes high status, comprehensive education, land, a harem, and the right to breed. Addressing an honored, name-bearing Kzin by his former occupation is a grievous insult, and sometimes a fatal mistake.

While many Kzin travelers have an excellent command of Interworld, all prefer to use the Hero's Tongue, their native language. To most humans their speech sounds like a rapidly spat-out string of insults, replete with screams, snarls, growls, and atonal inflections. Intonation and forms of address carry much meaning. Quieter, but just as important expressive modes are often overlooked; these range from sharp, barely-audible single syllables to low, muted, burry rumblings. Kzinti script is fluid and non-linear. Its characters resemble dots and commas, often arrayed in circular and spiral patterns. Their numbering system is octal, based on the eight digits of their two hands.

Kzinti are excellent mathematicians and computer specialists when they have the patience for such occupations. Their physical science once far surpassed that of Earth, though the reverse is more nearly true during the Ringworld era. (The Kzinti taught humans the use of the gravity polarizer.) Perhaps because they depend on autodoc technology to a far-lesser degree than do humans, Kzin emergency medical supplies are generally superior to humans' — and eagerly sought on the black market.

Except in magnificent, long-formalized traditional styles, Kzinti sculpture and panel art (though sometimes shocking) is seldom compelling to human specialist or flatlander. Their music, employing an eight-tone scale,

sounds oddly familiar. Most their heroic sagas use octameter-based lines.

Kzinti Sexuality and Upbringing

Female Kzinti of the Patriarchy are docile and non-sentient, unable to manage their own affairs without male supervision, and unable to defend themselves It is possible that the home world males bred out intelligence and aggression from their mates, a devolution taking millennia and completed long ago. Each family now consists of a father and his male descendants. Females are treated as property, or as faithful pets. They are fiercely protected for the sons they bear rather than for any personal qualities. Each patriarch keeps as large a harem as he can provide for and defend, according to his status.
Most of his females will be pregnant at any time, for the number of family heirs must be maximized. Kzinti take their social structure for granted, but those familiar with humans and other alien species are sometimes wistful, even envious. Sentient females might be compellingly exotic to Kzinti males.

In the unknown volume far beyond what is now Kzin Space may be forgotten colonies of more primitive Kzinti stock, where genetic drift and new environments have created quite different social patterns.

Kzin males receive extensive training in martial arts practically from birth. Most become masters of armed and unarmed combat with natural, primitive, and advanced weapons, an ancient tradition. The imposing House of the Patriarch's Past (a grand, sprawling building formed from thick slabs of volcanic rock fused along the edges), contains a war museum. Displayed are great *sthondat* thighbones with grips worked into them — clubs wielded by primitive Kzinti. Here are weapons classified as hand-cannon which few humans could lift. Silver-plated molded body-armor is cataloged which is as thick as a safe door. The two-handed battle-axes might be used to fell mature redwoods. There are also whole collections of *wtsai* blades, the ancient traditional war knife cast in the shape of a Kzin claw and polished black.

More than half of Kzinti kittens die in adolescent conflicts and duels. Overpopulation never has been a problem on Kzin — the more crowded it becomes, the more opportunity there exists for one Kzin to take offense at another, and therefore for the numbers to adjust themselves accordingly. When a Kzin smiles reflexively, he is baring his teeth for fighting.

In hunting practice, young Kzinti continue to improve coordination, hone extraordinarily-fast reflexes, and learn to efficiently channel their enormous strength. Hunting parks on Kzin are large, half-wild reserves stocked with predators and meat-animals. In these orange and yellow jungles, noble fathers teach their kittens how to watch and wait, to stalk, and to leap and kill. This is enjoyable business; if at all possible, the carnivorous Kzinti prefer to chase down and butcher their own food with tooth and claw. The concept of eating plants repels them, and human food (even meat) smells to them like burnt garbage. Usually Kzinti must settle for reconstituted meat, or at best for raw meat flash-heated to body temperature just before it is served.

Kzinti Honor

Kzinti have an uncompromising sense of personal honor, courage, and duty. It is said that if honor requires a Kzin to starve while within reach of meat, then starve he will. A point of honor is unaffected by time, particularly if the consequences are still present. No Kzin would sell his honor for profit, and most consider mere profit a motive unworthy of honorable sentient beings.

Kzinti social codes, though often admirable, also may seem strange. Their word is good; they do not make idle commitments or hollow promises. They will carry out any threat or challenge issued; though boastful, they seldom bluff. In conversation their standards of tact do not permit them to lie politely or to avoid insulting, confrontational, or embarrassing remarks. Unintended insults may be mistaken for intentionally-provocative challenges which sometimes require combat. Interrogating prisoners, their code of justice prohibits them from resorting to the services of a telepath or to other veracity-verification procedures so long as the captives behave realistically, do not lie, and do not mock their captors. Most Kzinti feel it is more merciful to kill a sentient being than to addict him to drug or tasp.

In combat, Kzinti do not believe in using more or more powerful weapons than the situation warrants. Technology, unless it is hopelessly superior, seldom daunts them. Hazardous-duty pay would insult a Kzin, who should not even notice unusual peril. Unquestioning and immediate obedience to a commander or leader is a virtue, as in the military of most species. Though a Kzin version of boosterspice is said to have been synthesized, most Kzinti would refuse it, since it would rejuvenate away their battle scars. Though it happens rarely, a dishonored Kzin may suffer the loss of one or both ears, or his claws. In cases of cowardice, treachery, treason, or heresy his name and entitlements must be stripped from him, or he may be killed in single combat by a member of the Patriarchy.

The Planet Kzin

The planet Kzin is the fourth world out from 61 Ursa Majoris, a star more than 30 light years from Earth to galactic north. The most distant of its three intermediate-sized moons is the largest; it has an eccentric, retrograde orbit. Solar eclipses are produced not by any of the moons but by the next innermost planet, Hgrall, a gas giant. Slightly smaller and denser than Earth, Kzin is a terrestrial world of marginally higher gravity. The day is 27.6 UNS hours; 204 UNS years equal 217 Kzin years. The average temperature is about 7° C (45° F), significantly cooler than that which most humans prefer. Kzinti are very uncomfortable in hot desert or tropical climates.

Liquid water covers only 50% of Kzin, and there is less rainfall than on Earth. Much of the land is divided between vast rolling plains covered with tall yellow grasses and thick lowland jungles rife with rich orange and yellow-green vegetation. Kzinti dislike water, and few live near the industrial seaports for pleasure. The rocky, mountainous outbacks are almost totally uncivilized wildernesses, though no part of Kzin ever has been crowded by human standards.

Kzin biochemistry is so similar to that of Earth that it argues for a common microbial ancestor. Destinies notwithstanding, humans and Kzinti are cousin species, and this may partly explain why, to the average flatlander, Kzinti have become the best-known and best-accepted alien race. Kzinti even drink bourbon, though they prefer it heated.

The Man-Kzin Wars

Long ago, when ships from Earth first rode fusion drives to the stars, Kzinti already were using the gravity polarizer to power interstellar warships. Able to sustain short bursts of incredible acceleration, their dreadnoughts were faster and vastly more manoeuvrable than human ramships. Contact with the Kzinti abruptly ended a golden age of peace and prosperity on Earth lasting two-and-a-half centuries. Humanity had almost forgotten warfare; the colony ramships were unarmed. It had always been assumed that the inevitable first meeting between advanced alien races would be friendly. There was no human battle fleet in existence to defend the Centauri system when a single Kzin Conqueror warship swept in to subjugate Wunderland for the Patriarchy. Earth's resistance to the Kzin fleets should have been nominal, but mankind had been lucky. The early interstellar ramships used fusion-powered photon drives, and were launched by a combination of photon sail and asteroid-based laser cannon. Human pilots quickly learned the Kzinti Lesson: "a reaction drive's efficiency as a weapon is in direct proportion to its efficiency as a drive." The first campaign into the Solar System came as a terrific shock to the Patriarchy. While Kzin telepaths reported that the human worlds had no weapons, giant laser cannon chopped at their warships, and smaller mobile cannon darted in and out on the light-pressure of their own beams. Slowed by the unexpected human resistance and by the lightspeed barrier, the war ground on for decades — but the Kzin would have triumphed eventually.

The Puppeteers had studied the Kzinti for hundreds of years to determine if they should be exterminated. The first Man-Kzin war gave the Puppeteers a convenient way to conduct a selective-breeding experiment. They used a starseed lure to draw an Outsider ship into Human Space, near Procyon. The Outsiders sold the secret of the quantum I hyperdrive shunt on credit to the mayor of the human colony We-Made-It. Against hyperdrive warships, the Kzin sub-light fleet hadn't a chance, and a human victory was assured.

In three subsequent wars and other major incidents, the Kzinti were defeated. At the end of each conflict, one or two Kzin colony worlds were annexed as punitive damages; and the Kzinti empire slowly shrank to its present size, only slightly larger than Human Space.

The population of Kzin is currently several hundred million, a crowded world in Kzin terms. Yet at the height of their empire, the Kzin numbered eight times as many. In each of the Man-Kzin wars, two-thirds of Kzin's finest warriors died. In the 27th century, the Puppeteer experiment successfully concluded: the genetic edge had been filed from Kzinti aggressiveness, and the Kzinti (very reluctantly) opened diplomatic relations with other species. The Puppeteers no longer considered the Kzinti a dangerous threat to their business empire — or to their evacuation route from the galaxy.

Several Known Space alien species were once slaves of the Kzinti, as humanity certainly would have become without the Puppeteers' intervention. The Kdatlyno, betrayed by their attempts to use the 21-centimeter interstellar hydrogen radio band to contact other intelligent life-forms, were conquered entirely. The Pierin home worlds were taken

when the Kzinti traced backward the course of a scientific vessel. The Grogs of Down, utterly terrified by the presence of Kzin military colonists, never revealed themselves or they too might have been enslaved or exterminated.

Puppeteer products, particularly General Products hulls and thruster drives in later wars, were significant in the defeat and containment of the Kzinti. Humans often converted No. 2 hulls to attack craft, and modified No. 3 hulls to full battle cruisers equipped with reactionless thrusters, fusion motors, and the quantum I hyperdrive shunt. For centuries the Pierin used highly-manoeuvrable spacecraft based on the No. 1 hull; relying on the resources of unconquered colony worlds they retook their home system during the third Man-Kzin war. The Trinocs were never enslaved by the Kzinti (who had no yen for planets as alien as Trinoc), but they were continually harassed until they too bought advanced drives and other equipment from the Puppeteers.

Trinocs, Pierin, Kdatlyno, and humans all now possess interstellar spheres which check renewed Kzinti expansionism.

Though it no longer rules any sentient slave-races, the Patriarchy officially views its recent catastrophic losses as inconvenient but temporary setbacks, which may delay but cannot make less inevitable the eventual Kzinti conquest of Known Space and beyond.

Kzin warships are always impressive and formidable. The few presently existing are classed as police ships. At the height of their interstellar empire, a single dreadnought of the Imperial Conqueror class could have utterly destroyed the combined military strength of late 20th-century Earth. Armaments included fusion bombs, strike missiles, anti-missiles, laser cannon, microwave-disrupters, and induction-projectors. A fine example, maintained and guarded by ARM, may be viewed in the Smithsonian's Armstrong Orbital Museum above Earth. From a distance the battlecraft is an ominous, foreboding crimson disk, like some baleful, bloody eye. Closer, it becomes a huge red sphere over 200 meters in diameter, with ugly dead-black and silver elements projecting at random. Lumpy ridges trace the division of the hull into eight regular longitudinal segments, each containing a major weapons system. Two large circles of painted-green dots-and-commas indicate the ship's class and captain's name. Atop the sphere like a glowing ice-cap sits the main command and control dome. Two latitudinal belts of large hexagonal ports alternate with smaller, mirror-blue, crystalline laser domes. Hemispherical weapons-pods around the equator of the ship are actually detachable two-Kzin Scream-of-Vengeance interceptors, 15 meters in diameter. An equal number outfitted for planetary attack are stowed just beneath them in the interior of the main hull. Nominal complement for the Imperial Conqueror class was 512, plus a detachment of Conquest Warriors. Equipped with fusion-powered gravity-polarizers, these dreadnoughts cruised at .8 lights, with plenty of power left for maneuvering. An internal zero-gee field normally was maintained by acceleration shields, compensating for hard velocity build-ups and abrupt course changes. Though cabin-gravity generators have been commonplace for centuries, Kzinti warriors were expected to tolerate weightlessness, cramped quarters, and personal inconvenience. Usually the craft did not even spin for the comfort of the crew.

Currently the Patriarchy has limited military capacity. Though its fleets' Ripping-Fang cruisers and Merciless-Slayer-of-Cowards fighter craft look as fearsome as ever, treaties firmly restrict their weaponry, drive-systems, and deployment. Sale of used General Products hulls to the Patriarchy is prohibited.

Telepathic Kzin

Telepathy is not easy for a Kzin, physically or emotionally, for few are naturally adept. Trained Kzinti telepaths are forced addicts of a drug which drives insane all but one-tenth of one percent who take it. Survivors are shivering neurotics. The drug, a treated extract of *sthondat* lymph, must be administered by injection. The result is transitory but powerful. Once the drug takes effect, the telepath lapses into a relaxed hypnotic state, but anyone caught in his mental grip stiffens convulsively, simultaneously experiencing a piercing headache.

Once common on Kzin warships, telepaths could read the minds of sentient beings in metal-hulled ships at 2000 kilometers. Fortunately they could not exert a Slaver-like telepathic compulsion. In the grip of a Kzin telepath, a human may lose consciousness and will always experience a throbbing post-telepathyheadache.

The ordeal is disgusting, painful, and exhausting for the telepath as well, who sleeps for most of his leisure hours. His matted, unkempt fur, and his bedraggled, distraught appearance would be shameful for a Kzin of other occupation. A telepath will take the drug only if ordered to do so, but his honor requires him to remind his commander of his ability, if necessary.

Presently encountered only in espionage, piracy, and other illegal activities, Kzin telepaths are rare in Known Space. They cannot be ordered to read the minds of herbivores. Often dazed and groggy, as if from lack of sleep, Kzin telepaths are easily identified.

Kzinti Today

All Known Space Kzin alive in the Ringworld era are descended from those who avoided death in the Man-Kzin wars — those with the intelligence or forbearance to abstain from fighting human beings. The Puppeteers speculate that Kzinti now possess sufficient empathy and self-restraint to deal with alien races in a civilized manner, though the new traits may have produced new inner turmoil. For more than two centuries Known Space has been relatively peaceful, and the Kzinti have lacked significant offensive force. The worlds of their now-shrunken empire are still on probation, though recently many harsh restrictions have been relaxed.

Kzinti still detest cowards and pacifists, harboring particular disgust for herbivores. That their former enemies have not completely crushed and subjugated them greatly puzzles most Kzinti, since the freed races have been exposed to disreputable human ethics and have access to advanced technology. While holding much respect for conquered species who fought courageously, and always proudly honoring brave and formidable enemies, the Kzinti seem unwilling to believe that humans and other aliens also might share such attitudes.

To the Patriarchy, the last disastrous interstellar war is still officially the "Fourth Truce with Man," but Kzin fathers now routinely teach their offspring that human meat is not good to eat. A secret and heretical Kdaptist religion even holds that the Creator made man — not Kzinti — in His image. Early Kdaptist disciples (mostly from low-born families) wore masks of human skin when they prayed, hoping to confuse the Creator long enough to win a war!

Once mankind's most dangerous enemy, a Kzin on Earth often finds himself treated deferentially; his alien insights may be thought fascinating and surprisingly useful. At parties, a dignified furry ambassador may even allow his ears to be affectionately scratched by some sentient flatlander female. A Kzin may find it difficult to reconcile his image among aliens — and sometimes his own behavior — with the present inglorious status of his fatherworld and the ultimate destiny of his species.

Like the UN, the Patriarchy keeps much secret from its average citizens. Among the secrets are the principle of the quantum II hyperdrive and the location of Ringworld. Only Kzin diplomats trained to deal with humanity are permitted knowledge of the existence of the Pak, and their understanding of human ancestry often far exceeds that of the ordinary flatlander.

CREATING A PUPPETEER EXPLORER

Players using this section should also read the accompanying essay on Puppeteer society, history, physiology, etc. Creators of Puppeteer explorers must be familiar with human explorer creation. Consult the gamemaster before creating a Puppeteer explorer; he is likely to wish to limit the number of Puppeteer explorers in the game.

•Name: choose the name desired for the Puppeteer explorer. This should be the name he goes by when among aliens — his "real" name is likely to be unpronounceable.

•Gender: it is plausible that all Puppeteers off the Fleet-of-Worlds are of a single gender. In any case, Puppeteers do not breed when off their homeworlds, and never discuss gender or sex with aliens.

•Puppeteer Home World: all Puppeteer explorers come from the Fleet-of-Worlds; see the Puppeteer essay for more information.

•Mad **Puppeteer Personality Traits:** choose 1D3 of the following abnormal personality traits for each Puppeteer explorer and take them into account during play. No sane Puppeteer would ever exhibit any of them: aggressive, contentious, careless, lazy, curious, superstitious, truthful, humorous, sensual, independent, hypochondriacal, mystical, happy-go-lucky, generous, optimistic. Note that these traits are unlikely to be extreme. A "careless" Puppeteer will still appear colossally cautious to a human.

•Chronological Age: Puppeteers use a powerful life extender, but most mad Puppeteers either die or come to their senses within the first few hundred years of life.

1D6	*age in UNS years*
1	1D6 + 29
2	1D6 + 35
3	1D6 + 41
4	1D6 + 47
5	1D6 + 53
6	1D100 + 59

•Physiological Age: all Puppeteers have a physiological age of 30, the age at which they begin taking their longevity drug.

•Education: at age five, Puppeteers begin an intensive education lasting 25 years. After completing such basic education, a Puppeteer may remain in education longer, usually staying 1D20 more years, but EDU may never exceed the Puppeteer's Age - 5.

•Damage Modifier, General Hit Points, and Attribute Rolls: as per humans.

•Characteristics

characteristic		*normal roll*
Strength	(STR)	2D6 + 6
Mass	(MAS)	2D6 + 6
Constitution	(CON)	2D6 + 6
Intelligence	(INT)	2D6 + 15
Power	(POW)	3D6
Dexterity	(DEX)	2D6 + 6
Appearance	(APP)	2D6 + 6
Education	(EDU)	varies, see below

•Hit Locations: Puppeteer hit locations differ from human hit locations, but the human hit location table is still useful to figure out individual values. Puppeteers have a thick mane over their forebody which acts as 1 point of armor. No Puppeteer body outline for the explorer sheet exists.

location	*1D20*	*armor/HP*
hind leg	01-03	0/(.30)
hindbody	04-06	0/(.30)
right foreleg	07-09	0/(.30)
left foreleg	10-12	0/(.30)
forebody	13-18	1/(.35)
right head	19	0/(.25)
left head	20	0/(.25)

•Puppeteer Defects: any Puppeteer who comes into contact with humankind is by definition insane. Those who have been left behind by the Fleet-of-Worlds are the boldest of their species, for they must trust their lives to hyperspace sometime in the next 20,000 years in order to escape the wave front from the explosion at the galactic core. To discover your Puppeteer's defect(s), roll below.

1D100	*defect*
01-24	manic-depressive
25	one-head talker
26-34	xenophile
35-40	enjoys spaceflight
41-60	schizophrenic
61-65	addict
66-70	suicidal
71-75	megalomaniac
76-78	homicidal
79-89	political/criminal exile
90	likes weapons
91-00	choose two of the above

Puppeteer Defects

MANIC-DEPRESSIVE: suffers attacks of (relative) boldness and courage, followed later by depression, remorse, and possible catatonia.

ONE-HEAD TALKER: for unknown reasons and to unknown effect, it uses only one head to talk or sing; usually talks only in one voice; may have a sense of humor.

ENJOYS SPACEFLIGHT: though not so foolish as to like hyperspace, it will fondly gaze at planetscapes for hours; also favorably regards ancient elevators, slide walks, etc.; in extreme cases may even enjoy roller-coasters.

XENOPHILE: enjoys talking to and being in the physical presence of aliens.

SCHIZOPHRENIC: subject to delusions, excessive (for a Puppeteer) paranoia, hallucinations, and aggressive behavior; one head may talk to the other.

ADDICT: wirehead, gambler, marijuana fiend, alcoholic, or other vice-server.

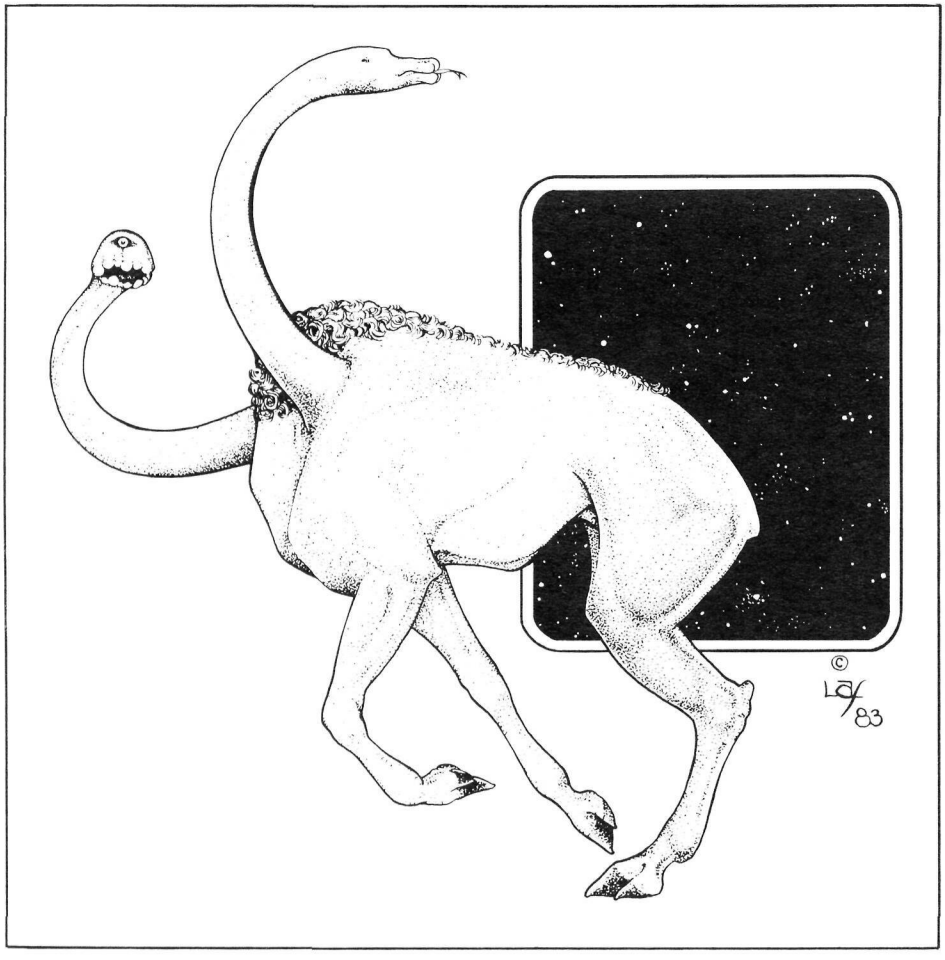
SUICIDAL: freely walks into potentially dangerous situations; not subject to normal Puppeteer catatonia; likes to play computer games.

MEGALOMANIAC: certain of his grand destiny (which is impossible to fulfil). Spends hours in mysterious communications or plots.

HOMICIDAL: this Puppeteer is capable of attacking, and may be obsessed by death and dying; possibly religious!

POLITICAL/CRIMINAL EXILE: stranded in Human Space for unknown crimes or purposes, the exile will be depressed and anguished most of the time.

LIKES WEAPONS: possibly a bully, who may enjoy threatening harm to people. Rarely knows how to use weapons, and is usually about as cowardly as a normal Puppeteer.



•Action Ranking: as per humans.

•Speed: Puppeteers move normally at a speed of 5m/im. Running all-out, a Puppeteer can double this to 10m/im for a time. See the game system chapter and the Athletics/Run skill for more information.

•Psionics: none.

•Puppeteer Occupation Points and Pursuits: after finishing basic education, the Puppeteer continues with 1 D20 more years of EDU. It then selects a pursuit, which it may change no more often than once every five years.

derivation	*occupation points generated*
education	(EDU - 10) x 30
pursuits	(Age - [EDU + 5]) x 20
special interests	INT x 10

•Occupation Points from Education: because of their intensive education and fine intellects, Puppeteers receive 30 occupation points per year of EDU after the first ten. Allot education-derived occupation points to any skill on the human education list. Devote at least 50 points to the Second Language/Interworld skill.

•Occupation Points from Pursuits: Puppeteer explorers may only choose from a restricted number of pursuits but need not roll randomly for the pursuit: the individual can choose the most appropriate pursuit for itself, choosing from Artist, Criminal (only if Criminal defect is rolled), Dilettante, Functionary, Engineer, Explorer, Journalist/Writer, Politician, Scholar, or Scientific Researcher.

•Individual Skills for Pursuits: skills for the pursuits are identical to those for humans, except that Puppeteers may never learn any Handgun, Heavy Weapon, Unarmed Combat, or Variable Sword/Flashlight Laser skill. They may also not learn Hyperdrive.

•Occupation Points from Special Interests: the points receivable from special interests can be distributed to any skill except for Handgun, Heavy Weapon, Hyperspace, Unarmed Combat, or Variable Sword/Flashlight Laser. Homicidal or suicidal Puppeteers may spend special interest occupation points on Handgun or Heavy Weapon skills.

•Converting Occupation Points into Percentiles: as per humans, and the usual sacrifice of 10 occupation points will convert a root skill maximum into its xenologically-qualfied counterpart (up to the Xenology maximum).

•Root Skill Maximums: as per humans.

•Wealth: Puppeteers in the employ of the General Products Legal Division begin with expense accounts of 1000 Stars, spendable only for official business. Criminals or other outcasts start the game with 1D100 + 100 Stars.

• Equipment: One full set of cosmetic products and weather-protective gear; choice of three items from the human equipment lists. If the explorer is on a mission for General Products, discuss additional equipment with the gamemaster.

•Puppeteer Physiology and Damage to Specific Hit Locations: this differs radically from that of humans or Kzinti. If a Puppeteer is damaged, it will go catatonic unless a luck roll succeeds. If any location is reduced to below zero hit points, the Puppeteer will automatically become catatonic, unless it is suicidal. Aside from this special catatonia, damage affects the Puppeteer as follows:

LEGS: as per human legs.

HINDBODY: as per human abdomen.

FOREBODY: as per human head. The Puppeteer has 1 point of armor here due to its mane.

HEADS: as per human arms. If one of a Puppeteer's heads is reduced to 0 hit points or less and it is not catatonic for some reason, halve its perception skills. If both heads go to zero hit points or less, it automatically goes into shock, even if suicidal or boosted by drugs.

•Puppeteer Attacks: Puppeteers can deliver a kick with their hind leg, doing 2D6 + 2 points of damage. The chance to hit is always equal to its DEX x 4, and will not go up by experience. In combat, a Puppeteer can use its two heads to watch two different target-of-opportunity arcs, or to watch one such arc while engaging in other actions (perception skills, etc.) with the other head.

If engaged against obviously superior odds, most Puppeteers will go catatonic and be of utterly no use to any comrades.

•Xenology Qualifier Maximums

species	*maximum skill*
Bandersnatch	30%
Dolphin	25%
Grog	10%
Human	90%
Kdatlyno	25%
Kzinti	90%
Martian	15%
Outsider	05%
Pierin	80%
Pak	60%
Slaver	50%
Sperm Whale	20%
Tnuctip	10%
Trinoc	35%

About Puppeteers

777e intelligent caution of our race is proverbial.

Pierson's Puppeteers are a highly-intelligent, non-humanoid species of tripedal herbivores who have enormously influenced the history of Known Space.

The origins of their spacefaring civilization date beyond Earth's Pleisto epoch, well before the evolution of humanity. Their earliest ancestors were wary herd animals, prey to carnivores, who found security only among throngs of their own kind. Today, Puppeteers number nearly a trillion, their population stabilized and regulated by a complex social hierarchy. They possess a formidable, sophisticated technology renowned for its efficiency and reliability. Using reactionless, inertialess drives purchased long ago from the Outsiders, they are capable of accelerating whole worlds to nearly light-speed. Luckily, the Puppeteers have no stomach for direct confrontation or for military aggression.

Puppeteers have had a tradition of pacifism, and their expert commercial enterprises have well-served them. Their corner on the interstellar market is older than the human Bronze age. Their trade empire once extended through at least ten million cubic light years, and must have included dozens of civilizations still unknown to the sentients of Known Space. Puppeteer traders dealt with Trinocs and Pierin, and closely monitored the Kzinti centuries before revealing themselves to humankind.

Few Puppeteers are willing to risk their lives to the uncertainties of space travel or the dangers of alien worlds. They customarily conduct much of their interstellar business through go-betweens or robot intermediaries. Sane Puppeteers exhibit a profound caution, preferring to rub shoulders and mingle gregariously only with other sane Puppeteers. They distrust aliens, alien motives, and alien technology; their evasive and secretive reputation in conducting alien affairs is well-deserved.

The Kzinti view Puppeteers as contemptible leaf-eaters, though officially not as enemies. Most humans think of Puppeteers as abject, miserly cowards driven by economic motives and paranoid phobias. There is much to this view, though in their own way the Puppeteers are daring, egotistical, and arrogant. They have often manipulated aliens for their own unfathomable ends. The libraries of the Puppeteer homeworld are said to contain knowledge humans have wondered about since the dawn of time — but no human ever is likely to enter those libraries.

With the exception of a handful of their courageous or insane, the entire Puppeteer race began an exodus from the galaxy over two centuries before the Ringworld era. Fleeing the explosion of the galactic core, they took with them their home planet and four farming worlds rather than risk hyperspace migration. Though the radiation shockfront should pose no threat to Known Space for 20,000 years, the Puppeteer Fleet-of-Worlds is already moving along galactic north at over 0.9c, several dozen light-years beyond Ringworld.

Physical Description, Reproduction

Olaf Pierson, a survey scout, was the first human to see a Puppeteer. His shipmates accused him of being drunk. To most humans (indeed, to most bipeds) a Puppeteer's appearance is striking, even shocking. From the side it vaguely resembles a weird terrestrial deer. Its body is triangular in plan, wider in front than in the rear, and displays a pronounced frontal hump. Beneath this bulge is a formidable brain, well-protected within a thick, bony, skull.

A Puppeteer has a pair of flexible, slender necks, rising sinuously upward, one from either side of the braincase hump. Perched atop the necks is a pair of python-like heads, flattened and triangular, each with a single staring eye set in a deep bone socket. A wide mouth filled with square, flat topped vegetarian teeth projects forward beneath each eye-socket; there is a long, narrow tongue, forked and pointed, within each mouth. Loose, knobbly lips rim the alien jaws, giving each head an unreadable expression of Cyclopean idiocy. Ear-pits are on the sides of the heads, while the necks contain both gullets and sophisticated larnxes.

Puppeteers stand braced on three legs, each terminating in a small three-clawed hoof. The two forelegs are set wide-apart, forming a stable, nearly-equilateral triangle with the single hind leg. A complex rear hip socket provides a wide range of complex motions — including the ability to deliver a swift, lethal kick, even while running.

To the top of the braincase. Puppeteers measure only a little over a meter; they may weigh in excess of a hundred kilos. The skin of a Puppeteer is mostly covered with a creamy-white hide, as soft as chamois and pleasant to touch. A coarse browinsh mane runs forward from the hip joint along the primary spine to form a thick protective mat over the braincase. This mane is groomed and cut in various ways, depending on the Puppeteer's social status and personal whim.

The Puppeteer's twin mouths double as hands, giving this species superb abilities as tool-makersandtool-usersalike.Extending 4-6cm beyond their teeth, their broad, rubbery lips, as dry as human hands, are rimmed with little finger-like knobs of exquisite sensitivity, though somewhat lacking in strength. In each mouth, the flickering prehensile tongue provides an olfactory sense and additional manipulative control. Devices designed to be operated by a Puppeteer's lips and tongue usually can only be operated by a human using pick and tweezers, and working very slowly. The dexterity of a Puppeteer can only be compared to that of a patient micro-engineer with a subtle fingertip taste-sense.

Independently-mounted eyes on long, snake-likenecksgive Puppeteerstremendous visual virtuosity. Variable binocular separation provides excellent depth-perception, while their field of view approaches 360 degrees, with one head turned to the rear. When running, one head will be stretched forward and held low to watch the ground and see around corners, while the other is held high for panoramic perception. When engaged in precision work, close-up and general views are available simultaneously.

Occasionally, a Puppeteer will arch his necks and curve them around until he is looking himself in the eye, holding this curious pose in silence for several seconds. Associated with the intense concentration for which this species is also noted, this behavior also has been interpreted as the tripedal equivalent of laughter, though Puppeteers normally are not thought of as having a sense of humor.

Most people who study them find Puppeteers graceful and quite lovely. Watching a Puppeteer move is a pleasure; as it walks, its hooves seem to tap out the odd rhythm of an alien waltz.

Almost all Puppeteers exhibit a catatonic reflex in response to shock or severe fright — generally preceded by a fit of shivering. First the heads bob and circle nervously, then, without haste, the alien tucks both necks beneath his forelegs, letting his legs fold underneath him. In repose, the Puppeteer is egg-shaped and hide-covered, with a cloud of hair as a tuft on the big end. The mane and glove-soft back rise and fall slowly with breathing. Depending on the individual and the circumstances, a Puppeteer may remain withdrawn from a hostile universe for hours or even days, protectively curled into its own belly Puppeteers can sometimes come out of catatonia quickly in the presence of imminent preventable danger. At times their withdrawl may be an intentional playing dead, to let events take their course. Puppeteers are said to fear pain worse than actual death, and those encountered by humans generally have means of committing painless suicide at will. A Puppeteer cannot be made to reveal useful information by intimidation or by force.

The style of a Puppeteer's mane can indicate his mental health, physical well-being, occupation, and status — though few humans are adept at recognizing the crucial variations. Natural mane coloration runs through the entire range of browns, with auburn and yellow occasionally seen. Scruffy, rumpled manes may be evidence of nothing more than fatigue; but chronically unkempt, straggly manes usually indicate insanity or genetic deficiency, or the lowest social status. Most of the mad General Products traders had coarse, dark-brown manes which they usually kept trimly twisted, brushed, and tied in a traditional manner.

Puppeteers of high rank are seldom seen by humans, but they are glorious. Their creamy hides are brushed to a glow, and their beautifully-ornamented manes glisten with spectacular ornamentation. Sometimes they have a cloudy phosphorescent radiance. Silky manes of gold and silver are displayed, died pure in color, with bright metallic strands alternating, or in multi-hued streaks. The hair may be straight, twisted, curled into ringlets, or fluffed, and it often glitters with jewels. Crystals which alter their spectral color as they move are favorites, as are black opalescent stones and micro-luminescent gems. The effect is striking, as if the Puppeteer had been dusted with tiny sparkling lights. Occasionally even the clawed hooves are tipped with silver, crystal, or glowing sheaths.

The characteristic scent of a well-groomed Puppeteer is pleasant, a fragrance that calls to mind the aroma of a spice-shelf or herb garden. Puppeteers are often quite vain about their physical appearance, and may use it to engage the wonder and admiration of impressionable aliens.

Puppeteer traders encountered by humans will not discuss Puppeteer sex with their alien clientele — they make it clear that they consider such topics a breach of etiquette. Their answers to specific queries were often misleading, and always evasive. Their reproductive cycle remains another Puppeteer species secret.

Among humans, it is commonly believed that Puppeteers have three or more distinct sexes, one of which may be non-sentient. It is suspected that only one of the sentient sexes ever exhibits the 'madness' required for interstellar commerce and alien contacts. Other theories abound.

The facts seem to be that there are really two "sexes," which breed parasitically on a different species, called the 'female.' Using nearly identical organs reminiscent of ovipositors, the 'sperm-carrier' and 'egg-carrier' each implant their germ plasm in the flesh of the host animal. The Puppeteer's progeny subsequently grows within the body of the female, eventually killing that animal. The hosts contribute no genetic material, but mate among themselves in a more conventional fashion to continue their existence. The non-sentient 'females' are commonly treated as property. It is probable that the two Puppeteer 'sexes' need not implant their germ plasm in the host at the same time. This would allow the original, wild Puppeteers to breed safely by proxy, as it were.

Human sexuality, in turn, has engendered amazement among Puppeteers, who seem to possess a spark of Puritanism. "No known sentient species copulates as often as you do," one has remarked with evident disgust.

Attitudes

Few humans have met a Puppeteer whom his own species did not judge mad. Yet the kind of madness that sends a Puppeteer trader to Earth is quite unlike any human form of insanity. Indeed, many traits and attitudes that humans admire are considered by Puppeteers to be revolting symptoms of hereditary deficiency.

Puppeteers have a very long life-span to protect, and they use more efficient life-extending techniques than boosterspice. They are afraid to die, for they believe death to be permanent: their scientists are said to have proved that their species has no immortal, undying part or soul. Puppeteers have no religions, and other species' gods and devils alike they consider possibly dangerous nonsense. Sanely careful of their own lives. Puppeteers view death as evidence of rash stupidity. Their ethical philosophers long have emphasized the value of a heightened natural caution, which naturally-incautious humans have labeled cowardice.

Normal Puppeteers are not courageous. They lack the urge to explore, the need for variety, independence, excitement, and adventure. That which humans discover through trial-and-error, risk-taking, or serendipitous curiosity, the Puppeteers obtain through careful observation, investigation, and laborious experimentation. Their remarkable intelligence gives them tremendous powers of deductive reasoning and logical thought. Puppeteers believe that no one should turn away from knowledge, but practical survival advantages motivate their studies rather than any desire to comprehend the abstract nature of the universe. Sane Puppeteers are extremely safety-conscious, and intensely distrust alien species, which are universally less cautious than themselves. Only a handful of Puppeteers entrust their lives to the fallible life-support systems of hyperdrive spacecraft, the hideous uncertainties of the Blind Spot (which has swallowed even Puppeteer-engineered ships), or the unknown deadly dangers which abound on alien worlds.

Humans must learn fear, but fear must be in Puppeteer's genes. The mad traders of General Products surely suffered instabilities deeper than the curse of their courage, including schizophrenia, manic-depression, acute paranoia, and some even became uncharacteristically aggressive when threatened. They seemed to wage psychic battles against ancient cultural traditions as well as instinct.

In modern times, Puppeteers go to great lengths to avoid direct confrontation. They may sell millions of spacecraft hulls to species in a new region to encourage them to do the risky business of exploring it. Perhaps this is why they gave the secret of the Quantum II hyperdrive to humans and Kzinti. Puppeteers have been known to try out untested spacecraft and other products on unsuspecting species before approving them for their own use.

Puppeteers have admirable traits which humans tend to ignore. They do not indulge in wishful thinking; and their practical realistic attitude towards problems can save the situation for all. Puppeteers never refuse to look at unpleasant truths. They are methodical, though incurious; they believe that tiny bits of information may prove crucial at some future time. They do not procrastinate, and superstition is alien to them. They may even

perform feats of daring on occasion, when the insanity of others makes no risk seem insane to them.

Their less laudable properties include an absolute lack of moral sense, a willingness to sacrifice members of other species or even entire species to give themselves even a marginally safer environment, and a ruthlessness which seems excessive even to human rulers (though not to Kzinti).

Puppeteer Technology

Puppeteers have faith only in the long-tested products of their own science. Over the last four centuries, many humans have come to share that faith. Puppeteer-developed systems continue to revolutionize Human Space - even though the Puppeteer trading empire collapsed two centuries before the first expedition to Ringworld.

A half-million years of cautious progress made Puppeteer engineering the most advanced in Known Space, though their scientific lore was surpassed by the Outsiders, whose range is the entire galactic whorl. Humans have never known the limits of the Puppeteer's power, and the mere existence of such obviously superior alien instrumentation has made many men uneasy and resentful.

Puppeteer artifacts are often miracles of multi-functional, compact design, All work with the same unobtrusive perfection. Their products are the finest manufactured in Known Space. Readily-indentifiable by a half-melted, silvery look, Puppeteer equipment and furniture are all soft curves, resembling mercury made to flow into a desired form and then quickly frozen. Puppeteer products are not cheap, but are worth the extra cost — they do not cut corners for extra profits.

The Puppeteers have wisely reserved their finest devices for their own exclusive use. Puppeteer pressure suits are so efficient that they can be adjusted to lose no heat at all, or set to precisely match the infrared background. Puppeteers use four basic types of room-temperature superconductors, only two of which are known to Kzinti or humans. Around urban parks on their homeworld, Puppeteers employ selective light-bending fields, possibly employing sonic control of air molecules. Their biological science is capable of such feats as transforming entire predatory species into sessile hedge like forms, but the Puppeteers themselves never speak of its ominous possibilities.

Using arrays of stepping-disc receivers and transmitters, the Puppeteers have created an open teleportation system which enables one to walk entirely around their home planet in minutes. These stepping discs are far superior to human transfer booths — they are portable and can be installed anywhere. Puppeteer ships use advanced thruster drives capable of much quicker sustained accelerations than those used by humans, and with much better fuel efficiency.

The Puppeteers have the ability to track ships in hyperspace. They also have invented an exotic form of hyperwave transmitter which allows them to communicate from inside a gravity well, not just across flat space. The Puppeteers fear hyperspace — they have apparently learned something about the Blind Spot which humans do not yet suspect.

For all their knowledge. Puppeteers have never achieved total conversion of matter to energy, a process evidently discovered by the extinct Tnuctipun. Nor have they learned the secret of cheap, large-scale transmutation, which they concluded the building of Ringworld must have required.

Though the Puppeteers build invulnerable spacecraft hulls, they will not outfit warships and do not sell armaments. They cultivate reputations as harmless cowards, and prefer to fight through foresight, anticipation, persuasion, economic coercion, blackmail, bribery, and unobtrusive manipulation. Direct confrontation seems to them inelegant and highly unsafe, though they have engaged in the equivalent of war upon other species at times (as with the biological war waged upon the City-Builders, when the Puppeteers spread the superconductor-eater across the lands).

It is an error to think of an unarmed Puppeteer as vulnerable or defenseless. Any piece of everyday equipment may double as an effective weapon. The Puppeteers invented the flashlight-laser, for instance, as well as disintegrators equipped with a second beam, to create an explosion in any normal matter the beam is turned upon. The tasp is a sterling example of Puppeteer persuasion — this remote inductance beam powerfully stimulates the pleasure centers of humans or Kzinti. Puppeteers often conceal devices such as these on their person, even surgically implanting them in one of their heads, or other parts of their bodies.

Homeworld

For centuries one of the Puppeteers' most closely-guarded secrets was the location of their homeworld. Adventurers and pirates eventually visited every star system of remotely solar-type in Known Space pursuing that modern El Dorado — but they searched the wrong suns at the wrong distances. The Puppeteers had relocated their planet a tenth of a light-year from its sun, a red giant.

The Puppeteer home world was a modest terrestrial planet with gentle gravity and no moon. Their sun was brighter than Sol, with a shorter lifetime. Perhaps as long ago as a half-million years, the Puppeteers realized that their sun was misbehaving, beginning to enter the final phase of stellar evolution. In the same era, their world was suffocating in waste industrial heat, and population pressure had already forced the terraforming of neighbor worlds for agriculture.

At some point the Outsiders sold the Puppeteers the secret of a drive capable of moving worlds. The cost was enormous, and the Puppeteers are still paying off the debt. With the advanced drive they were able to propel their world and its farming worlds outward into the cometary halo of their system. Safely distant from their dying sun, the Puppeteers watched it expand and become a variable over the millennia.

Mutually-profitable relations have since existed between the Puppeteers and the Outsiders, and they have many secret agreements. The location of the Puppeteer system remained a mystery to other aliens. The few who stumbled across it had their memories erased or simply disappeared.

Language

Puppeteers have a complex, beautifully expressive language which cannot be imitated by single-throated beings. In the company of their own kind, they much enjoy verbal socializing. Puppeteer conversation is a rich alien music, seductive and surreal, with the timbre of flutes and clarinets predominating. Their separate larynxes allow them to produce a marvelous variety of intonation — odd dissonant harmonics, clear single notes pure as laser light, or incredible orchestral bursts. Lost in thoughtful concentration, a whistling Puppeteer can rival a pipe organ.

Its remarkable brain allows a Puppeteer to carry on two independent conversations simultaneously, in two different languages, if necessary.

Since humans cannot pronounce Puppeteers' true spoken names, the aliens often substitute fanciful ones, such as the names of mythical centaurs. Superb linguists in many alien languages, Puppeteers are naturally adept at learning the speech of others. Their command of accent, innuendo, intonation, and verbal color goes far beyond any mere mastery of grammar and vocabulary. All the same, Puppeteers tend to overestimate the importance of communication to aliens who would act first and ask questions later.

When speaking with humans, a Puppeteer's voice is a lovely, thrilling contralto. The finer nuances of human expression vanish from a Puppeteer's voice if he becomes badly upset. As he loses control of a situation or feels threatened, the tone may become emotionless and mechanical, like a computer. This is a warning sign. The scream of a terrified Puppeteer resembles that of a steam calliope dying in agony.

Politics

The supreme executive of the Puppeteer government and society is known as "he-who-leads-from-behind" or "Hindmost." The term is also generically applied to the leader of any Puppeteer group. The expression emphasizes the leader's role in "directing his subjects from safety, because safety is his prerogative, and his duty, because his death or injury would bring disaster for all!" Puppeteers normally run from danger, but they also turn their backs to free their hind leg for action, to deliver its lethal reflexive kick. This apparent paradox may help one understand the nature of Puppeteer psychology.

It is speculated that the Puppeteer rulers may be of a different sex than the mad traders of human acquaintance. The most recent line of Hindmost leaders may represent a tiny fraction of risk-takers who encourage the rest of the populace to keep down their heads and avoid the risk of reaching for power. These Hindmosts often have strong, unpredictable personalities, often utterly unlike the skittish manic-depressive emissaries of two centuries ago, whose behavior led humans to stereotype them as "cowardly priests of survival." Of course, the recent Hindmosts also personify the characteristics of the daring line of Experimentalists.

Political control of Puppeteer civilization usefully alternates between two ancient factions, the Conservatives and the Experimentalists. Normally the Conservatives rule. They are traditionalist, unimaginative, and cautious. Experimentalist regimes typically come to power in response to major external threats, internal crises, or to handle particularly risky endeavors. They then "do what is necessary," and, having acted, are deposed, returning control to the safer Conservatives. Some (perhaps most) Puppeteers claim that Experimentalist leaders make a virtue of madness.

General Products Corporation

Direct human contact with Puppeteers did not begin until the mid-third of the 25th

century, in the decades following the conclusion of the First Man-Kzin War. The Outsider hyperdrive which ended that conflict also ended the vulnerable isolation of the six major human worlds and opened the galaxy to human exploration, paving the way for the development of an interspecies civilization based on interstellar commerce. A rapidly-expanding market arose for ultra-reliable spaceship hulls and other star-going goods and services. Opportunely, the Puppeteers then established General Products regional headquarters on Jinx and We Made It, keeping ostensibly top-level human managers in highly-visible positions for years.

General Products acquired the rights to manufacture Pelton transfer booths on four colony worlds, and soon afterward offered an improved model of its own. The Puppeteer company quickly won a reputation for durable products of extreme safety and dependability. By the mid-2600s, it employed (directly and indirectly) nearly two billion humans on several planets. The races of Known Space were vastly richer for the interstellar trade, Few recognized the economic dependence, technical guidance, and political power which the Puppeteer commercial empire brought with it. Most human governments backed General Products to the hilt, for any overt hostility toward the Puppeteers threatened interstellar trade. Kzinti foolish enough to attack Puppeteers found themselves financially ruined and dishonored. The Puppeteer species has always held strong policies on the safety of individual members.

Masterful businessmen, who neither overcharge nor overpay, the Puppeteers trust no one. The Puppeteers know the value of good publicity, and the practical benefits of good will when dealing with aliens.

Puppeteers approach interstellar affairs pragmatically. Those who actively help them can count on substantial rewards. Those who oppose them suffer disastrous reversals of fortune. The Puppeteer practices of blackmail and bribery were accommodated into the human legal and ethical systems with little difficulty, since a well-worked-out set of codes already existed for arranging immunity contracts, even in kidnaping for profit without bodily harm.

KNOWN SPACE GLOSSARY

ACTION RANKING - Defines an explorer's relative speed in completing major actions.

ACTION SEQUENCE - The numerically-ascending order of impulses by which real-time events within the game can be ordered and related.

ADVENTURE — An encompassing term for that sequence of events which results from the playing out of a scenario or a group of related scenarios. In a larger sense, all the time which the explorers spend on the Ringworld is an adventure.

AGE, CHRONOLOGICAL - The actual number of years which an explorer or other character has lived.

AGE, PHYSIOLOGICAL - The comparative state of health of an explorer as measured by the average physiological condition felt by members of his or her species at a particular age; may differ greatly from chronological age for explorers taking boosterspice.

ALIEN - In these rules, any and all intelligent non-hominids are called aliens. For example, Grogs, Kzinti, Puppeteers, and Martians are aliens.

ANIMALS — In these rules, all creatures which neither are intelligent nor are hominids are animals. For example, owls, cats, and the Ringworld dar'los are animals.

ANTISPINWARD — The direction opposite to Ringworld's direction of spin. One of the four primary directions on Ringworld as defined by its rotation.

APP - Appearance; a characteristic.

ARCHAIC WEAPONS - All weapons relying primarily on muscle power are archaic weapons — including swords, clubs, darts, rocks, spears, and bows-and-arrows. Such weapons may be used by many Ringworld natives, but only hobbyists normally use these arms in Known Space.

ARM — The United Nations special police force. Legal jurisdiction of agents is limited primarily to the Earth-Moon system, but ARMs tend to range throughout Known Space.

ARMOR — Armor provides physical protection from attack. Examples of armor include tough skin, leather clothing, impact armor, slabs of plate steel, and GP hulls. The rules of the game provide the actual ratings for armor.

ASYMMETRICISM - Artistic tradition native to Wunderland; once the dominant manner of expression on several major human colony worlds.

ATTITUDE JETS - Small reaction motors for adjusting a spacecraft's orientation.

ATTRIBUTE ROLL - Any of four D100 rolls based on characteristics, each of which has specific game purposes: the dodge roll (DEX x3), the health roll (CON x3), the luck roll (POW x3), and the reasoning roll (INT x3).

AUTOCHEF — Common name for any highly-versatile, programmable food synthesizer; also, Autokitchen.

AUTODOC — Within their capability, these medical devices automatically diagnose and treat injury and illness. They vary in size and complexity. The best autodocs can handle almost any problem; less-sophisticated units may deal only with superficial cuts, bruises, and hangovers. Autodocs are species specific; a human autodoc is of no use to a kzin, for example.

AUTOPILOT — Common name for the class of powerful computers often used aboard starships.

BANDERSNATCH - A huge, sentient slug-like creature created long ago by the Tnuctipun. Bandersnatchi are nearly-featureless white blobs, with an eyeless protruding stalk and a single, snail-like foot. The Tnuctipun originally engineered them as food animals for their masters, the Slavers, who called Bandersnatchi "white-foods." Bandersnatchi were first discovered by humans on the planet Jinx.

BATTERY — One of the two major power sources in the game mechanics; see also generators, below.

BELT — The asteroid belt of Sol system.

BELTER - A citizen of the Belt.

BIRTHRIGHT LOTTERY - The random drawing held New Year's Day of each year, which guarantees to every flatlander the chance to be a parent regardless of the state of his or her genes or social conduct.

BLIND SPOT - A disturbing perceptual phenomenon experienced during hyperspace flight. Prolonged viewing of hyperspace during flight may cause insanity in humans.

BLUE FIRE - A freeze-distilled wine widely imported from We-Made-It; known as 'the Crashlander's peacemaker."

BOOSTERSPICE - A drug neutralizing the aging process in humans. Although substantial cosmetic and metabolic rejuvenation does occur, Ringworld-era boosterspice cannot reverse aging or stop it entirely. Most users maintain the apparent age they had when they began boosterspice treatment. A single dose of boosterspice lasts for about 25 UNS years.

BUSSARD, R. W. - Pre-fusion-era physicist believed to have originated the theory of the interstellar ramjet.

BVS-1 — A neutron star located in Human Space; the first neutron star which humans found.

CABIN GRAVITY - Internally-generated fields which compensate for a ship's acceleration and simulate uniform gravimetric force.

CAMPAIGN — In roleplaying, a series of linked scenarios using the same characters and backgrounds.

CANYON — A former Kzinti world annexed by humanity at the end of the third Man-Kzin War. Canyon orbits p Eridani A, 22 light years from Sol. Its one habitible region is a long, deep canyon gouged by the Wunderland Treatymaker.

CAR — Common term for any small, general-transport vehicle not limited to the ground; see also Groundcar.

CENTRIFUGAL FORCE - The "fictitious" force one experiences due to centripetal acceleration. An example is the simulated "gravity" produced by Ringworld's spin.

CERES - Capital of the Belt, Sol system; largest of the inner asteroids.

CETACEAN - General term for Dolphins, Sperm Whales, and Orcas; the order of marine animals to which those species belong.

CETACEAN RIGHTS ACT - Passed in 2017 A.D., this act granted full human equivalence to all sentient cetaceans.

CHARACTER - see Explorer.

CHARACTERISTIC - A maximum of eight initial number sets define the abilities and potential of explorers, aliens, and creatures alike. These characteristics are Strength (STR), Mass (MAS), Constitution (CON), Intelligence (INT), Power (POW), Dexterity (DEX), Appearance (APP), and Education (EDU).

CHORDAL DISTANCE -The straight-line distance between two points on Ringworld, in the spinward-antispinward plane. The chordal distance is always shorter than the radial distance along the Ring's surface.

COMDISC — Compact, disk-shaped communicator often used as a link to a ship's autopilot computer.

COM-LASER — Any laser communication beam or device; standard shipboard equipment linked to the autopilot.

COMPUTER — Electronic devices capable of high-speed symbolic manipulation. In the Ringworld era, these machines can pilot spaceships, translate languages, run factories, and accomplish most other quantifiable tasks. Known Space computers are far more powerful and compact than their archaic 20th century ancestors.

CON — Constitution; a characteristic.

CONFINEMENT ASTEROID - The terraformed bubble-world in which most Belters once were born and raised.

CRASHLANDER - A native of the planet We-Made-It, and often an albino.

CREATURE - In these rules, all living beings are creatures if they are controlled by the gamemaster rather than by players. Therefore, creatures may be humans, animals, aliens, or hominids.

DAY - A Ringworld day is 30 UNS hours long. Of these hours, 21 are daylight and 7.5 are night. The remainder consists of 45-minute dawn and dusk periods. The UNS 24-hour day is standard throughout Human Space. It is based on the length of Earth's day. Each colony, though, has its individual length of day, based on that particular planet's rotation.

DEEP-RADAR - Pulsed-neutrino system for viewing the internal structure of material objects; strongly reflected by stasis fields and collapsed matter.

DEUTERIUM - The isotope of hydrogen that has atoms of twice the mass of ordinary light hydrogen atoms; deuterium occurs in small amounts in ordinary water, and is used extensively in Known Space fusion reactions; also called heavy hydrogen.

DEX — Dexterity; a characteristic.

DIRECT CONVERSION - Any technique for near-100% utilization of generated power by non-thermal coupling.

DIRECTION - Since Ringworld has no north or south magnetic pole, there is no uniform system of compass headings. The four Ringworld cardinal directions are spinward, antispinward, port, and starboard, defined with respect to the rotation of the Ring.

DOLPHINS — Sentient cetacean species native to Earth. Dolphins have colonized the oceans of several major human worlds.

DOWN — Formerly a Kzinti world, it circles the red-dwarf sun L5 1668, 12.3 light years from Earth. Down is the home world of the Grogs. Many of its human colonists actually inhabit orbital wheel-cities.

DOWNER — A native of Down.

DROUD — A small device that plugs into the skull of a current addict. Its purpose is to meter the electrical flow to the pleasure center of the addict's brain. See Wirehead.

DYNAMIC POWER GENERATION - See Generator.

DYSON, FREEMAN J. - Pre-fusion-era natural philosopher who anticipated the existence of immense star-girdling structures such as Ringworld.

EARTHLIKE — Having a terrestrial, oxygen-atmosphere environment in which liquid water can exist.

ECOSPHERE — The habitable zone around a star in which Earthlike worlds can exist.

ECOSYSTEM - The interdependent system formed by a community of organisms and its environment, whether natural or whether artificial.

EDU — Education; a characteristic.

ELECTROMAGNETIC RADIATION - General term for the wave-energy spectrum which ranges from low-frequency radio waves through microwaves, infrared, visible (to humans) light, ultraviolet, X-rays, and gamma rays. Electromagnetic radiation propagates at the speed of light.

ENCOUNTER — Any meeting between explorers (controlled by the players) and creatures (controlled by the gamemaster).

EVIDENCE DRUG - A class of hypnotic drug which induces direct, total recall for legal testimony.

EXPLORER - General term for Known Space humans (and Kzin) who travel to Ringworld; also, Ringworld inhabitants enlisted to aid Known Space causes. Players always control explorers.

FAR LOOK — Hypnotic trance self-induced by staring into the infinite black void of interstellar space.

FERTILITY BOARD - A subsection of the United Nations which makes and enforces birth control laws, to maintain Earth's population at less than 18.5 billion.

FLASHLIGHT-LASER - Powerful, adjustable-beam handheld laser of relatively limited availability.

FLATLANDER - A human from Earth; a human from Earth who never has been in space; any human who never has been in space; a tenderfoot, a greenhorn, an idiot. A term sometimes used contemptuously by offworlders.

FOOCH (Foochesth) — Stone couches set throughout the Kzinti hunting parks.

FLYCYCLE - A one-seated flying vehicle used by Ringworld explorers; roughly the equivalent in use of a well-equipped 20th century motorcycle.

FTL — Abbreviation for faster-than-light.

FUMBLE - See Special Failure.

FUSION — The process by which the nuclei of light elements (usually isotopes of hydrogen) unit to form heavier nuclei, in the process releasing tremendous amounts of energy.

FUSION DRIVE — Fusion power as used for starship propulsion.

GALACTIC CORE - The dense, oblate star-cloud at the center of most galaxies. In the Milky Way galaxy, the cloud is 7000 light years across and its nucleus is nearly 30,000 light years from Known Space. The Milky Way's core is believed to be undergoing a cataclysmic outburst, with an energy release comparable to a simultaneous explosion of thousands of supernovae.

GALACTIC NORTH - See Galactic Pole.

GALACTIC PLANE - The flattened disk of a spiral galaxy, containing its spiral arms; the mathematical surface defined by bisecting this disk.

GALACTIC POLE - The direction defined as 90° (orthogonal) to the galactic plane, or its North and South projections on the sky. North/south directions are always Earth-relative.

GAMEMASTER (GM) -The hard-working person moderating *Ringworld* game sessions for the players.

GEE — A term for a unit equalling one Earth gravity.

GENERAL PRODUCTS (GP) - This large Puppeteer-owned company once dominated interstellar trade in Known Space and beyond. This commercial empire collapsed when nearly the entire race of Puppeteers left Known Space to flee the galactic core explosion. In the Ringworld era the company is known primarily for its invulnerable spacecraft hulls.

GENERAL PRODUCTS HULLS - The ultimate in safety, these unique hulls are guaranteed impervious to normal matter in any form. Most are transparent only to visible light. They are proof against almost any weapon or impact. Built of incredibly strong material (said to be a single large molecule with strengthened interatomic bonds), GP hulls come in four basic types.

GENERATOR — Along with the battery, one of the two major energy sources used in the game. A generator creates new power.

GENE-TAILORING - Common term for applied genetic engineering.

GENETIC DRIFT — Random changes in the overall characteristics of a small, isolated population over time.

GODZILLA - Epsilon Indi V, a gas giant in the Home system.

GRAVITY POLARIZER - A sub-light space drive widely used before the advent of thrusters, especially by the Kzinti; still commonly found in older Known Space spacecraft.

GRAVITY WELL - The local distortion of space-time due to the presence of any massive object, such as a star or a planet. See also Singularity.

GROUNDCAR - Any small, general-transportation vehicle restricted to operation on a solid surface.

GROGS — An intelligent alien race, native to Down, in Human Space. Grogs are telepathic — able to influence the minds of and to control the bodies of most animals, aliens, and humans. Fortunately, Grogs are sessile, extremely vulnerable to ultraviolet — and friendly.

G-TYPE STAR - A yellow-white star similar to Earth's sun.

GUMMIDGY — A sparsely-populated human colony world at the edge of Kdatlyno Space. The planet teems with exotic native flora and fauna, but (from a human viewpoint) suffers from excessive ultraviolet radiation.

HANDICAPPED - Any sentient species lacking tool-making adaptations.

HANDS — Prosthetic manipulative devices for Handicapped species, sometimes psionically-controlled.

HELIUM II LIFE-FORM - An organism whose metabolism is based on ultra-cold liquid helium, such as the Outsiders. Most He II life is very primitive.

HGRALL — A gas giant in the Kzin system.

HINDMOST - A Puppeteer ruler; also, the Puppeteer term for the leader or dominant member of any group.

HIT LOCATION - A part of the body defined as discreet for game purposes, which may be separately affected by damage. Human hit locations are head, chest, abdomen, right arm, left arm, right leg, and left leg.

HIT POINTS — Units in the game representing the ability of a creature to withstand damage. Loss of hit points can lead to unconsciousness and death. General hit points determine the entire body's ability to take damage; locational hit points define the resistance to damage of specific parts of the body. Damage may occur to only one type or to both, depending on the event.

HOLOGRAPH - Any three-dimensional image, representation, or projection.

HOME — An Earthlike human colony world in the Epsilon Indi system, 11.4 light years from Earth. In the 24th century, its inhabitants were wiped out by disease - but it since has been re-populated.

HOMER — Native of Home.

HOME WORLD - Planet of origin.

HULLMETAL - A strong, relatively-light non-ferromagnetic metal, greenish in color, widely used in Human Space. Like memory plastic, some hullmetal alloys are programmable.

HUMAN SPACE - That volume of space occupied by stars with major human colony worlds; a portion of Known Space about 40 light years across.

HUNTZ, LORELEI - Legendary sensual tridee heartthrob.

HYPERDRIVE - The exotic propulsion system used extensively by Known Space species to cross interstellar distances faster than the speed of light. Use of a hyperdrive engine transfers the spacecraft to another universal continuum wherein the physical laws of motion permit FTL travel at well-defined rates. The most accessible hyperdrive rate is three days to the light year (quantum I).

HYPERWAVE - Nearly-instantaneous form of communication which works over interstellar distances but only outside of gravity-well singularities.

IMPACT ARMOR - Flexible, leathery, personal *armor* which stiffens upon strong impact and distributes the blow equally to all portions of the armor. In some versions of the armor, the wearer then feels the blow as a general compression. It is commonly worn as clothing in risky environments. It does not protect against beam weapons, radiation, poisonous gases, or other forms of attack. This armor does not neutralize blows.

IMPULSE — A unit of time, approximating one second, used in the game to help closely define movement which takes place over a short period of time.

INERTIA — A property of matter which causes it to resist any change in its state of motion.

INERTIALESS DRIVE - An extremely sophisticated version of the reactionless drive, which limits the buildup of relativistic mass during acceleration; used by Outsiders and Puppeteers.

INFRARED — Long wavelength **"light"** and bands of radiated heat invisible to humans, but visible to Pierin.

INSTITUTE OF KNOWLEDGE - The finest single museum and research complex in Human Space: in Sirius Mater, Jinx.

INT — Intelligence; a characteristic.

INTERWORLD - Human-based interspecies language used throughout Known Space.

INTERWORLD PLAYOFFS - The Human Space equivalent of Earth's Olympics, vastly-expanded to include light-gravity sports, lift-belt racing, sonic duelling, and the like. Also, Interworld Games.

ISLANDER - Native of Silvereyes.

JACK — Flatlander term for an uncouth native of Margrave.

JINX — One of the oldest, most populous human colony worlds. Jinx is an egg-shaped heavy-gravity planet in the Sirius star system, just 8.7 light years from Earth. Jinx is the home of the Institute of Knowledge, and is the planet on which Bandersnatchi were first encountered.

KDAPTIST — Heretical Kzinti religious cult originated by the Mad Kdapt-Preacher.

KDATLYNO [k'DAT-lie-no] - Once the slaves of the Kzinti, this race of massive, nightmarish-looking aliens was freed during the Man-Kzin wars. The Kdatlyno, though blind to visible light, have sensitive acoustic-sonar. They are well-known for their touch-sculptures, an exotic art form valued throughout Known Space — and for their complex traditions of honorable revenge.

KILLER WHALE - See Orca.

KNOWN SPACE - That volume of interstellar space explored by humanity or by humanity's alien neighbors. Known Space is about 80 light years in diameter. Human Space is a portion of Known Space.

KZINTI [k'ZIN-tee] - The best-known most human-like of the Known Space alien races. Kzinti are warlike carnivores whose interstellar empire once nearly engulfed the Earth. The Kzinti dream of conquering the universe has been delayed by a series of stunning defeats in the Man-Kzin wars.

LANDER - The general name for a ground-to-orbit craft, especially a smaller spaceship designed to land on the surface of a planet. Most landers are not equipped with hyperdrive.

LASER — Any device which emits a beam of monochromatic, coherent light. Though the output may be scattered by air, its trajectory will be straight-line. Lasers frequently are used as communication beams and as weapons.

LIFE SYSTEM - The habitable portions of a spacecraft; also, the equipment used to support life aboard a spacecraft.

LIGHT YEAR - The distance light travels in a year, approx. 9,460,000,000,000km.

LONGEVITY DRUG - A general term for any substance which extends the natural lifespan. Boosterspice is a human-specific longevity drug.

MAGLEV — Magnetic levitation.

MAGELLANIC CLOUDS - The major satellite galaxies of the Milky Way.

MAGNETIC MONOPOLE - Any subatomic particle possessing a single, powerful isolated magnetic charge.

MAJOR ACTION — An action which, when performed within the action sequence, requires the explorer's action ranking in impulses to perform; includes aiming a weapon and using a perception skill.

MAKE HIS (HER) DAY - Cynical human phrase for using a tasp on someone, especially from ambush.

MAN-KZIN WARS - A series of interstellar conflicts, including four wars and many major incidents, spanning roughly 300 years from the mid-24th to the mid-27th centuries. The first war began in 2367, when the Kzinti conquered Wunderland and then attacked Earth from the opposite direction.

MARGRAVE — A fairly primitive frontier world in the Serpens system, at the edge of Known Space. Margrave supports a relatively-small human colony, but recently has become important for its proximity to Trinoc Space.

MARS — The fourth planet from Sol. In the Known Space universe, Mars is UN property — ceded to Earth by the Belt. Much of Mars is covered by a thick layer of chemically-reactive dust. At one time the planet was inhabited by primitive, intelligent aliens (the Martians), but they are believed extinct on Mars in the Ringworld era.

MAS — Mass; a characteristic.

MASS INDICATOR - In hyperspace flight, a psionic device for detecting singularities; the device must be watched by a mind, not by another machine. Also, mass sensor, mass-pointer.

MELEE WEAPON - The user can do damage with a melee weapon only by touching his target with it while still holding it. Archaic weapons such as the club and knife as well as the Known Space variable sword are melee weapons.

MEMORY PLASTIC - Class of synthetic materials (electropolymers) which regain

their macroscopic form after compression for compact storage.

MEMORY BUBBLE - A micro-circuited module which connects to a computer. An information memory bubble contains all available information on a subject, and are connected to general-use computers when special information is needed. Memory bubbles can be adjusted internally to conform to specific needs.

MERCY WEAPON - General term for a non-lethal projectile weapon that does negligible tissue damage. Also, tranquillizer gun.

METRICS — The rules frequently use metric system measurements. A kilometer (abbreviated km) equals about 5/8ths of a mile. A liter of fluid is about 0.95 quarts. A meter equals a bit more than 39 inches.

MINOR ACTION - An action which, When performed within the action sequence, begins and ends in one impulse: includes running three meters, and firing a modern ranged weapon.

MOUNTAINEER - Native of Plateau.

NEREID — Neptune's smaller moon; the site of the Outsider base in Sol system.

NEUTRINO — Elusive, nearly-masslesssubatomic particle that travels just below the speed of light, to which normal matter is nearly transparent.

NEUTRONIUM - Collapsed matter having the density of a neutron star, natural or artificial.

NORTH GALACTIC POLE - The general direction of Ringworld as seen from Earth. See also Galactic Pole.

NORMAL SPACE - The familiar space-time continuum described by Einsteinian relativity, the physical laws of which all sub-light spacecraft must obey.

OCCUPATION POINTS - Units used in explorer creation; convertible to skill percentiles.

OFFWORLDER — A person not native to, not familiar with the world where he or she is currently. Sometimes pejoratively used, especially by flatlanders.

ORCA — Largest of the sentient species of Dolphins; native to Earth. Also killer whale orKzin-of-the-Sea.

ORGAN BANK — Repository of human (or alien) organs and limbs for purposes of transplant.

OUTSIDERS — An advanced alien race from beyond Known Space, the Outsiders are fragile beings with a Helium II metabolism, adapted to life in the cold interstellar void. Outsiders roam the stars at sublight speeds, trading in information and sometimes technology. Their ships travel from the galactic core to the tips of the spiral arms, often following starseeds.

OUTSIDER DRIVE - The first quantum hyperdrive, which the Outsiders sold to humanity but which they do not themselves use. Also, the Outsider inertialess drive, which has not been sold to humans during the Ringworld era.

PARSEC - Parallax second, an Earth-orbit-derived unit of astronomical measurement. One parsec of displacement indicates 3.26 light years of distance.

PATRIARCHY - The Kzin government; also, the Kzinti family with highest status, equivalent to royalty, whose names bear the -Rrit suffix.

PERCENT (%) - A fraction of an arbitrary whole number, object, or concept, defined in units of one one-hundredth. For example, 50% equals 50 one-hundredths.

PERCENTILE — The base unit of any percentage. Most percentile functions in the game are additions or subtractions. For example, subtracting 15 percentiles from a skill of 40% value yields a new value of 25%; subtracting 15 percentiles from a skill of 240% value yields a result of 225%.

PHEROMONE — Super-powerful hormonal biochemical. It stimulates physiological or behavioral response, one often species-specific.

PIERIN [PEER-in] - A species of intelligent, spacefaring aerial aliens possessing infrared vision. Their home world system, a remarkable double planet, was enslaved by the Kzin, but retaken during the third Man-Kzin war.

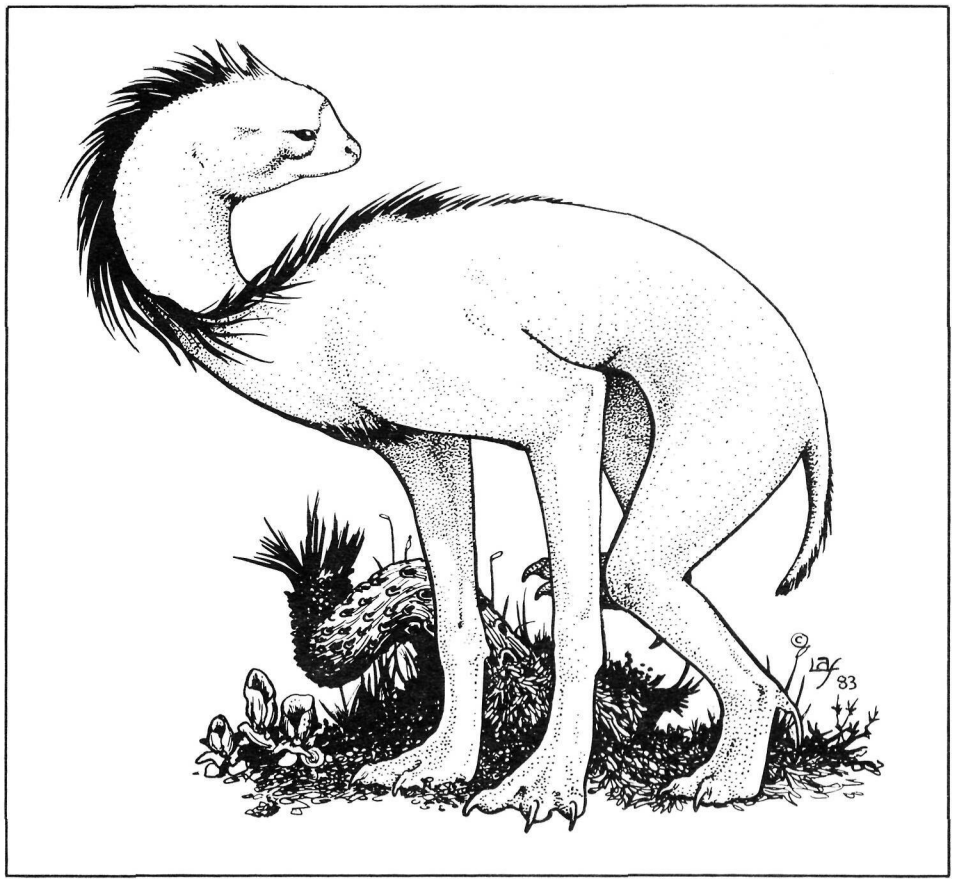
PLASMA — Super-heated, ionized gas such as that in a solar flare or fusion reactor; the fourth state of matter.

PLATEAU — The major human colony world in the Tau Ceti system, 11.8 light years from Earth. Its habitable surface area is limited to the upper slopes of an immense mountain, Mt. Lookitthat, which forms a maze of plateaus above the planet's hot, dense lower atmosphere.

PLATEAU EYES - A limited psionic ability found in some natives of Plateau. It requires direct eye-contact. When it works, it causes a person to lose all interest in the person possessing the trait, rendering the user temporarily invisible to the contactee.

PLATEAU TRANCE - This self-hypnotic state is especially one induced by staring down below Mt. Lookitthat into the void mist.

PORT — One of four primary directions on Ringworld; to the left as one faces spinward.



PSIONICS — The science of direct mind/machine interfacings; also, certain powerful but poorly-understood mental powers controlled by the mechanisms in the right parietal lobe of the brain — inaccessible to the conscious minds of most humans.

PUPPETEERS — An advanced alien species of two-headed, tripedal herbivores, the Puppeteers once dominated interstellar trade in Known Space and beyond. Most humans think of them as extraordinary cowards. In the Ringworld era, nearly all the Puppeteers have disappeared from Human Space, fleeing the radiation front of the galactic core cataclysm. Their influence upon human affairs, nonetheless, is still keenly felt.

PURSUIT — Used in explorer generation: a career or other preoccupation to which an explorer applied him- or herself before entering play.

QUANTUM II HYPERDRIVE - Develop-by the Puppeteers, a hyperdrive enormously faster than the quantum I hyperdrive commonly used in Known Space at the beginning of the Ringworld era. The *Long Shot* was the prototype quantum II spacecraft, the first to visit the galactic core.

QUANTUM SHUNT - A hyperdrive motor; a first-quantum hyperdrive shunt translates at three UNS days to the light year.

RADIAL DISTANCE - The distance as measured in the spinward-antispinward direction along the curved arc of Ringworld from one point to another.

RAMROBOT — Unmanned ramscoop exploration craft.

RAMSCOOP - The intense, conical electromagnetic field of a fusion ramship which accumulates interstellar hydrogen fuel; the toroids which generate such a field; an interstellar ship which employs a ramscoop to gather fuel.

RAMSHIP — Starships which use magnetic fields to gather interstellar hydrogen, directing the gas into a fusion chamber which powers the spacecraft. Although unable to exceed the speed of light, ramships often travel close to light-speed, and experience pronounced relativistic effects. Ramscoop ships often are the only practical way to reach relativistic velocities, since thruster-driven hyperdrive ships cannot carry enough fuel — and don't need to.

RANGED WEAPON - A weapon the effect of which does not depend upon physical proximity with its target. Most modern Known Space weapons are ranged weapons.

REACTION DRIVE - Any propulsion system which produces thrust by emitting a photon beam or expelling mass at sub-light velocities.

REACTIONLESS DRIVE - Any STL propulsion system which does not eject a stream of matter (or photons) to produce thrust, such as a gravity polarizer or a thruster.

REDUCING ATMOSPHERE - An atmosphere full of hydrogen-rich gases, such as the atmosphere of Jupiter or Trinoc.

RELATIVISTIC - Of or pertaining to velocities close to the speed of light; phenomena which occur at such velocities, such as time-dilation.

RENFIELD — a famous Human Space autokitchen model which has kept explorers alive despite gruesome conditions; named after the Bram Stoker character.

RESEARCH — An important way for explorers to invent or to discover new devices and knowledge, as well as to advance individual explorer skills.

RINGWORLD ERA - That time in Known Space history when the existence of Ringworld became generally known. Usually dated from 2850 A.D., the year of the first Ringworld expedition, which was nonetheless kept secret for many years.

ROOT/BRANCH SKILL - An associated group of skills which increase together until reaching a specific percentile threshold (the root skill maximum), after which they must be increased individually.

ROOT MAXIMUM - The maximum percentile level to which a root skill may be increased before specific branches must be addressed; based on characteristics.

SCENARIO — A role-playing situation in which the gamemaster presents a problem or series of problems to explorers which they must resolve, endure, or surmount.

SHAEFFER, BEOWULF - Crashlander pilot well-known for his flights to BVS-1 and to the edge of the galactic core in the 27th century; discoverer of the core radiation front.

SEA STATUE - Popular name for the first alien on Earth, a Slaver in stasis, found off the Brazilian continental shelf.

SECOND QUANTUM HYPERDRIVE - See Quantum II Hyperdrive.

SERPENS SYSTEM - The star 27 Serpentis and its planetary family, which includes Margrave, 34.7 light years from Earth.

SERPENT BELTER - A native of the Serpent Stream.

SERPENT STREAM - The unevenly-distributed asteroid swarm in the Wunderland (Centauri) system.

SILVEREYES - That major human colony world most distant from Earth, Silvereyes orbits Beta Hydri, 21.3 light years to galactic south. It is the oceanic planet upon which Slaver sunflowers were first discovered.

SINCLAIR MOLECULE CHAIN - An extremely tough, thin monofilament developed for use in ramship tow cables and similar applications.

SINCLAIR SHIPBUILDERS - A division of Sinclair Industries well-known for its flashy space yachts.

SINGLE SKILL - A skill which increases uniformly as a single unit regardless of the percentile level of the skill; no branches may be formed.

SINGULARITY - A discontinuity in hyperspace caused by a gravity well in normal space; also, a black hole.

SKILL — Explorers and other characters interact with the game universe primarily through the use of skills. Their relative skills percentages show their relative chances to successfully perform skills.

SKILLS CATEGORY - A group of skills sharing the same formula to generate root-skill maximums.

SKYHOOK — Intermediate-sized, human-built starships common in the Ringworld era. Manufactured by Skyhook Enterprises of Kansas City.

SLAVERS — An ancient race of powerfully-telepathic aliens, the Thrintun. Their ability to control other sentient beings allowed them to create a vast interstellar empire. They were wiped out in a galaxy-wide war with rebellious slave races. Artifacts from this war, protected by stasis fields, are still being found.

SLAVER DISINTEGRATOR - Commonly used as a mining tool, this device projects a beam which suppresses the charge on the electron in normal matter.

SLEEPING PLATES - Widely-used substitutes for beds, sleeping plates produce a gentle, contoured, zero-gee field usually designed to comfortably accommodate two occupants.

SLEEPSET — Low-current, low-frequency headset which induces concentrated, restful deep-sleep.

SLOWBOAT - Early human interstellar craft which carried its own fuel. Used before the development of safe ramships.

SMITHSONIAN INSTITUTE - Earth's foremost research facility and museum complex, rivaled only by the Institute of Knowledge on Jinx. The Smithsonian was known as the Smithsonian Institution before its vast reorganization and expansion.

SOLAR FLARE - A tremendous stellar outburst of charged particles and wave radiation, which erupts with the power of billions of nuclear bombs; a phenomenon highly-dangerous to unprotected living creatures.

SOLAR SYSTEM - In the Ringworld era, Earth's planetary family includes a dozen major worlds. *Persephone, Caina, Antenora,* and *Ptolemea* (unknown in the 20th century) lie outside the main singularity of Sol.

SOL — Earth's sun, a non-variable yellow-white star, main sequence spectral type G.

SONIC STUNNER — A weapon using a burst of ultrasonic sound waves to produce unconsciousness, often carried by police.

SOUTHWORTH STATION - One of the Solar System's main hyperwave-relay stations, just outside the gravity well of Earth's sun — far beyond Pluto's orbit.

SPECIAL FAILURE - A very unsuccessful attempt to use a skill, perhaps resulting in danger or severe confusion to an explorer or creature.

SPECIAL SUCCESS - An extremely successful attempt to use a skill, perhaps resulting in a bonus of extra information or extra damage scored upon an opponent.

SPECIES — A type of organism distinguishable from similar types, which tends to perpetuate those distinguishable differences by breeding within its type.

According to a famous biologist, "a species is whatever competent specialists in the field claim it is." In *Ringworld,* the term is most importantly applied to the magnificent variety of hominids, indicating easily-distinguishable physical characteristics which breed true.

SPECTRAL TYPE - Standard classification system system for stars, based on temperature, size, composition, and other factors.

SPEED OF LIGHT - Light (and all other electromagnetic radiation) travels at a speed of 299,792.46 km per second in space. This fixed velocity represents the upper limit to the speed to which any object or particle can be accelerated in normal Einsteinian space. In the Known Space universe, various ways exist to bypass this limit, the most common of which is the quantum I hyperdrive shunt.

SPERM WHALES - Huge sentient cetacean species which became extinct on Earth in the late 20th century, due to human activities.

SPINWARD — In the direction of rotation of Ringworld; one of the four primary directions used on Ringworld.

SPY BEAM — A coherent microwave/ultrasound transducer beam for sophisticated eavesdropping.

STAGE TREE — Tnuctipun-engineered plant which grows a solid-fuel rocket core, a relic of the Slave Empire; found on some Known Space worlds.

STATEMENT OF INTENT - During the action sequence, players and the gamemaster state their characters' intended next activity at the start of an impulse or at the end of a major action.

STAR — Though a familiar type of astronomical body, a Star is also the basic unit in Human Space currency, equivalent in use to the US dollar. One Star equals approximately $10 US (1984) in purchasing power — but Stars can buy much which had yet to be invented or discovered when dollars were legal tender.

STARBOARD — To the right as one faces spinward; one of the four primary directions on Ringworld.

STARSEEDS — Huge, mindless life-forms which migrate from the galactic core to the tips of the spiral arms, often followed by Outsider ships.

STARSEED LURES - A device which causes a star to emit signals which attract starseeds said to have been invented by the Puppeteers.

STARSHIPS - The general term for interstellar spacecraft. In Known Space, starships are almost always equipped with hyperdrive, but ramships are also starships.

STASIS BOX — In the rebellion against the Slavers, both sides put valued items in containers equipped with stasis fields, for safekeeping. Some of these 'boxes' have been found by Known Space races. Their contents occasionally have included valuable and exotic technical items which have revolutionized the civilizations of Known Space. See Stasis Field.

STASIS FIELD — A time-retarding field. Beings or objects within a stasis field experience the passage of time at a significantly slower rate than does the rest of the universe. Items have emerged from Slaver stasis boxes after billions of years which appeared to have been stored only seconds before. Stasis fields have a perfectly reflective, shiny surface nearly invulnerable to outside damage. A stasis field will reflect deep-radar. See Stasis Box.

STEPPING DISCS - An advanced teleportation system designed and used by the Puppeteers. It consists of flat, open disks. When one steps onto a transmitter disc, one immediately is transported to the next receiver disc.

STL — Slower than light.

STR — Strength; a characteristic.

SUNFLOWERS - Slaver sunflowers are a Tnuctipun-engineered plant. Their highly-reflective petals focus sunlight on their photosynthetic nodes, and the blossoms turn to track the sun. The plants can direct enough concentrated solar energy at moving targets to fry them.

SUPERCONDUCTOR -A substance offering nearly zero resistance to the flow of electric current; electronic devices incorporating superconductors can be extremely compact and efficient. In the Ringworld era, most superconductors operate at room temperatures.

TANNIN PILL - Artificial skin-darkening compound taken to protect against overexposure to ultraviolet, or for cosmetic reasons.

TANJ — Slang acronym formed from There Ain't No Justice. An expletive.

TARGET OF OPPORTUNITY - Declared by the player when his or her explorer is covering a particular 90-degree arc with a ranged weapon and intending to fire at any enemy who ventures into that angle. Alsoreferredto as opportunity fire.

TASP — An inductance-beam which stimulates the pleasure center of the brain, creating such intense ecstasy that the victim can do little but crave further stimulation.

TELEPATHY — A powerful psionic ability very rare among humans, difficult for Kzinti, but natural for Grogs. The ancient Slavers could exert telepathic compulsion upon entire sentient races.

TERRAFORM — The process by which a planetary surface and atmosphere (or other environment) are transformed and rendered Earthlike. Only worlds basically similar to Earth can be terraformed.

THALLIUM OXIDE - A black, toxic, water-soluble powder which, as a soil additive, is necessary to the growth of symbiotic virus in tree-of-life plants.

THERMOELECTRIC GENERATOR - A general term for a device which converts solar or heat energy to electromagnetic power with high efficiency.

TIME DILATION - A relativistic effect which becomes important at velocities just below the speed of light. Shipboard time slows appreciably with respect to the stationary observer.

THRINT — The Slavers' name for one of their own species, the Thrintun.

THRUST — A linear reactive force exerted by propulsion systems to drive vehicles or spacecraft.

THRUSTER — This reactionless drive has replaced the fusion drive in most of Known Space. Fusion engines are still used on warships. Though a spacecraft may have a hyperdrive, it must have another drive with which to enter and exit the gravity wells of stars and planets.

TNUCTIPUN [t'NUK-ti-pun] - A mysterious, ancient alien race of biological engineers and advanced technologists who led the rebellion against the Slavers.

TOTAL CONVERSION - Technique utilizing 100% matter-to-energy transformation for generating power. Though not now possessed by any species of Known Space, the secret once may have been discovered by the Tnuctipun.

TOROID — Large, doughnut-shaped electromagnetic loop used to generate ramscoop fields; also, general term for any vaguely doughnut-shaped structure.

TRANSFER BOOTH - A teleportation system used by humans and some other species of Known Space. Transfer booths are about the size and shape of enclosed 20th century phone booths. To use a transfer booth, a character enters the booth, closes the door, and punches up the coordinates of the desired destination. Teleportation is nearly instantaneous.

TRIDEE — General term for any holographic image or device.

TRINOC [TRY-nok] - This methane-breathing alien species of Known Space first was encountered by humans about 20 years before the events of the novel *Ringworld.* Some flatlanders consider Trinocs 'racially paranoid.'

TZLOTZ BEER - Odd-tasting, strangely-refreshing beverage known throughout Human Space.

UNS - United Nations Standard. All UNS time measurements are Earth-relative: the 365-day year, 24-hour day, and so on.

ULTRASOLID — General term for any superdense material, natural or artificial — neutronium, for instance, or scrith.

ULTRAVIOLET - Short wavelength 'light' invisible (and harmful) to humans. Lethal to Grogs.

VARIABLE-SWORD - Hand weapon with variable length blade of fine wire, protected and made rigid by a stasis field.

VENUS — Nearest planet to the Earth-Moon system; it is slowly being terraformed.

VERGUUZ - A fabulous Wunderland liquor.

VERINOL — Powerful truth drug used occasionally in legal proceedings.

WALKER -- Dolphin slang for human, or other non-sessile land-dweller; also, cybersuit allowing Dolphins to move about on land or in space.

WARHEAD — Kzinti name for Canyon.

WE MADE IT — A human colony world in the Procyon star system, 11.3 light years from Earth. The planet is known for its high winds and light gravity.

WHITEFOODS - The Slaver name for Bandersnatchi.

WIREHEAD — A person who has implanted an exterior electrical connection to the pleasure center of his or her brain; the experience is highly addictive, reputedly generating sensations of calm, luminous ecstasy. Also, current addict. See Droud, Tasp, Make His Day.

WU, LOUIS - First human to establish informal contact with Trinocs.

WUNDERLAND - A human world in the Alpha Centauri triple system. The nearest colony to Earth, 4.3 light years distant, Wunderland is also the longest-established. It is a light-gravity world with a relatively-benign climate and a history of political turmoil.

WUNDERLANDER - Native of Wunderland; also, the old language of Wunderland's aristocracy.

WUNDERLAND TREATYMAKER - A huge, exotic weapon used to end the third Man-Kzin war.

XENOLOGY - A general term for the study of aliens, alien cultures, and alien technologies. In the game, Xenology is a skill qualifier.

XENOLOGY QUALIFIER - A skill qualifier which when applied to a specific skill provides knowledge of that skill as seen by a specific alien species. A Xenology qualifier may be applied to any root/branch skill. Humans can only learn xenologically-qualified skills to certain percentage limits; other species may have greater or lesser percentage limits concerning the same third species.

RINGWORLD EXPLORER SHEET

Back

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . . Money . . . . . In Bank . . . . .

MAS . . . . . General Hit Points . . . . . Equipment (on body) . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects . . . . .

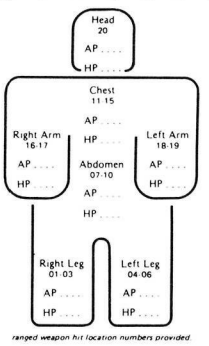
EDU . . . . . .

Pursuits Workspace	Years	Occ. Points/Wealth

Education	Years	Occ. Points

HIT POINT TALLY:

1	2	3	4	5	6	7				
8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29
31	32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50		



HIT POINTS BY LOCATION

r/leg . . . . .
l/leg . . . . .
abdomen . . .
chest . . . . .
l/arm . . . . .
r/arm . . . . .
head . . . . .

Unconsciousness Level . . . . .

WEAPONS

Weapon	Applic. Skill	Weight	Power Supply	Energy Draw	Damage	Range	ATT%

Action Ranking . . . .

Impulse of Completion

Movement rate . . . .

Psionic Ability: Yes ☐ No ☐

. . . . . .

. . . . . .

Equipment	Weight

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Ringworld

TECHNOLOGY BOOK

Larry Niven's

Ringworld

TECHNOLOGY BOOK

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INTRODUCTION

This book presents a small selection of the equipment available to an explorer from Human Space. Devices range in size and complexity from starships to simple tools. All items selected are from particular manufacturers; dozens or hundreds more of similar-type devices made by competitors exist.

Each entry is rated for some or all of the following characteristics:

ACTIVE SKILL: a vehicle or weapon has a particular skill which is used to operate it. Frequently these are obvious.

ARMOR: some equipment has protection against certain agents of damage, as represented by the armor value. Sometimes the armor value will be a simple number of hit points of damage protected against; sometimes the entry's expression will be more complex. If there is no entry, the item has no armor.

DAMAGE DONE: weapons do damage in different ways; the game effects are described in this entry. Only weapons have this listing.

VOLUME: metric dimensions

ENERGY UNITS: most equipment requires energy to function, measured in energy units. Generators produce energy units, batteries store energy units, and equipment and vehicles consume energy units. Most devices are rated for input; generators and batteries are rated for output.

HIT POINTS: each piece of equipment is assigned an amount of general hit points, representing the maximum amount of damage which can be taken by the object without destroying its usability.

HIT LOCATIONS: large equipment, vehicles in particular, can take damage to locations in addition to general hit points. Small equipment has only general hit points.

RANGE: such equipment as weapons and communication gear have particular ranges of effect. Ranged weapons have three distinct ranges, explained in the combat section of the explorers' book.

SPEED OF OPERATION: equipment which requires perceivable time to complete an operation has a listed speed of operation.

WEIGHT: equipment is rated in kilograms. Players should be reasonable in the amounts of equipment their explorers carry. Convert on the MAS/weight equivalency table if the MAS of an object is important.

The Failsafe Agreement

Between the second and third Man-Kzin wars, the governments of the UN, Belt, Wunderland, Jinx, and Down agreed to adopt a group of production standards; most other human planets and bodies, including We Made It, Home, Silvereyes, Plateau, and Margrave, have since signed. This standardization was undertaken at least in part to make equipment and parts interchangeable in wartime.

The signatories agreed that mechanical, electrical, and polymer devices would be operable under a standard range of interstellar, interplanetary conditions. The interworld mark 'failsafe' (often hidden) provides the following specific assurances:

1) The device operates between 0-10 UNS atmospheres of pressure, whether liquid or gas.

2) The device operates for its normal life at gravities between 0-3 gees; it will continue to operate despite momentary strain up to 10 gees.

3) The device operates normally in vacuum or terrestrial atmospheres. The device operates in any jovian atmosphere (assuming the pressure limitations are not exceeded) for at least an hour. There is no more than a 25% chance of malfunction for each additional hour. Units rated for specific atmospheres are so marked: 'failsafe/methane,' for instance.

4) The device operates normally between the temperatures of -1 50 and +1 50 degrees Centigrade.

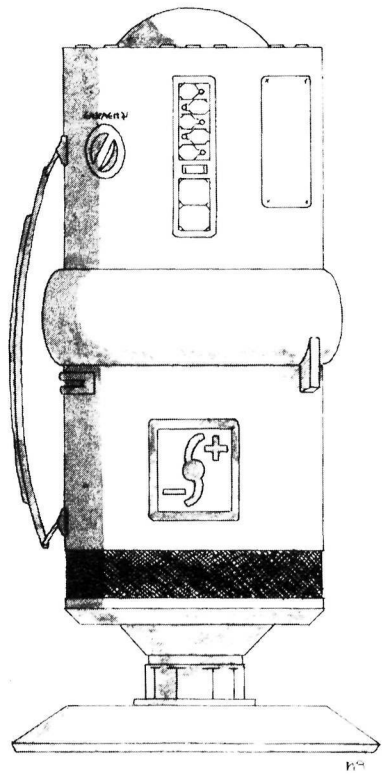
Unless otherwise stated, all Human Space devices presented in this game comply with the Failsafe Agreement.

Illustration by Lisa A. Free

GENERATORS

Most devices require a power supply to function. Many small items are self-contained, drawing from rechargeable, internal batteries. Larger objects may be connected to larger batteries or to a power generator. All power is measured with the game energy unit.

Human Space power supplies are standardized and nearly interchangeable, so long as the generator or battery is powerful enough. For the most part, in fact, human, Kzin, Kdat, and Pierin devices and power supplies are inter-usable. Occasionally, mating a device with a particular power supply requires interposition of a buffer or transformer, or minor wiring changes, a simple function of the Engineering or Repair skill.



Fusion 1 Generator

Batteries

In Known Space, batteries come in standard shapes and sizes, but a battery can be custom-built for almost any device. Equipment descriptions include or suggest a battery or batteries. Standard batteries are slightly less expensive than the custom batteries, and slightly less versatile.

Battery Presentation
Battery statistics are presented in a particular order: maximum Load/Maximum Draw/Mass/Rechargeable or Not Rechargeable. For example, a 100-point battery with a maximum draw of 25 points that weighs 50 grams, and is not rechargeable, will be described in the following fashion: 100/25/50/N.

Build-Your-Own-Battery
Each energy unit of maximum load costs 0.01 Stars.

Each energy unit of maximum load weighs 1 gram.

Each energy unit of maximum draw per impulse costs 0.01 Stars.

Each energy unit of maximum draw per impulse increases weight by 1 gram.

Weight can be reduced at a cost of 0.01 Star per gram reduced, to a minimum of 25% the original weight.

CH If the battery is non-rechargeable, halve the final cost.

Solar Generators
A solar generator generates 20 energy units per minute per square meter of surface, on Ringworld or Earth. Planets with dimmer or brighter suns produce more or fewer energy units. Solar generators are almost useless in interstellar space, but are invaluable in solar systems because the star provides its light (the fuel for the generator) for free. With cunning molecular packing, the collector surface has been successfully condensed into very small volumes, but the standard units here are simply one-meter-square plates costing 10 Stars per 1 kg plate (Greenquest, S. A. Luna), which can be assembled into any size of installation. Solar generator plates are fairly reliable — the individual plates break easily, but the destruction of one or more panels does not hamper the operation of others.

Fusion Generators
The first widespread commercial use of fusion technology was in the early 21st century. Vehicle- or household-sized generators did not become available until the late 23rd century. In the Ringworld era, fusion technology has achieved nearly ultimate efficiency and safety.

A fusion generator uses deuterium for fuel; its waste products are helium isotopes. A breach in the reaction chamber of a fusion generator would not cause much exterior damage — the active elements rapidly cool off and halt further activity. Unless the generator is armored in some fashion, a few hit points of damage is enough to put it out of action. Fusion is a widely-used source of power in Known Space, both as a power source and (by cutting a small hole in the reaction chamber) a starship drive.

Moscow Motors Fusion Generators

type	*energy output*	*weight*	*cost*	*dimensions*
Fusion 1	24/im	1 kg	100 Stars	3cm x 4cm x 5cm
Fusion 2	120/im	4 kg	400 Stars	5cm x 6cm x 10cm
Fusion 3	600/im	16 kg	1600 Stars	11.5cm cube
Fusion 4	3000/im	64 kg	6400 Stars	20cm cube
Fusion 5	15,000/im	250 kg	25,000 Stars	35cm cube
Fusion 6	75,000/im	1000 kg	100,000 Stars	60cm cube
Fusion 7	375,000/im	4000 kg	400,000 Stars	1m cube
etc.	x 5	x 4	x 4	x 5 volume

Camus Fabrique 2M Generators

type	*energy output*	*weight*	*cost*	*cylindrical dimensions*
2M-1	2000/im	500 kg	1000 Stars	30cm x 3m
2M-2	12,000/im	2500 kg	4000 Stars	60cm x 4m
2M-3	72,000/im	12,500 kg	16,000 Stars	1 m x 7m
etc.	x 6	x 5	x 4	x 5 volume

Pertweert of Home Ocean's Standard Rechargeable Batteries

name	*maximum load*	*maximum draw*	*cost*	*weight*
MicroCell	10	1	.2 Stars	3 grams
MiniCell	50	1	.48 Stars	13 grams
MacroCell	100	10	.75 Stars	30 grams
Flashlight I	300	10	3.2 Stars	310 grams
Flashlight II	300	10	5.4 Stars	78 grams
Pow'Pack I	500	50	5.5 Stars	550 grams
Pow'Pack II	500	50	9.13 Stars	137 grams
Searchlight	1000	100	11 Stars	1100 grams
Compact Searchlight	1000	100	20 Stars	275 grams
Bakpak I	10,000	100	100 Stars	10,000 grams
Bakpak II	40,000	100	700 Stars	10,000 grams

MAXIMUM LOAD: the maximum number of energy units which can be stored in a given battery. The battery never accepts more than that number of energy units.

MAXIMUM DRAW: the greatest amount of energy points which can be put into or removed from a battery in a single impulse.

Non-rechargeable batteries are sold in sizes identical to rechargeable batteries, but retail for half the price. They are designated by the letter N: rechargeable batteries are designated by the letter R.

2M Generator
A magnetic monopole (or 2M) is a rare, amazingly-heavy particle with only a single magnetic pole. They can be used to generate very strong magnetic fields, and this property is exploited in 2M generators, Bussard ramjets, and other devices requiring intense magnetic fields. In generators, these monopolar magnets can output electricity for years without requiring new monopoles. There could be one 2M in a device, or many. Much of the Belt's wealth came from monopole mining.

Tachyon Interference Field (TIF)
This experimental field acts like a net thrown into hyperspace which, in a complex inter-

Tachyon Generators, UN Peoples' Properties (experimental)

type	*energy output*	*weight*	cost	*spherical dimensions*
Mark 1	2000/im	20kg	50,000 Stars	20cm diameter
Mark 2	8000/im	40 kg	200,000 Stars	25cm diameter
Mark 3	32,000/im	80 kg	800,000 Stars	32cm diameter
etc.	x 4	x 2	x 4	x 2 volume

action, earns energy at a ratio of about 10:1 to input. The field can be initially powered by any source, then becomes self-powered upon establishment. Controversy surrounds the TIF, because some scientists believe that the use of this field slightly increases universal mass, thereby affecting fundamental processes and relationships. The field is inoperable within a significant gravity well, to about the same parameters as for hyperdrive. Any damage to such experimental devices render them inoperable until repaired.

COMPUTERS

This section mostly discusses shipboard computers, using as examples the line manufactured by Donovan's Brains (DsBs) of Earth. There also is a discussion of Sirius Cybernetics' MicroMind, a hand-held portable brain-aid.

Ringworld-era computers perform many operations simultaneously. Their multiprocessors include several subsystems. Each subsystem operates in conjunction with a memory bubble cartridge that typically deals with one aspect of ship operation or, in the case of purely informative memory bubbles, with one subject or area of knowledge.

Each subsystem is capable of accessing the memory bubbles of all other subsystems in the computer link which are not specially restricted: it is difficult to impossible for any other subsystem to access a spacecraft's security subsystem, for instance. Some subsystems require the presence of other subsystems before they can function.

These compact, sophisticated instruments have enormously powerful capacities for storing, correlating, and processing information. They can perform complex calculations and execute long lists of commands rapidly. They learn, recognize patterns, and extrapolate probabilities with great efficiency. Their capabilities make them essential in astrogation, life-support, communication, holographic imaging, data storage and display, language translation, and controlling other machines. Most systems interact with users by means of voice boxes. On many worlds, a citizen's right of access to a library computer and its public data base is guaranteed by law.

These devices frequently rely on zero-gee manufacturing techniques developed as long ago as the 21st century. Power consumption is usually quite low. A typically inexpensive computer uses organic-molecule data-retention sites interconnected by microchannel waveguides, ion tunnels, or room-temperature superconductors. Internal stimulated emission and absorption of photons accomplishes much of the information processing and storage. Standardized microchannel I/O grids link modular memory bubble packs with one another and with external units.

In practice, the computers' usefulness in problem solving is more limited by the imagination and experience of the user than by the capacity of the machines themselves. Nevertheless, computers are not miraculous devices. They are not all-knowing demigods able to answer any question or to solve any mystery. They entertain no malevolent thoughts, benign intentions, or lustful urges. Like wrenches or hammers, computers are tools, and can be used in any way its user sees fit.

The theory of artificial intelligence is well-known, but has not yet produced machine consciousness in Known Space — at least to the degree that citizenship rights would need to be allotted. The theory of artificial intelligence has not yet produced machine consciousness in Known Space. Contacts with Dolphins and sentient aliens have broadened the very concept of 'intelligence' far beyond the narrow 20th-century definitions of human researchers. Humanoid robots, though faddish at times in the past, are not common on Ringworld-era Earth.

Memory Bubbles

Memory bubbles are composed of stacks of planar memory pack (PMP) modules, 0.01cm to 0.5cm thick, assembled in specified sequences for standard applications. Expressed in archaic digital terminology, the raw storage capacity of a single write-once-only PMP wafer typically exceeds a billion bytes per module.

Manufactured for commercial use, memory bubbles vary in size from 2cm to 15cm diameter cartridges. The smaller bubbles, used most often in handheld or domestic model computers, can easily hold the information equivalent of 100 volumes of standard UN encyclopedia-format text, including graphics, or 24 hours of color tri-dee entertainment. Such a bubble is 4cm in diameter, weighing 8 grams.

Autopilot computers use standard 15cm diameter memory bubbles, each of which contain the information-equivalent of a fair-sized 20th-century library, and weigh 500 grams.

Memory bubbles are commercially available in most fields of specialized knowledge: human physiology and medicine; Known Space history; literature, art, and anthropology; contemporary science (astronomy, biology, chemistry, engineering, etc.) — nearly every imaginable area of expertise or entertainment. A vast selection of programs enables users to do everything from running peripheral equipment to playing epic sensual tridee adventure games.

Memory bubbles are nearly indestructible. Advances in non-bubble information storage have eliminated most fears of information loss due to the proximity of magnetic fields, and improved shielding techniques safeguard remaining magnetic information storage systems. Standard memory bubbles are non-erasable and non-reproducible. Blank memory bubbles are available for personal use.

UNS STANDARD DATA STORAGE (SDS)

Encyclopedia Format:
1 volume = 1000 pages
1 page = 75 lines
1 line = 150 characters (bytes)

Optical/Graphic Display (digital equivalents):
standard screen size (miniature portable) = ten million pixels
resolution = 10,000 x 10,000
standard storage = ten bytes per pixel, or nine million pixels per screen
standard O/G-to-text ratio = 1:10

Micromind

About the size of a 20th century hand calculator, but far more sophisticated, the MicroMind is produced as a thinking-man's aid. It accepts information via verbal command, keyboard entry, or direct datalink input. It displays text or graphics on a thin, flexible screen (retractable) which connects by intercable with the main unit. Through a comdisc or intercable link, MicroMinds can communicate easily with larger computers or with other MicroMinds. MicroMinds are not compatible with memory bubbles, but Sirius Cybernetics provides a line of Infotabs usable with the MicroMind. Each thumbnail-sized tab covers a specific area of knowledge with the information equivalent of a single UN standard encyclopedia. Typical Infotabs will hold the information for a specific language, the condensed history of a specific planet, etc. The average selling price of an Infotab is 250 Stars. The trade-name MicroMind is the property of Sirius Cybernetics, Jinx.

For bulk data storage or program input, each MicroMind contains one internal, user-inaccessible, optically switched 2 cm memory bubble.

In the field, the MicroMind is handy as a reader, navigator, communicator, calculator, and translator of languages.

Used as a translator, with a special translator Infotab, the MicroMind must listen for several hours to an unknown language before it begins to synthesize speech, and several hours more before the translation reaches beyond the most simple possible statements.

A MicroMind wilt attempt translation for its user at any time, also presenting a simple percentage readout of the probability that its translation is correct. After several hours, the MicroMind will be limited more by inadequate vocabulary than by difficulties of fit to the Chomsky matrix; for instance, it would be forced to use Interworld scientific terms during a technical discussion until the equivalent words in the other language are unambiguously spoken. Initially (approx. 45 minutes) a MicroMind's capacity is totally absorbed in translation, so that it can perform no other tasks without removing it from translation mode. Once basic understanding is achieved, the computer can resume multi-processing. Unknown or untranslatable words and phrases will be pronounced phonetically by the voice box. Instant translation is available if the appropriate language tab has been inserted into the memory bubble. Routinely, an earpiece is worn for translations; the MicroMind's tranlate switch must be depressed for it to translate its base language (Interworld, usually) into the tongue it is learning or knows as a second language. MicroMind is not rigged to translatewrittenlanguages.

Autopilot

This powerful class of computers takes its generic name from its most critical use, as that of a starship's autopilot control and main computer. Autopilot central memories nearly always use long-chain molecular structures arrayed in a crystal lattice to store information. Segments of molecules energized to different degrees of excitation represent clearly-distinguishable information states. With this type of memory, an autopilot computer can store and process information millions of times faster than its digital predecessors of the late 20th century. Computers in this class are also available for off-shipboard use, and are then referred to by name and make.

Autopilot computers are compatible with standard memory-bubble subsystems. The subsystems available for such computers are listed later in this section.

All commonly-available memory bubble-compatible computers are limited in the number of memory bubbles that can be accessed simultaneously. Enterprising explorers with good computer engineering skills can modify the fixed and optional subsystem capacities of these computers. However, the processing speeds and function limitations of any computer cannot be bettered through jury-rigging. These are technological limitations.

Autopilots can serve as translators in much the same way as MicroMinds, except that the task occupies only a small fraction of their processing capacity. For an effective translation, the autopilot must hear the meanings of at least some of the words it transcribes. The sample need not be much. For example, saying "in the statement *Thbarth do kai romone,* one of the words means 'tree' " suffices to begin preliminary understanding. Autopilots can be programmed, accessed or commanded verbally via comdisc, keyboard, screen input, or direct datalink. Aboard ship, these computers control life support functions, engineering, navigation, propulsion, and communications. An autopilot is fully capable of piloting its craft unassisted in normal space, in orbital maneuvers, and in planetary landings, though it is likely to experience difficulties in unforeseen situations. An autopilot's skill as a normal space pilot and atmospheric pilot is never less than 30% in equip ment manufactured after the 27th century. Human Space autopilots, at least, have not yet become capable of exceeding 100%.

Shipboard Access

A ship's computer is accessed through a number of terminals scattered through the ship. A particular terminal directly accesses only a limited number of subsystems. Lab terminals, for instance, can directly access only subsystems dealing with their scientific project areas. Bridge terminals have access to the autopilot, the weapons subsystem, the sensor subsystem, communications, and the life system All the open subsystems such as library and recreation are available to every terminal, unless specifically closed.

A single locked master terminal in the captain's quarters has access to all of the computer's subsystems except the security subsystem. The security subsystem, once activated, can be deactivated only by the deliverance of a mathematical or verbal code usually in the possession of the ship's owner. The person entering this code must be properly identified by means of retinal patterns, fingerprints, voice prints, electrostress factors, and a DNA sample (a finger is inserted momentarily into a slot beside a visual scanner). The master terminal can alter the date flow between the computer system or particular subsystems and other ship's terminals. It could allow a cabin terminal to have access to the sensor subsystem, for instance, or completely cut off a terminal from all information.

Selected Known Space Computers

parameters	*COMPUTER MODEL* *MicroMind*	*Vizier*	*Mate*	*Crew*	*Brittanica*
subsystem capacity:					
fixed	0	0	3	5	cultural
optional	0	3	3	15	0
functions	5	5	10	20	50
speed rating	1	2	5	5	50
MAS	(.35 kg)	1	3	5	11
cm dimensions	7 x 2 x 1 1	40 x 17 x 5	40 x 30 x 5	40 x 30 x 15	40 x 50 x 35
cost	125 Stars	1800 Stars	3400 Stars	6700 Stars	200,000
Armor/HP	2/3	2/5	3/5	5/10	5/20
energy draw/im	.001	.056	.096	.15	.35

SUBSYSTEMS: the number of subsystems which the computer can run simultaneously. Fixed subsystems cannot be deleted from the machine. Optional subsystems will accept various memory bubbles as supplied by the user.

FUNCTIONS: the number of functions that each of the computer subsystems can run at once. The subsystem descriptions list standard functions. Standard functions will automatically be assigned by any Human Space computer providing that the required subsystem is present in the computer.

For the MicroMind, this gives the functions which the entire computer can run one time.

SPEED: the relative quickness with which the computer operates. 1 is the slowest, and higher numbers represent correspondingly faster computers.

MAS: the weight of the central processing unit; for MAS of peripherals, multiply by eight or so.

DIMENSIONS: measured at the highest, deepest, and widest points of the central processing unit. Human needs often require a small CPU to be mounted in a well-proportioned desk.

COST: in Stars. Can vary with seller.

Armor/HP: armor points / hit points — the computer can resist/take this much damage without being affected; excess damage harms the computer. DsBs Mate, Crew, and Britannica models take locational damage to specific subsystems rather than to the whole system. The hit points for these models are per subsystem. To determine which subsystem is hit, number them, and roll 1 D6 for hit locations for the Mate, and 1 D20 for the Crew. If an inactive subsystem is hit, the computer will lose the capability to use that subsystem, but other functions will be unaffected. If excess damage is done to a subsystem, the additional damage will affect another random subsystem. DsBs offers armored housing for the Mate, Crew, and Brittanica models. This provides an additional 5 points of armor which covers the entire unit and costs 1000 additional Stars. Additional increments of armor may so be purchased.

ENERGY DRAW/IM: the number of energy units used by the computer each impulse.

To use any terminal, the user simply tells the computer in plain Interworld what he wants done — the computer summons up the proper programs to accomplish the task. It is possible for the user to attempt to use the wrong terminal. For example, a pilot could not make course changes from the lounge terminal, nor could a scientist change bridge security arrangements from a lab terminal; either could ask the ship's library about the diet of the Incan aristocracy in the 14th century.

The Shipboard Terminal Access Table details what some common shipboard terminals access. The autokitchen, clothing processor, and shipdoc are not 'true' computer terminals, but provide food, raiment, and medical care by request.

Typical Shipboard Terminal Access

terminal location	*accessible subsystems*
autokitchen	autochef
bridge	all subsystems except security and some science subsystems; captain's cabin main terminal (if in existence) may have priority override; otherwise bridge main terminal has mastery of all subsystems
clothing processor	raiment
engineering	engineering, some science subsystems, library, recreation; priority override is captain's cabin, bridge, engineering deck if present
laboratory	library, all science subsystems
lounge	library, recreation
main terminal	may be in captain's cabin or on bridge: all subsystems (security subsystem requires special code
autodoc	shipdoc

A small ship may have only one terminal: a master terminal on the bridge.

A terminal incapable of directly accessing a subsystem may be able to reach it indirectly, allowing limited information to flow from that subsystem If forbidden, use of this indirection is time-consuming, and requires considerable Computer skill

Donovan's (DsBs) Shipboard Systems
The best-known producer of ship's computers is Donovan's Brains (DsBs) of Earth. DsBs manufactured computers throughout the Man-Kzin wars, and is acknowledged as the producer of the most reliable computers in the Ringworld era of Known Space.

Speed
A computer's speed rating determines the amount of time it requires to perform an action. The gamemaster must assign a difficulty rating to each action. The difficulty is then divided by the computer's speed rating. The result gives the number of impulses which the computer requires to complete the action. Round up any fractions.

Sample Difficulty Ratings

action	*rating*
retrieve library entry	1
translate from known language	10
print one page of text	10
seal off ship section	20
aim and fire ship's weapon	20
analyze inorganic chemical	100
plot course	200
quick mediscan	400
compile and print in-depth dossier on assigned subject	1000
prepare single gourmet meal	2000
translate unfamiliar language	200,000

FUNCTIONS
A function is anything which requires a subsystem's attention, or which accesses the subsystem for information.

In each of the subsystem descriptions below standard functions are provided. Standard functions are assigned automatically by any Human Space computer provided that the interlinking subsystems are present.

The sensor subsystem, for example, always records the information that it receives as one of its available functions. If that computer was also running a weapons subsystem its draw of information from the sensor subsystem would also count as a function for the sensors. In addition, if the computer were running the ship defense subsystem, that would be a third function for the sensors. A fourth function would be the bridge sensors required for a bridge log. Therefore, a sensor subsystem running on a DsBs Mate model computer with all the above subsystems operating would be left with six free functions.

Both gamemaster and players must know how many actions are being performed by each subsystem and how much free capacity exists. The accompanying form may help to keep track of the various subsystems.

SUBSYSTEMS
A subsystem is a computer section devoted to a specific purpose, with access to stored data on a specific subject. There are two subsystem classification used here: fixed, and optional.

Fixed subsystems may not be removed from computer access by the computer user without considerable tinkering and use of Computer skill. The autopilot, communications, and life system subsystems are examples. These fixed subsystems are included as standard equipment on all autopilot computers manufactured in Known Space.

Optional subsystems can be easily removed and replaced with others on a modular basis, though appurtenances which they may demand must also be present — security subsystems need surveillance devices, for instance. An activated subsystem cannot be deactivated without the proper code. The codes are detailed in the subsystem descriptions.

Many subsystems automatically require that a certain number of subsystem functions be used to access other subsystems. The Functions listing in the subsystem descriptions indicates both the type and number of automatic (standard) functions which the subsystem requires.

To exchange a memory bubble in a subsystem has a difficulty rating of 10,000. Subsystem exchange is achievable only at the master terminal.

The subsystems described below may all be purchased from DsBs of Earth, in standard memory bubble sizes, except where indicated. All subsystems are available with Xenology qualifiers. The price of each subsystem is given after the name.

AUXILIARY SUBSYSTEMS [half regular price] : some of the computer systems provided in *Ringworld* come equipped with standard subsystems. Prudent explorers often keep auxiliary subsystems in preparation for emergencies. For example, no one wants to be left without a life system. Auxiliary systems perform all the basic functions of the primary subsystem, but cannot perform the more complex functions, as determined by the gamemaster. They cost less than the normal full systems, but take up as much space. Some wealthy explorers routinely keep full primary systems as auxiliaries

ADMINISTRATION [350 Stars] : this subsystem includes crew personnel records, equipment and supplies inventory, and takes care of all accounting procedures. All contracts between the captain or owners and the crew are recorded on this subsystem, and can be

SUBSYSTEM . . . . . .

Standard Functions

1 . . . . . .
2 . . . . . .
3 . . . . . .
4 . . . . . .
5 . . . . . .

Optional Functions

6 . . . . . .
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played back for reference. Only ship's officers can gain access to the administration subsystem Every time a piece of equipment is used, it is recorded as a transaction in this subsystem. If the equipment is not returned within a specified amount of time, it will be subtracted from the inventory. All other subsystems aboard the ship automatically transfer any inventory and accounting information directly to the administration. This subsystem knows where all ship's property is, and usually its current condition as well.

Standard Functions — per autodoc (1), autochef (1), engineering (1, plus 1 per engine system), library (1), life system (1), probe control (1), ship's defense (1), ship's log (1), per weapon type (1)

AUTODOC [400 Stars] : use of this subsystem requires that a shipdoc be installed. The autodoc subsystem governs and audits all shipdocs, and any deskdocs or minidocs voluntarily linked to it. Governing each autodoc unit requires one function.

Standard Functions: administration (1), per autodoc (1), emergency (1), life system (1), per simweb cocoon (1)

AUTOCHEF [375 Stars] : requires an automatic food processor. This subsystem controls all food synthesization and automatic food preparation on the ship.

Standard Functions: accounting (1), per autokitchen unit (1), per simweb cocoon (1)

AUTOPILOT [500 Stars, comes as standard equipment for Mate and Crew models] : this subsystem is required by Known Space interplanetary law for all spacecraft registered by the UN, Down, Home, Wunderland, and Jinx.

An autopilot subsystem will successfully operate a spacecraft in normal space under non-emergency conditions. It performs all navigation and always knows the ship's relationship to the charted locations of Known Space. The autopilot always can inform the pilot of the distance and course required to reach a particular Known Space world.

Autopilots can automatically successfully perform normal and standard-emergency internal and ship maneuver functions. Autopilots automatically monitor the full range of their EM-spectrum sensors, but do not announce data unless so requested, either after the fact or when first received. Autopilots will not perform research or deductive or inductive reasoning. Autopilots have a standard ship-identification code which they transmit automatically upon reception of the authorized code phrase, but this ID command can be overridden; such an operation will be entered in the ship's log, of course.

Standard Autopilot/Subsystem Capabilities

(1) Against a featureless background, the autopilot can detect one calorie of heat at 100,000 km.

(2) Against a featureless background, the autopilot can detect one cubic mm of neutronium at 100,000 km.

(3) Against a featureless background, the autopilot can visually resolve, enhance, enlarge, or interpret to identifiability a 1 cm square object at 100,000 km.

(4) Against a featureless background, the autopilot can individually resolve point heat sources which are 4 cm apart and 1000 km distant.

(5) Against a featureless background, the autopilot can receive and locate the source of a 1 milliwatt radio signal at 1 million km.

(6) Against a featureless background, the autopilot will plot the trajectory of any detectable object in 0.025 seconds, and will interrupt other operations to announce if there is a course intersection.

(7) The autopilot has triply-redundant "save this ship" routines programmed as fundamental operations: this includes evasive maneuvers and the activation of stasis fields and crash webs. These routines are basic to all Human Space autopilots, and permit routine evasion of collision as well as the life-support parameters within the ship, the use of fusion drives near substantial masses, and take-off and cruise velocities. The ability of pilots to do damage with their ships is quite restrained when such a program is in operation, though pilots are free to re-program or override many such limits. Such operations always are logged.

Standard Functions: communications (1), emergency (1), life system (1), probe control (1), security (1), sensors (1), ship's defense (1), per stasis field operator (1), per weapons type (1), per bridge (1)

COMMUNICATIONS [425 Stars - comes as standard equipment on Mate and Crew models] : requires communications hardware to function and is mandatory gear for all Known Space ships except for those registered on We Made It, where the right to remain silent is absolute.

This system monitors the ship's hyperwave, normal space radios, microwaves, internal intercoms, and the ship's log, as well as any other installed communications. The communications subsystem may monitor surveillance devices which have not been specifically denied to it, allowing it to record input from those sources as well, if its functions are not exceeded. The communications subsystem also is responsible for any language translations required; completely new languages will require a library function as well.

Standard Functions: administration (1), autopilot (1), hyperwave monitor (1), normal space monitor (1), ship's defense (1), ship's log (1), per simweb cocoon (1), translation (1), per explorer channel (1)

EMERGENCY [500 Stars] : the emergency subsystem only takes action when important portions of the computer have been made inoperable. The emergency subsystem is best kept in a separate location from the main computer unit— sometimes in the captain's cabin, auxiliary bridge, or in a specially secured area. If the main computer goes down, the emergency unit assumes the most basic functions: life system, stasis fields, autopilot, engineering, and autodoc. It will help operate auxiliary systems if those are all that are left. Only those functions most vital to the ship can be operated by this unit — no library functions are available, for instance. If the main computer returns to service, the emergency unit returns to stand-by.

Standard Functions: autodoc (1), autopilot (1), engineering (1), life system (1) ship's defense (1), stasis field operator (1)

ENGINEERING [650 Stars, standard on Crew model] : required by all human governments. It coordinates the routines relating to the ship's normal space drives and hyperdrives. It contains a technical library dealing with the repair and maintenance of the ship's drives, and a limited amount of information on other drives, duplicated in the main library on many ships.

Standard Functions: autopilot (1), communications (1), emergency (1), reaction drive (2), reactionless drive (3), quantum I hyperdrive (5), rumored quantum II hyperdrive (about 10), per weapon system (1)

LIBRARY [350 Stars, + 300 Stars per additional memory bubble] : may be supplemented by any number of memory bubbles. The standard library subsystem combines the functions of an encyclopedia, dictionary, and almanac, but with exponentially greater detail and information, and in elaborately-analytical detail if desired. It is completely cross-referenced, and will automatically enhance its cross-references to include any supplemental memory bubbles. It uses either Interworld speech or print, as desired. The library includes a dictionary of misspellings and mispronunciations which it will check before declaring an entry unfound or a question unanswerable. With the appropriate memory bubbles, the library subsystem can be modified into the knowledge subsystems of Anthropology, Biology, Law, Mathematics, Theology, Zoology — in short, any science or intellectual art.

Standard Functions: administration (1), recreation (1), translation (1), per access terminal (1)

LIFE SYSTEM [500 Stars, included in Mate and Crew models] : this subsystem is required by Known Space interplanetary law for all spacecraft registered by the UN, Down, Home, Wunderland, and Jinx.

The life system requires the presence of life support system hardware, which is required by law to be present in any ship in which a living being is intended to exist. This subsystem controls the ship's environment, and usually is accessible only from the main terminal or the bridge. On some larger or luxury-class craft passengers are able to adjust cabin conditions to some extent. It is possible during an emergency to upgrade this to an engineering terminal if the proper codes are entered. Usually only the ship's officers know these commands.

Standard Functions: administration (1),per autodoc (1),emergency(1), ship's defense (1), ship's log (1), per simweb cocoon (1), stasis field operator (1)

PROBE CONTROL [500 Stars] : capable of controlling the navigation, sensors, scientific and communication equipment aboard two small unmanned probes. The communications subsystem is required to correlate the information from the probes once it has reached the ship. Probes can be fully controlled from any computer terminal accessing this information, but the bridge terminal has priority of command. The function of a probe is further explained in the section covering probes.

Standard Functions: administration (1), library (1), per probe controlled (1), sensors (1), per weapon system (1)

RECREATION [425 Stars] : programmed to see to the psychological well-being of a ship's crew. It can play any game in a vast repertoire, and can learn new ones if a successful Computer Software roll is made. Roleplaying simulations and abstract strategy games are popular. This system also has a huge library of music, poetry, tri-dee comedies and dramas, art, and real-time images hours in duration from many planets. Some ships have simwebs.

The recreation subsystem can also carry on a verbal conversation via terminal, which some find of comfort and solace. This simple psychological counseling relieves tension, stress, and anger. Conversations containing particular key words are monitored into the ship's log, and particular conformations (such as "sabotage the hyperdrive") are read into the security subsystem as well.

Standard Function: library (1), per access terminal (1), per simweb cocoon (1), per tridee imager (1)

SECURITY [400 Stars, included in Crew Model] : protects the computer from outside tampering, scans for external intrusions, and checks within the ship for mutinous activity. Even the captain can be deemed guilty of mutinous activity if he attempts any of a number of acts specifically programmed into the subsystem as mutinous. It can monitor any number of audiovisual pickups, but can actively coordinate only that number equal to the computer's functions number. This, multiplied by three, is the percentage chance that the security subsystem has noticed and recorded any particular incident which occurred aboard ship. UN-registry vessels always keep the bridge under surveillance, making up an important part of the ship's log — everything which takes place on the bridge is fully recorded.

All security subsystems contain profiles of routines which can be run immediately in response to standard threats: internal intruder warnings, sealing off the bridge, responding to meteor holes, and so forth.

Standard Functions: per protected subsystem (1)

SHIP'S LOG [675 Stars] : protected from tampering by one-way encoding, involving a multi-billion string of digits. An explorer can try three times every three UNS minutes to offer the release code to the autopilot; it obviously will take a very long time to try to randomly enter the log memory. Actual recovery of the log involves a replicating counter-code procedure at a spaceport customs office under the governmental authority of the planet or nation which registered the spacecraft.

Depending on the authority, a log may consist merely of sensor data and pilot commands, or it could consist of recordings of everything which happened on board. Every room conceivably could have multiple tridee records which could be reviewed at a customs officer's leisure. In practical terms, such an avalanche of information would glut a bureaucracy unless extremely sophisticated scan-and-understand procedures were used by very talented people. Usually the ship's log is not surveyed until there are military or legal reasons to check the memory.

Standard Functions: administration (1), per autodoc (1), communications (1), emergency (1), engineering (1), life system (1), probe control (1), security (1), sensors (1), ship's defense (1), weapons (1)

SENSORS [350 Stars] : can be modularized to fit the needs of a particular ship. This system acquires and regularizes information gathered from many different sources (gamma ray, cosmic ray, x-ray, ultraviolet, visible light, infrared, microwave, radar, short wave radio, long wave radio, deep radar, sonic scans, etc.). It is the source of the incredible autopilot sensing abilities, and is essential to the autopilot's proper working. All data received by the sensors are recorded automatically, and can be called up again for later perusal. If the sensor subsystem becomes saturated with routine information, it will transfer back files to a memory bubble subsystem retrievable through the library subsystem. The sensors may be set to announce the discovery of objects with certain characteristics — such as stasis fields or Kzinti warships.

Standard Functions: autopilot (1), per simultaneous electromagnetic band scan (1), gravity scan (1), magnetic scan (1), sonic scan (1), ion and cosmic ray scan (1), deep-radar scan (1), ship's defense (1), per weapons unit (1)

SHIP'S DEFENSE [375 Stars] : commands certain special-case defensive routines not otherwise accounted for by ship procedures. In some cases it may override both the autopilot and the security subsystem to further the integrity of the ship and the safety of the crew.

Areas of special function include activation of the ship's stasis field and crash web generators, external danger analysis, coordination of the autopilot and a weapons subsystem (if any), formation of hypotheses concerning enemy spacecraft maneuver, and so forth.

Standard Functions: administration (1), autopilot (1), communications (1), emergency (1), life system (1), sensors (1), ship's log (1), stasis field operator (1), per weapons type (1)

SIMWEB [550 Stars] : allows autopilot linkage to one or more simwebs, and enables ship's library to contribute to highly-detailed and specific training adventures. The simweb is an environmental training device. See the Game System chapter of the explorer book for details.

Standard Functions: administration (1), autopilot (1), library (1), recreation (1), per simweb cocoon (1), tridee imager per cocoon (1)

STASIS FIELD OPERATOR [450 Stars] : controls discrete stasis fields aboard ship. A Known Space may be equipped with four to five interior stasis fields, the status of which is maintained by this subsystem. Does not link with any overall protective stasis field for the ship, which is controlled by the ship's defense subsystem. These small fields automatically shut off when the main field is activated.

Standard Functions: administration (1), autopilot (1), emergency (1), ship's defense (1), life system (1), security (1), sensors (1)

TRANSLATION [500 Stars] : controls all the functions associated with translating a new language. The translation subsystem can translate for as many comdiscs as the computer has functions per subsystem, minus one if the translator must translate a completely new language. There are a great variety of memory bubbles containing languages available for use with this subsystem; it will not have to translate each language anew every time it hears it. Using this system the computer can understand verbal commands made using any accent or dialect of Interworld, and twenty other human language. The Hero's Tongue is programmed directly into this subsystem as well, so no memory bubble is required for conversation with Kzinti.

Standard Functions: communications (1), library (1), recreation (1), per simweb cocoon (1)

TRI-DEE IMAGER [600 Stars] : interfaces with any other datalink subsystem to project a large holographic image of an object into the focus area. It is useful in research, to see a magnified image of an object, area, or outline. If the ship's sensors can penetrate within the object, this subsystem can project a complete plan of the inside of the object as well — with a resolution fine enough to depict the facial features of each human within a spaceship, for instance. When interfaced with the Engineering subsystem, it can be used to find visually the causes of problems affecting the ship. The tri-dee imager can be interfaced with the library subsystem in order to examine the plans for any object described within.

When interfaced with the medical subsystem, it can depict the working insides of a living bodies — this can even be used to fully 'dissect' living creatures without doing any damage to the creature.

The tri-dee imager has a library of over 1000 3D grids which can be projected over an image. The image can be peeled away layer by layer or piece by piece to reveal hidden details or relationships. The projected image can be magnified enough that a microscopic object can fill a room, and still remain clear enough to be studied carefully. A single part of an object can be magnified and studied using the coordinate grids. Images of large objects can be reduced to the size of pinheads — thus, the imager could show the real-time major elements and orbits of a solar system.

The 3D imager can be instructed to project objects of different heats or densities in different colors, or to project only a certain range. It can be programmed to only project objects giving off radiation at a certain range in the electromagnetic spectrum, or to only show objects moving at certain speeds. The 3D imager cannot project anything on which it does not have data, of course.

Aboard ship, at least four 3D imagers usually exist: one on the bridge, one for the labs, one for a staff room, and one for the medical room.

Standard Functions: administration (1), autodoc (1), autokitchen (1), bridge (1), library (1), ship's log (1), per imager unit (1)

WEAPONS [750 Stars] : to be used, the ship must carry external weapons. This subsystem acquires and fires weapons upon activation; it may be instructed by voice or keyboard about special requirements and situations. It is nearly always connected to the ship's defense subsystem, which greatly increases flexibility, and permits the weapons to be fired under certain carefully-designated conditions without human intervention. The weapons subsystem is activated only from bridge terminals or the main terminal.

Standard Functions: administration (1), autopilot (1), communication (1), engineering (1), probe control (1), security (1), sensors (1), ship's defense (1), ship's log (1), per weapons unit (1)

MEDICAL EQUIPMENT

AUTODOCS
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- Minidoc 9
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DRUGS
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Autodocs

Autodocs are electromechanical devices which can diagnose and treat nearly all diseases, wounds, and conditions to which humanity is subject. There are four general types in Human Space: the deskdoc, the minidoc, the shipdoc, and the megadoc. Unless specifically noted, the term autodoc should be understood to exclude the deskdoc, which is incapable of performing serious medical treatment.

Autodocs are relatively small machines which have capacities equal to or exceeding those of entire ancient hospitals and which have largely relegated the role of doctors to research, repair, and administration. Specific figures herein refer to the Protek (based on We Made It) line of Autodocs; there are other lines as well.

General Considerations

Autodocs are usable only on the species for which they were designed; they will immediately perceive a wrong species and refuse treatment. To redesign an autodoc for another species' use is basically impossible, though parts of an autodoc could be used in trying to build a second autodoc from scratch. Building an autodoc from scratch is a time-consuming and risky endeavor, requiring 100%+ skills, specific memory spheres, and at least 20 research steps.

No autodoc can ever help an explorer that has been at 0 general hit points or less for longer than his CON in impulses: he is irrevocably dead. But an explorer that has at least 1 positive hit point or has had 0 or less for his CON or less impulses can be helped by autodocs. Any explorer who has been reduced to zero or less general hit points, who has had hit points in his head go to zero or less, or who has had chest or abdomen take double damage is required to make a roll on the Aging Table (found in the Explorers' Book, game system section) and thus may possibly lose one or more points in one of his characteristics. This represents brain damage. Such loss may require recalculation of secondary characteristics and skill rolls. Special circumstances, such as lowered body temperature, could slow an explorer's deterioration and permit him to last longer than usual — or it could speed up such decay.

An autodoc is able to administer one point of healing per hit location as soon as it begins treatment. From a game standpoint, this initial treatment is instantaneous. Further treatment will require more time. A hit location that has already received such initial treatment cannot again receive this instant healing benefit from an autodoc unless it is wounded again.

DELUXE DESKDOC

WEIGHT: 3.4 kg (with flamewood top)

VOLUME: 10cm x 10cm x 25cm

HIT POINTS: 10

SPEED OF TREATMENT: fingernails in 75 seconds

ENERGY DRAW: 1/minute of operation

POWER SUPPLY: usually plugged into the power supply of the building it is located in.

EMERGENCY OPERATING TIME: none

CAPACITY: one limb or head of one patient

COST: 140 Stars with tri-dee receiver

The deskdoc is designed for personal hygiene and grooming, and is equipped to perform minor medical attention such as removing splinters from fingers or healing paper cuts, but it is more frequently used to perform manicures or trim the user's hair in the latest fashion. It can be programmed for different hair styles or manicure fashions. It can apply nail polish or hair ornaments, but they must be provided by the owner and placed within the deskdoc.

Deskdocs can administer regular treatments needed by the user, such as insulin for a diabetic or the proper drugs to keep a psychotic stable, but these drugs must be provided by the user as well, and the machine programmed (a simple procedure) as to what drugs it holds. It can heal a single point of damage in the instantaneous fashion possible to all autodocs, but can heal no more damage than that under any circumstances.

This deluxe model has an emergency circuit linkable to a megadoc network, and is equipped with a tri-dee screen for the user's entertainment.

MINIDOC (Pocketdoc)

WEIGHT: 4.7 kg

VOLUME: 50cm x 50cm x 4cm

HIT POINTS: 15

ARMOR: none

SPEED OF TREATMENT: square of the hit points damage to the patient in hours, to a maximum of 75% damage healed per hit location (round up fractions)

ENERGY DRAW: 1 8/hour

POWER SUPPLY: micro-fusion pile of 4/im maximum output

CAPACITY: one hit location of one patient

COST: 1000 Stars with drugs, 940 without

A minidoc is a hand-portable machine which can automatically administer a variety of specific and broad-spectrum antibiotics, clean and staunch wounds, make simple diagnoses, set bone breaks, and in other ways act as first aid support. In Known Space, a minidoc may be emergency-circuited with a particular shipdoc or megadoc network, which might override the limited understanding of the minidoc to immediately dispatch additional aid. So long as its energy and drugs hold out, a minidoc faithfully attempts to sustain the life of its patient.

The minidoc cannot replace limbs, but can reheal and seal over stumps . It can only heal a single specific location at a time. In use, the minidoc is placed on or nearby the injured location, and begins operation when an activation button is pushed, or a verbal command given. Any time a patient is touching a minidoc, the minidoc will expend energy.

The standard Protek unit includes three folded arms, each .9 meters long, which are used to apply bandages, remove foreign objects, and create pressure to reduce blood loss. At the end of each arm are six DEX 18 fingers of various sorts, including retractable surgical tools such as a clean-field (sterilizing) projector, laser knife and cauterizer, and several microsteel knives, clamps, and suction swabs. With such tools and its internal supply of surgical bonders, ligatures, and false-flesh bandages, the minidoc can adequately treat major wounds and perform routine operations such as removing a burst appendix or a musket ball, extracting a broken tooth, or setting broken bones. It cannot perform complex operations nor organ transplants.

Using the Minidoc

Every minidoc has two modes, inferential and deferential. In inferential mode, the minidoc is programmed to carry out whatever acts it deems necessary to maintain the life of or to heal its user. In deferential mode, the minidoc only carries out specific requests, either verbal or ones keyed in; in this mode, the minidoc may sometimes override user requests. Unless specifically set by the user, a minidoc is always in deferential mode.

A minidoc is activated once it is loaded and powered at the point of sale. From then on, it is always ready to operate, so long as its generator functions.

When not currently functioning, a minidoc looks like a small suitcase with a few readouts and settings on one side. When a minidoc begins to function, various panels and doors open and it uses its appendages to orient itself to the patient, often crouching spider-like above prone patients on its arms to perform a bio-scan. Ordinarily the first action a minidoc will take after the preliminary mediscan is to administer a dose of Snoozem, so that the patient does not thrash about.

The unit scans the patient for two impulses, then acts upon the gathered data. A read-out displays the diagnosis. If the unit decides that the patient is in critical condition, it engages emergency mode, bypassing full body scan. Ordinarily, it will not shift from one hit location to another until the first location has been stabilized (healed to at least 1 positive hit point, if head, chest, or abdomen, or healed to less than double damage if a limb). Because of this, the minidoc will not diagnose a second crucial problem about the body for some impulses. Minidocs therefore are not absolutely reliable, and everyone in Known Space understands this; someone who is indefinably suspect is said to be "untrustworthy as a minidoc."

Notes
A minidoc has no capacity to carry or to perform organ transplants.

Explorers frequently wear minidocs on their back or belt or attach them to their vehicles as part of standard gear.

Deluxe minidocs can also perform routine social hygiene functions, such as depilation, application of skin toner, or a manicure.

SHIPDOC

MAS: 40

VOLUME: 4.1m x 2.4m x 1.5m high

HIT POINTS: 20

POWER SUPPLY: ship's generator, plus emergency battery

ENERGY DRAW: 360/hour (0.1/im)

EMERGENCY OPERATING TIME: 40 hour battery (14,400/5/14.4/R

SPEED OF TREATMENT: square of the hit point damage in hours divided by 4 (round up fractions); can heal up to full normal hit points; heals all hit locations simultaneously

CAPACITY: one patient

PRICE: 50,000 Stars, comes with drugs

The standard Protek shipdoc is casket-shaped; with ducts leading to additional shipboard storage points.

To use the shipdoc, the lid is lifted and the patient either crawls in or is placed in; the shipdoc is activated to inferential mode by this entry. It is possible to activate the ship doc by reaching one of several touchplates on the outside of the autodoc, or by a specially-programmed verbal command: in this case, the aroused machine will open its own lid and extend appendages (maximum of 3m reach) to lift in the incapacitated explorer. Unlike minidocs, shipdocs are always activated. Like minidocs, they also have a deferential mode, though it is normally not turned on.

Treatment by shipdocs proceeds in the same fashion as minidoc treatment, except that a shipdoc has a wide medical capacity, including replacing severely-damaged or destroyed body parts, and it never misdiagnoses a patient

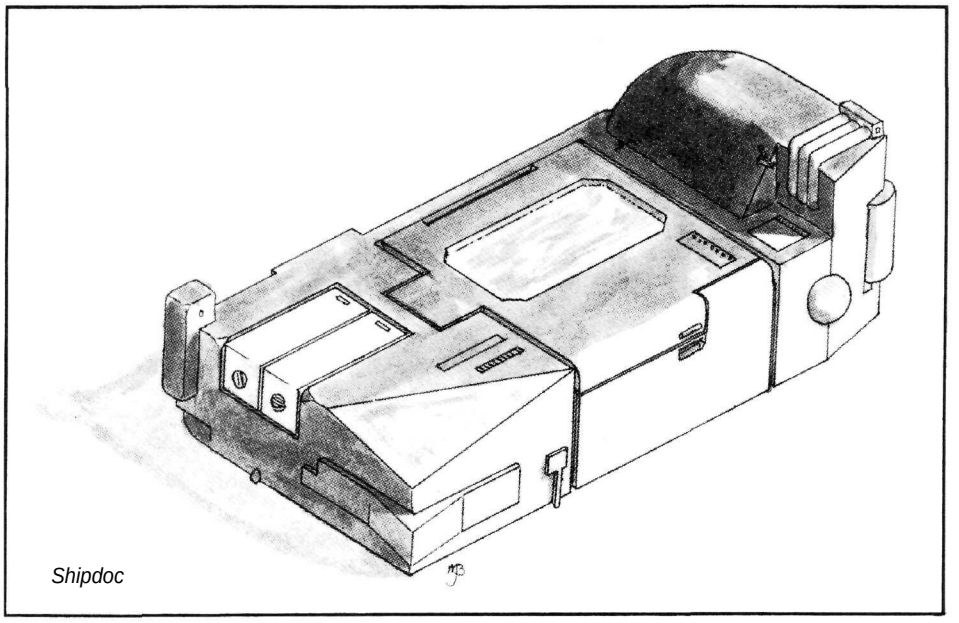
Shipdocs have many appendages, and have a limited ability to repair or redesign them. A shipdoc usually has access to four complete sets of human body parts; two male and two female unless otherwise specifically stocked. This means that fits, coloring, and proportions of transplanted parts usually do not match the organ that was lost. More sophisticated pairings are possible only using megadocs. Shipdocs have sizable plastiskin banks to care for burns and similar wounds, without needing to resort to transplant.

Though a shipdoc can perform an autopsy, it can only do so in deferential mode. Body parts recovered through an autopsy or dissection can be placed in the doc's organ bank storage for later use. Only megadocs can fully treat collected cadavers for organ bank processing; users risk a 10% chance that jury-harvested parts will fail if the shipdoc tries to store them by itself.

A corpse is placed in a stasis-field casket to await disposition; a shipdoc may also do this with seriously-ill patients that yet live, calculating that a megadoc's services are needed. It may also do this if a particular drug is needed that the shipdoc is out of.

Shipdocs contain a much broader range of drugs than indicated in the Medicinal Drugs section, but most are so specialized that knowledge of them yields no game value.

Shipdocs are so-named because they are standard issue for all starships. In impoverished regions or spots isolated from transfer booths, a shipdoc might be the only type of doc available.



Shipdoc

MEGADOC

MAS 200 + 10 per patient capacity

VOLUME: 4m x 4m x 3m high, plus 2m x 1 m x 1 m section per patient capacity

HIT POINTS: 30

POWER SUPPLY: hospital or city generator, auxiliary Fusion I generator

ENERGY DRAW: 0.1/im per unit in action; 360/hour

CAPACITY: normally 4 patients

TREATMENT TIME: square of the patient's damage in hours, divided by 4 (round up all fractions); all hit locations healed at once

COST: 250,000 Stars, plus 50,000 Stars per patient capacity; comes with drugs and organs

Megadocs are the main medical devices of Human Space. The great majority of the inhabitants of every human world live no more than a transfer-jump away from the local Megadoc. They are often organized in banks of several hundred; such numbers allow organ banks of great variety to be assembled and maintained. Megadocs are of such size and require such auxiliary support that they are rarely encountered in spacecraft other than the most magnificent spaceliners of Human Space, or in Kzin military hospital ships.

Megadocs have the widest medical capacity available in Human Space, including the ability to process cadavers for the organ banks and perform autopsies. A megadoc must be commanded by authorized personnel before it will so treat a corpse.

Medicinal and Recreational Drugs

Boosterspice

Boosterspice retards and can reverse aging, to some extent. In the Ringworld era, two types of boosterspice treatments can be taken. There is a yearly injection, which costs about 500 Stars, the effects of which incapacitate the subject for up to a week. These treatments must be taken every year, or the subject will begin to age again rather quickly.

The other fashion is a treatment given every 20 years, requiring up to a month of hospitalization and costing a minimum of 12,000 Stars.

In either style, boosterspice reverses physical aging, restoring the subject to the physical condition in which he or she began to take the drug. Just how long and how successful is a particular treatment varies with the individual.

Some humans are allergic to boosterspice; others are troubled by side effects which do not appear for one or more centuries — including slower healing rates, memory problems, reduced sexual activity, frequent skin cancers, and an easily recognizable 'stretched' quality to the skin.

The drug was first discovered at the Jinxian Institute of Knowledge some 500 years ago. It was synthesized from genetic material in ragweed, a notoriously sturdy plant. At first only tiny amounts of prohibitively-priced drug could be produced. Early versions of boosterspice merely retarded aging. Later versions had regenerative effects; scars disappeared, wrinkles were ironed out, hair pigment returned, etc. Nonetheless, 200-year olds (such as Louis Wu) who claim that they are as vigorous as 20-year-olds overstate the results, for obvious reasons.

MEDICINAL DRUGS

Medicinal drugs are often dispensed by autodocs, and thus are sold in quantities appropriate to autodoc refills. Because of this, medicinal drug costs and vial sizes have been standardized as to dose size. The minimum amount of Superhist normally purchasable, for instance, is 35 doses for 25 Stars. Autodoc sales lines are calibrated for specific lines of drugs; Protek autodocs are rated for Protek drugs, for instance. Drugs are also available for personal use.

A minidoc generally air-injects drugs, but might use suppositories or pills for specific reasons. Shipdocs and megadocs can also use IV drips, gaseous infusions, osmotic patches, skin paints, and so forth. Drugs taken sans autodoc can be found in whatever form is required.

The standard minidoc vial weight is 55 grams, the shipdoc vial weight is 500 grams, and the megadoc vial weight is 4.6 kilos. The shipdoc vial carries 10 times as much as the minidoc, and the megadoc 10 times as much as the shipdoc. All packaging is failsafe. Autodoc vials are not refillable; they are intended to be disposed of, and a new vial inserted.

A Selection of Protek Medicinal Drugs

If using these drugs, explorer characteristics, modifiers, or attributes may need to be temporarily recalculated while the explorer is performing game actions while under the influence.

Some drugs can be administered upon demand from an autodoc; others will be given only when the autodoc perceives their need. The gamemaster always makes the ruling.

CURZEM: broad-spectrum antibiotic which prowls the bloodstream, looking for foreign protozoans and bacteria. Its effectiveness partly depends on blood-type signatures, which the autodoc should know before it administers this drug. A well-stocked autodoc will have tailored dosages of Curzem for each major blood group. Generally a dose shortens an infection by at least 18 hours; multiple doses are without particular side effect. Curzem is not effective against all parasites — the gamemaster must decide whether or not a particular disease-causing organism is susceptible to Curzem.

HEALZEM: used on small cuts, insect bites, and so on which need no other treatment than cleaning. It will repair 1 hit point of damage, but will not affect wounds of more than 1 point of damage at all. The minor wounds helped by Healzem heal in one hour. One-dose Healzem comes in capsules; break the capsule and administer the contents as a coating; when the coating falls off, the damage is repaired.

HELPER: a drug widely used throughout Known Space to eliminate mood. Anger, joy, fear, lust, and so on can be lifted (or flattened) into a pleasant, clear-headed, flexible emotional state within 20 impulses after ingestion. Having reached a state of rational judgment, the user is free to reactivate his or her emotional state; Helper is a time-dampened drug normally deactivating after one minute. A character under the influence of Helper will not experience adrenaline surges or similar physiological reactions to stress.

NOGLO: retards the effects of hard radiation. A dose of Noglo cures 1 point of radiation damage to general hit points every 1 2 hours; no more than one dose of Noglo per 10 MAS points or fraction thereof can be safely administered during a single 24 hour period. Explorers under Noglo treatment are groggy and clumsy, temporarily losing 6 points each of INT and DEX — if either score is reduced to 0 or less, the explorer is bedridden. For serious radiation damage, shipdocs or megadocs are the only useful resources. Noglo is administered only by injection.

NOQUEEZ: NoQueez is administered for motion sickness, upset stomach, and so forth. This drug will not cure hit point damage, but it does act within 10 seconds.

NUMBZ (internal or surface): this painlessly blocks portions of the nervous system. External Numbz blocks receptors on and just under the skin; internal Numbz works on the involuntary and voluntary muscles and must be administered precisely. Numbz never repairs damage, but will allow a conscious character who normally would be incapacitated to perform actions. Internal Numbz is potentially a deadly nerve poison if deliberately misused. External Numbz can be bought as a waxy stick which is rubbed onto the painful spot.

PROTEK: the first drug developed by Protek, this drug combats viruses by raising the body's immune level for seven days. A 12-hour fever follows immediately after administration of the agent, causing temporary loss of three points of CON for that period. Actual efficiency against a particular virus can be determined only by the gamemaster, but Protek is fairly effective. It works on the vast majority of rhinovirus types causing the common cold. Available only by injection. If two or more doses of Protek are taken within a seven day period, each additional dose acts as a type B poison, potency 6.

RUSHEM: temporarily increases an explorer's endurance and general conditioning: for six hours his or her CON and STR each temporarily increase by 3 points. Side effects include irritability and the temporary loss of 3 points each of both DEX and INT. This drug is available on demand only from an autodoc, but the autodoc can override the request due to an explorer's condition. An autodoc can administer a dilute Rushem as a recreational drug. Multiple doses of Rushem have a cumulative effect, but with each additional dose beyond the first, the explorer must succeed on a health roll or his CON will be permanently reduced by a point after the drug wears off. If Rushem reduces INT or DEX to zero or less, the explorer goes into a coma for the drug's duration.

SNOOZEM: an excellent sleeping drug, Snoozem works quickly and pleasantly. One dose puts an explorer to sleep in the same number of impulses as his or her MAS. There are no recorded side-effects, but the user does not dream. The user will sleep for 1 D6+2 hours, and will be unable to wake (or be awakened) before then unless the Snoozem is countered by Soberup. Wake'em does not counteract Snoozem. Each additional dose beyond the first acts as one dose of class D poison, potency 8.

SOBERUP: useful for curing hangovers, for recovering quickly from recreational drugs and from drugs in general, and for treating class C poisons. One dose of Soberup neutralizes one dose of any listed recreational drug or one dose of any class C poison. It will reduce the effects of class A or B poisons to those of class B or C, respectively. Unless an explorer can roll under his health roll x 2 on D100, each additional dose of Soberup will act as a dose of class C poison (which cannot be healed through the use of Soberup).

SUPERHEAL: a more-powerful form of Healzem, useful in treating any wound or incision. One dose of Superheal removes 1 hit point of damage per day. Only one dose of Superheal can be administered to a single damaged location. Additional doses of Superheal will be wasted without different locations for them to heal. Plastiskin bandages or bonder will be needed for wounds of 2 hit points or more. Superheal comes in applicator bandages which are sealed directly over the wound.

SUPERHIST: general-purpose antihistamine group; most efficient when a specific blood group has been entered into the minidoc. The gamemaster must rule on particular effects, dosages, and efficiencies.

VACCIPLUS: specific against bacterial toxins. It lowers the effects of such toxins by two levels per dose. If an explorer swallowed one dose of a class A bacterial poison, a dose of Vacciplus would lower the effect to class C. Additional doses will not change the level of effect. Vacciplus will temporarily cure all symptoms in an explorer afflicted by a bacterial disease, but will not help cure the disease at all, and within a day or so, he will again fall ill. This drug has no effect on non-bacterial poisons.

Standard Protek Autodoc Drug Packs

		doses contained/cost of drug		
drug	*single dose*	*minidoc vial*	*shipdoc vial*	*megadoc vial*
Curzem	1/1 Star	25/25 Stars	250/200 Stars	2500/1500 Stars
Healzem	1/.5 Star	50/25 Stars	500/400 Stars	5000/3000 Stars
Helper	1/2 Stars	1 50/300 Stars	1 500/2400 Stars	15,000/18,000 Stars
Noglo	1/10 Stars	10/100 Stars	100/800 Stars	1000/6000 Stars
NoQueez	1/.2Star	25/5 Stars	250/40 Stars	2500/300 Stars
Numbz (internal)	1/4 Stars	75/300 Stars	750/2400 Stars	7500/18,000 Stars
Numbz (surface)	1/.1 Star	85/8.5 Stars	850/68 Stars	8500/510 Stars
Protek	1/3 Stars	25/75 Stars	250/600 Stars	2500/4500 Stars
Rushem	1/.4 Stars	25/10 Stars	250/80 Stars	2500/600 Stars
Snoozem	1/.1 Stars	25/2.5 Stars	250/20 Stars	2500/1 50 Stars
Soberup	1/1 Star	100/100 Stars	1000/800 Stars	10,000/6000 Stars
Superheal	1/2.5 Stars	50/1 25 Stars	500/1000 Stars	5000/7500 Stars
Superhist	1/1 Star	35/35 Stars	350/280 Stars	3500/2100 Stars
Vacciplus	1/22 Stars	25/550 Stars	250/4400 Stars	2500/33,000 Stars
Wake'em	1/.5 Star	25/12.5 Stars	250/100 Stars	2500/750 Stars

WAKE'EM: a drug useful for explorers who need to remain continuously awake for longer than usual. Each dose allows an explorer to stay awake for 12 continuous hours. Multiple or subsequent doses will extend the period of wakefulness. Each period of Wake'em non-slumber costs the explorer 1 point each of INT, CON, and APP, cumulatively. If an explorer were to take two doses in order to stay awake 24 hours longer than usual, his INT, CON, and APP each would drop by 1 point during the first 12-hour period, then by another point during the second 1 2-hour period. When INT or CON reach 0, the explorer will fall into a sleep automatically, and this sleep will last for a period of time equal to the remaining hours of Wake'em effect plus 1/2 the hours he remained awake until then. Soberup will immediately cancel the effects of Wake'em. After using this drug, the explorer's statistics will remain lowered until he has slept for a time equal to half the period for which he extended consciousness.

RECREATIONAL DRUGS

Recreational drugs can be dispensed by autodocs, but are also available in individual doses or through vending-machines. Recreational drugs are not dispensed by Protek megadocs, but are available in minidoc and shipdoc vial sizes. Standard minidoc vial weight is 50 grams, and shipdoc vial weight is 500 grams. All packaging is failsafe.

Special Notes for Recreational Drugs

Most Human Space societies tolerate the use of recreational drugs. Autodocs cannot administer alcohol as a recreational drug — it is too dangerous.

Shipdoc recreational drugs are often programmed 'out of use,' to provide a general shipboard reserve when minidoc supplies run out. Minidocs normally administer recreational drugs aboard ships; this yields a workable mixture of privacy and medical monitoring.

All comments on recreational drugs assume that the autodoc administers standard one-dose units to the explorer; it is impossible to exceed this limit when receiving drugs through an autodoc. In general, recreational drugs are time-release in nature anyway, making overdose more difficult.

Recreational drugs can be purchased in most mental health stores or entertainment complexes.

A Selection of Recreational Drugs

CIRCUS: a social pheromone-linked mood-elevator, triggered only when the user is with other humans. It raises the spirits of the user by a precalculated amount, but commonly some get more exuberant than others, a possibly frustrating consequence. The effect lasts for about three hours.

DREEMZ: a hallucinogen frequently used by non-verbal artists. It creates fantasies, visions, and other distortions of perspective. One dose of Dreemz lasts one hour for an individual with a MAS of 10 and 30 minutes for an explorer with a MAS of 20; prorate the interval.

EUCLID: concentrates the intellectual consciousness of the user, suppressing emotional and intuitive input. It is sometimes used by people who must solve or comprehend complex problems not requiring creative thought or by those who must perform elaborate processes without significant mistakes. The effect temporarily raises INT by 3 for six hours, but eliminates all creative thinking on the part of the user. A competing brand is called Robotol.

FRENZY: those with mild to strong depression or frustration can request this useful cathartic. The effect lasts for about 1 5 minutes, during which time the user frantically indulges in random physical activity. Since it cannot predict what the patient will do, any autodoc will require a no-fault contract with the user before administration. The user ordinarily puts himself within a room or enclosure where personal injury is unlikely to result.

FRISKY: a less-powerful version of Circus usable when alone; it also lasts 3 hours.

LORELEI: named after the immortal Lorelei Huntz, this drug suppresses most of the abstract functions of the brain, leaving the user a quivering bundle of emotions and memories. The effect is shattering when used with a depressant such as alcohol. It lasts one hour.

MELLOW: a languorous, contemplative version of Circus, the effect of which lasts about three hours. It can be used as a social drug, and traditionally is combined with Rowzem for purposes of seduction.

MNEMO: suppresses the exterior functions of the senses to a minimum; the user is free to respond to outside stimulus, but feels no haste nor compulsion to do so, and no regret if he does not. Under Mnemo's sway, the brain preoccupies itself by replaying memories. A dose of Mnemo lasts four hours; users frequently report profound perceptions and self-understandings after an experience. It is sometimes possible to dredge up specific memories from long ago with this drug.

PINHEAD: shuts down most of the brain's activities except for short-term memory, autonomic responses, and sensory perception. Pinhead was originally a Panamanian worker-control drug, but a small group of devotees now enjoy the sensation. Occasionally Pinhead prompts inanely antisocial behavior, and use of it requires a no-fault contract if administered by an autodoc. Wives frequently accuse husbands of being on Pinhead. A competing brand is known as Do.

ROWZEM: message drug tailored to increase blood flow and pressure to human primary and secondary sexual characteristics. Used by both sexes. The effect lasts for about two hours; it may be unperceived by some and may make others slightly uncomfortable. Its purpose is purely aphrodisiacal.

RUSHEM: in its dilute form as a recreational drug, Rushem causes the user to act more decisively and more aggressively for about an hour, adding 1 to the POW characteristic. One dose of this mild form costs the user a point of CON, temporarily.

SUPERMAN: creating a sense of exaltation and infinite capacity in the user, Superman frequently is combined with other drugs. It lasts for 30 minutes, then, almost instantly, the effect fades. Timed-release maintains a plateau of effect. May require a no-fault contract with the autodoc.

WOWZEM: generates great enthusiasm in the user, a state lasting interminably (about three hours). Everything becomes astonishingly wonderful and miraculous. Wowzem users find good in everything — while in their starry-eyed trance they can be robbed, assaulted, and bludgeoned without resistance. States of religious transcendence have been reported. The drug causes the user to talk endlessly and vacuously, meaning everything but saying nothing. Users say that transcriptions of their words somehow fail to communicate the essence of their thoughts. People refuse to go near someone on Wowzem unless they want to steal or borrow from him.

Recreational Drug Packs produced by Protek

	doses contained/cost of drug		
drug	*single dose*	*minidoc vial*	*shipdoc vial*
Circus	1/.6 Star	25/15 Stars	250/120 Stars
Dreemz	1/.2 Star	25/5 Stars	250/40 Stars
Euclid	1/13 Stars	10/130 Stars	100/1040 Stars
Frenzy	1/200 Stars	1/200 Stars	10/1600 Stars
Frisky	1/1.5 Star	20/50 Stars	200/400 Stars
Lorelei	1/.4Star	25/10 Stars	250/80 Stars
Mellow	1/.1 Star	50/5 Stars	500/40 Stars
Mnemo	1/2.4 Stars	25/60 Stars	250/480 Stars
Pinhead	1/.3 Stars	11/3.3 Stars	110/26.4 Stars
Rowzem	1/6 Stars	25/1 50 Stars	250/1200 Stars
Rushem	1/.2 Stars	10/2 Stars	100/16 Stars
Superman	1/.1 Star	25/2.5 Stars	250/20 Stars
Wowzem	1/.3 Star	25/7.5 Star	250/60 Stars

Other Aids and Items

KZIN MILITARY MEDICAL FOAM

Available only as gifts from the Patriarchy or through black market dealers in Human Space, this orange foam is sprayed out of a pressurized container and quickly hardens to form a protective cushion over the wound.

In one day this foam will heal D6 hit points of damage to a particular location. It then peels off, and must be re-applied for further healing. A container covers 20 hit points

of damage (application varies with the shape and depth of the wound) and costs 20 x 1 D3 Stars, when it can be found. This foam always leaves visible scarring, and some believe that with its use scarring actually increases. Many humans, having paid an exorbitant sum for it, are consequently disappointed by Kzin military foam.

OXYTAB
Protek

A remarkable semi-living breathing agent, Oxytab (an enormous capsule nearly 3cm long) dissolves upon removal of the protective film and total immersion in water. Held between the teeth, it quickly (four impulses) turns to a membrane covering mouth and throat through which gases can pass, but not water. Most importantly, it separates oxygen from water on the way in, and allows waste gases to escape. A human with an Oxytab filter can breathe normally underwater for nearly 30 minutes before the life-span of this plant-creature is ended. Cost is only 2 Stars; everyone in Human Space has used Oxytabs to plod around at the bottom of rivers and lakes. An Oxytab causes uncontrollable gagging in any explorer not used to using it unless his or her player succeeds with the explorer's health roll.

PLASTISKIN

WEIGHT: 0.2 kg

VOLUME: various sizes, totally 100 sq cm

COLOR: Will change color to match the skin color of the wearer

COST: 1 Star per box

Resembling skin, plastiskin bandages are slabs of long-chain organic molecules which protect cuts and wounds while allowing them to breathe. Properly color-matched plastiskin is virtually unnoticeable when placed over a break in the skin, except that the area is somewhat more shiny. The bandage sets almost immediately, and does not require sticky adhesives. Plastiskin heals 1 D3 hit points in a week and then peels away by itself; if removed before it drops off, establish an injury to that hit location by rolling 1 D3 for healing and another 1 D3 for damage, not to exceed the original damage.

PROSTHESES

Transplant-resistance has not been conquered even in the Ringworld era; fortunately prosthetics technology has become quite advanced. For 300 years Akco Prosthetics (Earth) has been the major producer of human prosthetics.

Prosthetic limbs look and feel like real ones. Prostheses can be adjusted in pigmentation to match the current pigmentation of the wearer. They must be custom-made for each wearer, and consequently cannot be brought to Ringworld in anticipation of an accident — but must be purchased on the transplant resistant's return to Known Space.

The STR of a prosthetic limb can be adjusted from 10 to 20, as the wearer needs. Make any STR rolls using the average of the prosthetic limb's STR and the explorer's STR. Explorers should use high STR prosthetics with caution, so as to not tear muscles or inflict hernias.

Explorers with a prosthetic limb lose 1 point of DEX. Those with two prosthetic arms take a 3-DEX penalty; those with three or four prosthetic limbs take a 5-point DEX penalty. Additionally, explorers with two prosthetic legs lose 1 m/im of speed walking, and 2m/im of speed running.

There have been rumors for centuries that the ARMs have a highly-developed cyborg division which regularly turns out supermen. No such rumor has ever been substantiated or proven.

PROTEK MEDISCAN

WEIGHT: 0.5 kg

VOLUME: 3 x 6 x 8 cm

HIT POINTS: 2

POWER SUPPLY: battery 36/1/.008/N

ENERGY DRAW/IM: 0.001

LIFE OF BATTERY: 10 hours

COST: 18 Stars

To understand this diagnostic device, the explorer must have at least 1 5% Biology and 25% Emergency Treatment skills. The mediscan is essentially the detached diagnostic unit of a minidoc, and has no capacity to actually perform medical treatment. The mediscan can diagnose illness and injury in humans with a 90% chance of success. Failure indicates mis-diagnosis.

TANNIN PILLS
Pioneer Supplies, Gummidgy

These pills darken the user's pigmentation. They can be used both cosmetically, and as a protection against high levels of ultraviolet. Tannin pills are sold in packages of 25 for .099 Stars, and in packages of 100 for .485 Stars.

VERINOL
Government Issue

Usually present in a shipdoc, on UN-registry spacecraft Verinol is demandable and administrable only by the ship's chief executive officer. The subject becomes quiet and cooperative for about 30 minutes, answering all questions put to him as best he can. He obviously cannot answer questions concerning things he knows nothing about.

TOOLS

This book presents a handful of the devices, equipment, fields, weapons, and other technology available to residents of Human Space. Many of the items are commonly available throughout Known Space.

TOOLS

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AUTOKITCHEN
Renfield Autochef

MAS: 31 (375 kg)

VOLUME: 2m x 1 m x 1m

ENERGY USED: 5 per meal

POWER SUPPLY: ship's generator or city power beam

SPEED OF OPERATION: 1 meal generated in 30 seconds

COST: 750 Stars

A Renfield food processor will make any dish in its repertoire and can try to duplicate any new food offered to it. The new food may differ in texture, taste, or color, but it will be recognizably similar. An autochef must be fed adequate raw materials — it cannot make food from nothing or from inorganic materials.

A food processor can be altered to perform some of the jobs of a Refiner, such as refining particular elements, simple compounds, or organic molecules. To do this, an explorer must receive successful skill rolls in Computers, Repair, Engineering, and Physics, using appropriate branch skills. Additionally, a link is needed through a computer to a memory bubble containing the data pertaining to the required compound or element.

A building or spacecraft generally has 2-3 processors per 50 users, and carry as well an emergency unit on the bridge. Since only one meal can be synthesized at a time, there should be enough units that there is little waiting and so that humans may eat together.

The average food processor is built into a ship or house and cannot be moved. Its weight includes radiation shielding. Shipboard food processors always are included within the ship's recycling system; reprocessed human wastes are the most important source of food.

CLOTHING PROCESSOR

MAS: 21 (165 kg)

VOLUME: 1m x 1m x 1.8m

ENERGY USED: 3/im

POWER SUPPLY: usually connected to a generator

SPEED OF OPERATION: 2 impulses per MAS point of human customer covered

COST: 1 959 Stars to buy a unit new, but many used models are for sale. Most clothing processors are coin-operated devices in public locations; a garment will cost 1 centistar to 1 decistar, depending on the material used.

Ready-to-wear clothing can be obtained from these machines, so long as the gear is made up of organic molecules. A clothing processor produces clothing in styles standard to the planet or system of manufacture; most machines include an up-date display, so that the fashion approach of the processor is known.

The standard clothing processor works from one type of fabric only. The machine can create different weights of the fabric. Cuts, patterns, and colors vary at the whim of the orderer. Raw material may not always be available if clothes have not been recycled or if the commercial machine has not been recently serviced; most ship captains will make sure that their manifests include several bars of hydrocarbons with which to feed the processors.

Clothing processors can cloth alien shapes, but without massive re-programming, the fit will be faulty.

COMDISC

WEIGHT: 250g

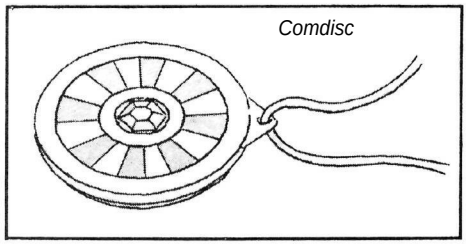
VOLUME: 10cm diameter disc

ENERGY USED: 1 per 10 minutes of use

POWER SUPPLY: battery 100/1/25g/R

RANGE: 20 km in all directions — optional tight-beam microwave transmitter extends range to 100 km (direction of receiver must be known).

COST: 40 Stars + additional 30 Stars for optional microwave transmitter



Comdisc

The comdisc is an audio-only communications device normally used by explorers to communicate between themselves or with a base station while widely separated. For short-distance communication, the visual-transmitting 'tracy' is commonly used.

This device is a disc, slightly thicker in the center than at the edge. At one side of the disc is a digital keyboard allowing the user to select a proper frequency. The other side, at the touch of a pressure-plate, extends into a memory plastic dish-shaped antenna used both for transmission and reception of radio signals.

A detachable microwave transmitter is available for the comdisc, greatly increasing the range of the device, but requiring that transmissions be broadcast in a particular direction. Comdiscs not equipped to transmit microwave transmissions may still receive such signals.

With a comdisc and the proper codes, an explorer can access directly into a computer to use any library or probe subsystem.

CRASH WEB

WEIGHT: 2.75 kg

VOLUME: generator is 0.4 cubic meters plus 0.2 cubic meters per person to be protected

ENERGY USED: 10/im per person

POWER SUPPLY: vehicular power source

ARMOR VALUE: 30 (for machine itself)

HIT POINTS: 10

COST: 40 Stars + 10 Stars per person

The crash web generator creates a force field which becomes instantly operational in the event of a crash. They are most often used in vehicles, but are deployed in spacecraft as well. The web's field is yielding, cushioning and absorbing impact caused by high-energy, wide-area impacts. Damage caused by such impacts is reduced by 90% (drop all fractions). Slow-motion movement is possible within a crash web, and it is possible to escape one. Crash webs have no effect on small, high-velocity projectiles.

DEEP-RADAR

Deep-radar is used to detect and image normal and collapsed matter in normal space. Matter appears on the deep radar screen as a pale, translucent, tridee image showing the surface and internal structure of all but the densest substances — collapsed matter, or other objects which reflect or absorb a significant percentage of neutrinos. The denser a mass, the darker is its deep-radar image. For example, the deep-radar image of a G-type star is a wide gray disk, darkening gradually to near-blackness at the center. Stasis fields (which reflect nearly all incident neutrinos) appear on the screen as nodules of pure black. Stasis fields are easily found using a deep-radar set — but slaver stasis-boxes, which appear as tiny black flecks, are far more difficult to spot. Deep-radar sees right through GP hull material.

Ringworld-era deep-radar operates using low-power hyperwave pulses induced by bursts of stimulated neutrino emission — it is the only form of hyperwave which can be used in a gravity well. The wave travels at approximately 5 times lightspeed (a rate equal to an unstable hyperspace quantum resonance), providing almost instantaneous information about objects within range of the set's beam.

No direct doppler effect occurs (the hyperwave uncertainty principle permits only positional information about an object), but velocity can be approximately calculated by plotting the intervals of successive pulses. Objects moving at near-lightspeed appear distinctly blurry. The hyperwave uncertainty principle allows deep-radar images only as probabilities; the higher the density of the object shown, the greater is the probability that the object really exists in the space shown by the deep-radar. Ghostly, hard-to-see images hold the most detail.

Though deep-radar operates faster than light, it cannot be used for communication, within a gravity well. Randomized nuclear-field resonance reflection and the hyperwave uncertainty principle prevent information transmission along a deep-radar beam faster than lightspeed, though the beam itself does travel faster, in much the same way that changes in phase can travel sent along a radio band faster than light, but cannot carry information faster than light.

Within a gravity well, the use of a deep-radar set can be detected only from its pulsed neutrino emission by other deep-radars. Outside gravity wells, detection by hyperwave sets is possible. Hyperwave sets, though, cannot pinpoint the direction or distance of deep-radar emissions. Use of deep-radar is usually forbidden near hyperwave relay stations because it interferes with normal signal traffic.

The hyperwave boundary at the edge of a gravity well blocks deep-radar scans from sets beyond; but pulses from within a well travel outward and reflect normally. (Neutrino emission is unhindered by the boundary.)

To examine any but the largest or most obvious objects, a deep-radar set must be focused. Through focus, the interior of some dense objects can be discerned, or extremely small or light objects seen. Resolution is very poor, and deep-radar is often relegated to scanning large areas — if anything interesting crops up, other sensors come into action. In all cases, the image cast by the surface of a stasis field is completely black.

Two types of deep-radar sets are commonly available in human space: ship's deep-radar, and portable deep-radar. Specifications on these are provided below.

SHIP'S DEEP-RADAR

MAS 50 (2000 kg)

VOLUME: 3m x 4m x 3.5m

ENERGY USED: 100/im

POWER SUPPLY: ship's generator

RANGE: 16 billion km maximum; varies with density of object

COST: 23,000 Stars

This form of deep-radar set is bulky enough that it is generally only used on full-scale starships. Its range encompasses entire solarsystems.

PORTABLE DEEP-RADAR

MAS 3 (13 kg)

VOLUME: 30cm x 50cm x 1m

ENERGY USED: 12/im

POWER SUPPLY: vehicle power supply

RANGE: 100 km

COST: 1000 Stars

This form of deep-radar is used in small planet-bound vehicles. Its short range severely limits its use.

DOLPHIN'S EARS

WEIGHT: 50 g, plus battery pack

VOLUME: fits as a headset over human ears, connected by microcable to battery unit

ENERGY USED: 1/10 minutes

POWER SUPPLY: any battery or generator

COST: 30 Stars

These compact headsets permit the hearer to localize sound sources and, to some extent, to discern hidden objects through their acoustic properties. These units are based on the anatomical structure of a dolphin's sonar sense, incorporating small resonance-transducers to produce the sensation of three-dimension acoustic space.

Dolphin's ears come in two models: underwater and air. Those designed for use underwater increase the user's Listen skill by 65 percentiles while worn. Those designed for use in air only increase the Listen skill by 25 percentiles while worn.

DROUD
various manufacturers, legal, reliable, and otherwise

WEIGHT: 5 to 25 grams

VOLUME: 2 to 100 cc

ENERGY USED: .001/im

POWER SUPPLY: connects to a generator or wall socket. If battery-powered, the battery is usually about 100/1/25/N

COST: 40 to 60 Stars where legal; 400 to 1000 Stars where illegal

A droud is a portable, concealable device which, by artificial circuitry, connects to the pleasure center of a current addict's brain. A droud may plug into a wall outlet or be battery-operated.

The current trickles into the wirehead's brain, causing profound contentment and ecstasy. The experience frequently leaves addicted personalities uninterested in anything else. Eventually, wireheads usually die of starvation or dehydration as their personalities disintegrate and they finally cease to bother to turn off the units to allow for sleeping, eating, etc.

Drouds are cheap to make, and there have been many different designs over the centuries. They can be as small as a walnut, or as large as a fist. Drouds normally have only one output. Even where drouds are legal, wireheads are held in contempt or pitied by those who learn their shameful secret.

A droud socket must be surgically implanted in the subject's head, allowing the droud to connect directly to the pleasure centers of his or her brain. Drouds are very addictive, and are thus illegal in spots, though most Human Space governments refrain from involvement in personal behavior.

Any shipdoc or megadoc can remove the brain-implanted socket for a droud. A socket can be reinserted by a shipdoc or megadoc under deferential control.

EXPLORER PACK (Standard)

WEIGHT: 2.5 kg loaded

VOLUME: 0.25 cubic meters, plus Spartan unit

ENERGY USED: see specific item description

POWER SUPPLY: see specific item description

COST: 100 Stars or more, depending upon primitiveness of planet (generally costlier on more civilized worlds); unavailable on non-human worlds

While explorers are free to equip themselves as they wish, the Standard Explorer Pack is a good list of equipment from which to design one's own personal set. Parenthetical numbers after the equipment indicate the number of pieces of that item, or the number of doses for drugs.

If players do not specify explorer equipment, the gamemaster can fairly assume that the character has the usual pack, which is complete for short reconnaissance missions.

item	*number included*
comdisc	1
lensmen	1
lumes	3
hullmetal knife	1
medical drugs:	
Curzem	5
Euclid	5
Healzem	2
Noglo	3
NoQueez	2
Protek	10
Rushem	5
Snoozem	2
Soberup	4
Superheal	10
Superhist	5
Vacciplus	5
Wake'em	8
bug spray	1
Yum-Yum food concentrate	4 bars/4 days
water purifier w/cup	1
Spartan long-range suit, boots, hat	1

This equipment is arranged in a fitted day pack or fanny pack. The Spartan suit combo does not fit in the pack and is meant to be worn: it is a comfortable, breathing, jump suit with shoes that shed water; it weighs about another half kilo.

GRAVITY GENERATOR

WEIGHT: 100 kg

VOLUME: 10cm thick x 4m diameter disc

ENERGY USED: 90/im

POWER SUPPLY: building or ship's generator

COST: 2750 Stars

These mechanisms create an artificial gravity field, affecting everything within the directional net provided with the generator. The generator is always exterior to its field, though it may be within another gravity field.

A gravity generator can help to move a massive object by lessening the local gravity. Though its mass does not change, the object's weight lessens, so that one persistent human can move large components. The mover must not forget that he must put as much effort into stopping an object moving under zero-gravity conditions as he spent getting it moving.

If a gravity generator is used to increase gravity, everything within the net becomes heavier. Trees and plants might fold and snap under their own weight, while animals and people fall helpless.

A gravity generator is shaped like a massive doughnut with a grid net tightly woven in a hexagonal pattern — like metal caning — across the center. Around the outside edges of the generator are connections for the net. The shape of the net defines the shape of the field. The net is constructed from a flexible metallic substance weighing 1 kg per square meter of surface.

When the generator is turned off, the net can be hand-shaped to any configuration, but when the generator is activated, the net becomes rigid and cannot be bent — though sufficient force will break it, thus turning off the field. Outside the net is a set of controls, which can be removed as far as 3 meters from the generator itself.

The gravity within the net is relative to outside gravity, and portable models (such as that described here) can only adjust the vector by two gees along the dominant axis. For example, on Earth (1 gee) a gravity generator can adjust gravity within the net to three gees, negative one gee, or any quantity in between; using the floor or the ceiling as the floor — never a wall. Gravity so generated is relative cumulative with or subtracted from the effect of the acceleration of a starship, or the centripetal force which acts like gravity on Ringworld.

Starships carry massive gravity generators called gravity stabilizers which have capacities up to 20 gees (at some risk of burn-out, up to 30 gees). These units coordinate with the ship drives, and maintain stable cabin gravities even under the strain of evasive maneuvers, though the shock of an explosion or jar would not be cancelled.

Though one net can nest within another while activated, the nets may not intersect. If this occurs, the generators will break down, and emit bursts of gamma radiation.

Ship gravity generator nets are built into the cabin walls, and the gravity stabilizer's net is painted with conductive paint onto the hull (inside the stasis field if there is one).

Gravity generators are energy-expensive, and always depend on generators for power. Gravity generators have a maximum-size

Portable Gravity Generator Table

model	*net area (sq. m.)*	*weight (kg)*	*cost (Stars)*	*energy cost per impulse*	*max. door opening (sq. m.)*	*diameter of generator disk*
1	3	3	250	20	.75	30 cm
2	6	7	475	50	1.50	60 cm
3	12	13.5	950	60	3.00	80 cm
4	20	19.0	1300	120	5.00	1.2 m
5	36	32.0	1600	250	9.00	2.0m

opening which the net can sustain without harming the field. These openings are included in the nets for doorways.

HOLO CAMERA
(Single Frame, Still Image)

WEIGHT: 200 g

VOLUME: 14 x4 x 10 cm

ENERGY USED: 1/day of continuous operation

POWER SUPPLY: Battery 4/1/1g/n

HIT POINTS: 3

COST: 12 Stars for camera body; 10 Stars for macrotelephoto lens; 0.5 Stars per print cartridge.

This simple device shoots and develops a still holoprint in 5 impulses. It is aligned to the response of the perfect human eye, and takes exactly the image visualized by that standard. Speed, aperture, and depth of field adjust independently. A flash unit can be attached. Manual-setting capability is available. The macrotelephoto lens can enlarge objects of any size at any distance to 100X.

The holohelper (250 Stars) is a radio-controlled lift belt levitating the holocam and demand-snapping pictures. An optional monitor (100 Stars) shows framing. The helper has a fusion 1 generator. Controls are line-of-sight; control signal range is 100 meters.

HYPERPHONE

MAS: 25 (3.5 kg for ship's transmitter/receiver; 225 kg for expeditionary hyperwave station)

VOLUME: ship's model, 0.5 cubic meters; station model, 7.8 cubic meters

ENERGY USED: ship's model, 1/im; station, 25/im

POWER SUPPLY: ship's model from ship's generator; station model fusion 1 generator

HIT POINTS: ship's model 20 hit points; station model 100 points

ARMOR VALUE: ship's model 10 points; station model 50 points

COST: 750 Stars for ship's model; 15,000 Stars for station model

The hyperphone allows quick communication over interstellar distances.

Hyperwave was developed independently by humans as a result of work relating to the construction of early hyperdrive shunt units during the first Man-Kzin war. It became commercially available in the mid-2400's, 20 to 30 years after the close of the war.

Like hyperdrive, hyperwave will not work within the gravity well of a star. All major Known Space worlds have hyperwave relay stations just beyond the perimeter of their gravity well. Laser or microwave relays link such stations with the interior planets. Earth's Southward station is over five light hours from Earth; therefore it takes time to communicate over interstellar distances, even though hyperwave itself is virtually instantaneous.

Hyperwave will not cross a singularity; major systems routinely support six hyperwave stations at their well-perimeters to receive transmissions from every direction, and by interstellar agreement re-route calls if necessary.

Hyperwave transmissions travel on an almost infinite range of bands. Anyone who has a receiver can track to the band being used and listen in on the transmission relatively quickly, so most hyperwave transmissions are sent in sophisticated squib code, for secrecy.

Hyperwave transmissions can be transmitted and received by ships travelling in hyperspace. Most Ringworld Era interstellar ships are equipped with a hyperphone. Some colony and exploration ships carry the equipment to set up a hyperwave relay in their destination system. Though this equipment is expensive, it can prove invaluable during the mission.

LENSMEN (LMBs)

WEIGHT: 15g, 335 g microcircuitry and battery

VOLUME: fits over human eyes; headband-connected microcomputer and battery

ENERGY USED: 1/hour

POWER SUPPLY: battery 280/.3/285/R

COST: 39 Stars

Lensmen are almost weightless combination binoculars and sunglasses which are worn like a dark mask over the eyes of the user, giving the wearer a racoon-like appearance. Some models are gray. Light amplification, enhancement, filtering, and magnification functions are performed by a microcomputer attached to the headband of the device. As the head moves, the sensors on the outside of the mask accept a constant 140 degree image and relay it to the microcomputer. According to how the pressure relays on the microcomputer are pushed, magnification increases or decreases, light is amplified or dimmed, enhanced or diffused, or UV or IFR frequencies are displayed.

Display takes place on the inside of the goggles; usually enough information is present that the display can be holographic — but it may be two-dimensional where there is inadequate general EM radiation.

LUME
Consolidated Electric, Earth

WEIGHT: 100 g including battery

VOLUME: 4 cubic cm, many shapes

ENERGY USED: 1/hour

POWER SUPPLY: battery 336/1/84g/N

LENGTH OF OPERATION: 60 UNS days

COLORS: standard soft white; many colors

COST: 0.1 8 Stars

Lumes produce a soft light without consuming much energy, or generating much heat. One lume can continuously illuminate a room for about two months; then it dims and is thrown away and replaced. The light switches on or off, and is dimmable. Any side of the lume can be opaqued by rubbing the hand down the surface, giving directional illumination.

MEMORY PLASTICS

Memory plastics consist of a broad family of memory pulleys, coils, straps, connectors, furniture, and devices which are molecularly-preprogrammed to change to a particular shape or size, either constricting or enlarging after application of chemical or electrical triggers.

Memory Coils

Specific-purpose memory coils are a vast, not easily summarized family. The coils included here are general-purpose designs used as ties, clamps, connectors, and so on. Most coils are a centimeter or less wide, and arranged in several or many flat, concentric loops. Nearly all are cheap, throw-away substitutes for archaic heavy-duty pulleys, straps, and mechanical saws. All have maximum expansions, and all contract to a diameter 1/100th of their length.

Memory coils can cut down trees, pull jail cell bars together, hoist vehicles, crack walnuts, open cans, power spring-action toys, hold gear to the hull of a starship, haul in

Direx Sample Memory Coils Table

ID color	*max. extension*	*initial MAS*	*one-gee lift (kg)*	*maximum force exerted*	*tensile strength*	*cost per coil (Stars)*	*catalyst required*	*can be dissolved?*
black	1m	negligible	2000	3000 kg/sq cm	25000 kg	0.09	Direx X	no
grey	2m	negligible	4000	3000 kg/sq cm	25000 kg	1.20	Direx A	yes
red	4m	negligible	4000	500 kg/sq cm	50000 kg	1.99	Direx X	no
orange	8m	negligible	8000	500 kg/sq cm	50000 kg	2.50	Direx A	yes
yellow	16m	small	16000	1 50 kg/sq cm	50000 kg	2.99	Direx B	yes
green	32m	small	24000	75 kg/sq cm	100000 kg	5.99	Direx X	no
blue	64m	MAS 1	30000	75 kg/sq cm	120000 kg	7.69	Direx X	no
white	128m	MAS 2	10000	50 kg/sq cm	150000 kg	9.99	Direx B	yes

big fish, act as emergency tourniquets, and much more.

Some memory coils have lateral break lines which can be manually separated for required lengths. Some coils can be dissolved by a chemical catalyst when they have served their purpose; others must be disintegrated, burned away, or cut to be removed. Some can be expanded or contracted through the use of chemical agents or electric current. Some are electrical conductors or superconductors.

Catalysts for Direx Memory Plastics

catalyst	*cost per application*
Direx A	0.2 Stars
Direx B	0.5 Stars
Direx S	5.5 Stars
Direx X	0.3 Stars

Superconductor coil of 0.01 mm gauge is available, with a maximum length of .5m and a minimum contraction of 5 cm. It has a tensile strength of 2500 kg. The catalyst used is Direx Q, and the price is *24.99 each.

The Patriarchy frequently uses memory coils as torture devices, the so-called 'convincing coils.' These small units are routinely carried as standard equipment in a pouch or in kzinti police vehicles. A convincing coil is simply placed around a limb of the being who is under questioning. The coil is made of a memory plastic which begins to tighten once it has been extended to wrap around an arm, a leg, etc. The extension trips the embedded shape of the coil, which continues to tighten until the interrogated being's member is severed. The final diameter of the coil is 1 cm; it can be extended to a diameter of 1 m or more. The contraction of the coil is sufficient to sever limbs of any hominid or alien species described in the Ringworld game, but it may not be sufficient (at the gamemaster's option) to bisect steel or other dense material. A convincing coil, depending on the type, takes a few minutes up to an hour to close.

The convincing coil can be removed at any time by pouring a few drops of catalyst on it, causing the entire coil to dissolve. A single coil can be used only once.

Memory Tools (water tools)

Direx of Down markets tool kits of memory plastic. A small (12x19 cm square, 0.1 mm thick, weight 5 g) page of memory plastic is imprinted with the specifications of the tool (a hammer, for instance). By placing the page into a container holding a specified volume of distilled water, the molecular instructions encoded in the page reorganize the plastic and the water into a graspable tool. This much of the procedure generates a tool which will last for one UNS hour, then dissolve. (In a famous accident, a flycycle laden with such tool kits fell into a river on Home, damming completely the river for an hour, and then releasing a disastrous flood.)

Adding a prescribed electrical charge to the solution generates a tool lasting for one UNS day (50% failure chance each UNS hour thereafter). Applying a maintenance coating extends the life of the tool to 7 UNS days, after which it irrevocably dissolves to an unusable mess. Tools inadequately or improperly prepared fail half the time.

Spacecraft routinely carry books of memory tools for emergencies. Multiple sheets of the same item are available in large quantities at most tool shops.

Such tools are commonly simple mechanical devices (perhaps with molecular gears), special containers, elementary hammers and shears, and so on. Similar sheets duplicating the properties of specific elements, compounds, and alloys (but not formed to any specific shape) are also common, though the users may have to add rather spectacular amounts of water and energy to upgrade to the equivalent of the heavier elements. Such materials sheets will yield a mass equal to the mass of the ingredients, minus 1%.

Sample Direx Memory Tools Table

item	*price in Stars*
hammer (book of 10)	0.49
flesh bandage (30 cm sq)	0.49 per 10
governmental forms (specify)	0.01 per 100
trousers (adjust size by water measurement)	0.79
optical magnifier (400x)	0.89 per 10
street map, Sirius Mater	0.39
body wipes (20 sheets)	0.05
gloves	0.29 per 100
glass-like retort (2.5 liters)	1.19 per 10
filter mask	2.39
wrench set (100 assorted)	0.69
maintenance coating (10 applications)	1.39
rivets and expansion bands	1.99 per 10

Memory tools usually come in books of ten pages or more.

PROBE, System
(Terraseek Corp., Orbital Down)

MAS: 43 (1082 kg)

VOLUME: 4.5 cubic meters

MAXIMUM SPEED: light speed (hypothetical)

ENERGY USED: 60/im reactionless thrusters; 15/im all-wave sensors; 20/im parallel-feed comlinks

POWER SUPPLY: fusion 2 generator

APPLICABLE SKILL: Reaction Drive

ARMOR: 25 point

HIT POINTS: 100 (comlinks broken after 25% damage)

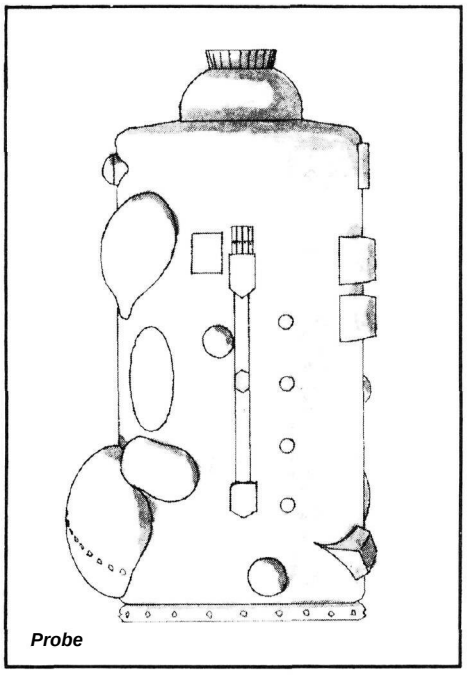
COST: 14,000 Stars

Unmanned informational space probes have been part of spaceflight since its beginnings. The illustrated model is a system probe, to be launched by a starship before it enters an unexplored star system or to act as a scout when trouble is expected. Such probes are routinely recovered and reused. Most interstellar probes have hyperdrive; system and atmospheric probes have only thrusters or other reactionless drives.

In order to receive data from a probe, the vehicle must be data-linked to the receiving ship's autopilot by means of a probe control computer subsystem which accepts and data-marks the full-spectrum signals from the probe. The probe's maser or laser reports arrive in a continuous real-time relay, in regular bursts, or as otherwise commanded before or during the journey.

The probe can be commanded to use only passive sensors, or it can actively send out radar and deep radar signals as well. In general, system probes have the minimum sensor characteristics attributed to autopilots in the computer section of this book. By deep radar, radar pulse, enhanced telescope, etc., a ship or ship-sized object not deliberately hiding itself should be well-detectable at about 30 million kilometers.

Resolutions of planetary formations or low-power EM signals from planetary surfaces vary both with particular planetary conditions and with the probe's fly-by distance.



Probe

A system probe heading into our Solar System in the 20th century would detect Earth's radio and television transmissions well before reaching Pluto's orbit. It could detect the movement of an automobile on the surface of the Earth from about 800,000 km, although its ability to look into deeper atmospheres or across wide stretches of Terran-type atmospheres is greatly less.

REPAIR KIT (Electronic)
Direx of Jinx

WEIGHT: 1.4 kg

VOLUME: 0.4 cubic meters

ENERGY USED: none

COST: 45 Stars

The kit includes common tools and supplies used in repairs. Contents:

1 tube conductive bonder
100 sq. cm. superconductor fabric
a selection of Direx micro-circuitry
1 book of water-tool electronic tools
10 meters conductive wire

30 meters insulated conductive wire
10 meters non-conductive wire
1 sonic solderer (identical to sonic knife)
1 book memory plastic switches and knobs
1 pair insulating gloves
1 repair manual describing common procedures
1 tube molecular bonder
1 roll of tack tape
1 Direx catalog listing all of the wonderful tools not included

Without this kit, gamemasters may rule that a particular repair must be made at half-normal skill percentage.

REPAIR KIT (Mechanical)
Direx of Jinx

WEIGHT: 1.7 kg

VOLUME: 0.4 cubic meters

ENERGY USED: none

COST: 45 Stars

This kit includes the items commonly needed to make mechanical repairs. Contents:

1 book water-tool wrenches
1 book water-tool carpentry tools
20 applications maintenance coating
50 assorted memory coils
4 application dissolving catalyst
1 book memory plastic gloves
1 repair manual, describing common procedures
2 tubes molecular bonder
1 tube lubricant/deseizer
1 tube construction foam
1 sonic knife
11m spool of Sinclair monofilament
200 assorted screws, nuts, bolts, rivets, tack strips, weld points, etc.
1 Direx catalog, listing all the wonderful tools not included here

Without this kit, gamemasters may rule that a particular repair must be made at half-normal skill percentage.

SEASUIT

MAS: 2 (10 kg)

VOLUME: fits human form

ENERGY USED: 15/im

POWER SUPPLY: fusion 1 generator

ARMOR : 1 2 hit points; once breached cannot be repaired without removal from the water.

COST: 799 Stars

The marinex is an anthroform pressure-resistant suit which maintains an Earth-normal environment within itself while withstanding outside pressures of up to 100 atmospheres — enough to allow an individual to descend to 1000 m on Earth or Ringworld. These sorts of suits are available for all Known Space species.

The suit stay flexible under maximum rated pressures, but stiffens progressively: explorers wearing the suit operate under a DEX penalty of 2 points and lose one point of DEX per 20 atmospheres of pressure. To defeat this DEX loss and to enhance fine manipulation, the suit is equipped with a set of DEX 15 waldos — if employed, use the normal DEX of the user or of the waldos, whichever is lower.

The suit is equipped with stage filters which separate oxygen and hydrogen. The oxygen is used in the life system, the hydrogen is expelled along with carbon dioxide generated by the wearers breathing. The inert agents nitrogen, helium, and neon are continually recycled. Selective filters remove contaminants form the system. Food processing and waster recycling systems allow the wearer to survive within the suit for weeks at a time.

Thrusters can propel the suit at speeds reaching 30 kph, somewhat more slowly under higher pressures. Several powerful variable searchlights aid vision.

Seasuits are available whose internal pressure is rated to normal conditions for each of the major Known Space worlds.

If the suit is breached while under water, the wearer of the suit will take appropriate asphyxiation and pressure damage.

SENSORDISK (Standard)

WEIGHT: 100 g; battery maximum is 500g

VOLUME: 2 x 12 cm cylinder

ENERGY DRAW/IM: 0.01/10 impulses at 100 m; a sensordisk requires 0.01 point of energy per 10 km range — a sensordisk set for 100 km draws 1 unit of energy every 10 im of use.

POWER SUPPLY: 250/2/62.5g/R

RANGE: Maximum range of 10 km, variable range — setter calibrated in meters. Larger disks may have maximum range up to 1000 km.

HIT POINTS: 2

COST: 25 Stars

A sensordisk is a microminiaturized electronic array which performs one or more sensor functions, depending on its size and sophistication. Common functions are listed below. In this entry, the 'radiation' refers to all the wavelengths of electromagnetic energy — not merely to dangerous wavelengths of radiation.

EM-TUNABLE: Many sensordisks can detect the whole spectrum of electro-magnetic radiation (gamma ray, cosmic ray, x-ray, ultraviolet, visible light, infrared, microwave, radar, short wave radio, long wave radio). The user must adjust the disk to the desired band or wavelength range. The simplest sensordisks may be able to detect on 1-3 narrow bands.

RADIO-BAND-TUNABLE: specific communications frequencies, to 0.01 Hz, can be located or monitored.

GRAVITY-TUNABLE: discrete sources of gravity waves or of gravitational anomalies can be located, and their intensities of variations presented.

VISUAL PRESENTATION: Larger sensordisks include a small screen visually presenting requested data; most will create a to-scale schematic pinpointing a particular radiation source; and existing coordinate systems may be entered. Data can include intensity and comparative profiles of standard sources.

SCANNING: continuously flips through entire e-m spectrum sequence, or specified bands; alarm indicates any new spot sources. Requires 5/im per band scanned.

WARNING: audio or visual signal when a specified localized or point-source comes within range.

DATA LINK: a cable or microwave link to a specific computer allows information to automatically enter the computer banks.

SHELTER BLOCKS
many manufacturers

MAS: 2 (1 frame 2.5 kg, 1 can foam 4 kg)

VOLUME: (before) 1 frame 1 5 cm cube, 1 can foam 15x35 cm cylinder

ENERGY USED: none

SPEED OF CONSTRUCTION: frame sets up in one minute. Foam dries in 5 minutes. Additional time is required for manual labor, foundation connections, and for any modifications.

ARMOR VALUE: 6 points

COST: 20 Stars one frame; 21 Stars one can foam

These buildings consist of memory plastic frames and hardened-foam walls, floors, and roofs. The foam comes from spray-cans of quick-drying stuccofoam. Each frame creates a 3 x 3 x 3 m structure. Frames can be soldered together to create larger structures. Doors and windows can be cut out of the drying foam as needed.

The spray-on foam dries 5 minutes after application to form a steel-hard fire resistant shell over the memory plastic frame. Solvent is also provided with the foam to break it down when needed. When the foam is dissolved the memory plastic frame can be brought back to its compact form and reused. The foam cannot be reused.

Without foundation, these buildings have the unfortunate tendency to be blown away by high winds or to be shoved around by earthquake and large animals. Explorers may want to build more permanent structures if they plan to stay in a location for a significant length of time. For short durations, these semi-permanent camp buildings are useful and economical.

These structures are not airtight; they are not useful in space, or in non-Terran atmospheres.

Framed units of clear plastic windows are sold separately for 5 Stars each, and dark plastic doors for 6 Stars each. Some companies install screens or anti-insect fields.

Often explorers use tri-dee projections to make these semi-permanent installations more home-like. Sturdeebuild (Luna) offers several different environmental tri-dee tapes for 5 Stars each.

SIMWEB
(Deepspace Flextics Ltd., Ceres)

MAS: 2 (8.3 kg) experience-generator unit; 2 (5.3 kg) one simweb cocoon

VOLUME: 20 x 30 x 70 cm ex-gen; human jump-suit-sized cocoon

ENERGY USED: 1/im simweb user

POWER SUPPLY: ship's generator or other external source

SPEED OF OPERATION: real-time experiences; about 30 seconds to enter or to awaken from the dream experience.

ARMOR: none

HIT POINTS: 5 for generator; 8 for cocoon

COST: 10,000 Stars for experience generator; 1500 Stars per cocoon; 550 Stars for computer subsystem link

The simweb looks like an artificial cocoon made of extraordinarily-resilient plastics. DeepSpace Flextics markets species-specific simweb cocoons and peripherals for humans, Dolphin, Kzinti, and Kdatlyno. The company developed a Puppeteer model, but the Puppeteers loathed the total separation from each other as well as the loss of consciousness necessary for simweb use. Only one was sold, and the model was discontinued.

New users of simwebs often feel extremely claustrophobic until the cocoon is activated. A fleeting feeling of weightlessness occurs when local anesthetics and neural stimulation cause the user to forget about the external cocoon structure. Then it seems to the user that he or she merely awakens, or exits from a tunnel into daylight, or opens his or her eyes as if from a blink, or the mind contrives in some other way to adjust to the simweb's signals. Once partaking of it, a simweb training session feels like reality or an infinitely-detailed dream — pinching one's self has no effect other than the perceived pain of the pinch.

The cocoon systems will provide for food, waste elimination, sleep, etc. for simweb users. Simwebs do not possess autodoc capabilities, though a doc could be retro-fitted.

Besides the fantasy adventures for which the simweb is justifiably famous, using the simweb is a practical training method for skills which have experience — check boxes next to them on the explorer sheet. See the Game System chapter for details.

Simweb Death Effects

In studying combat skills or other dangerous skills, occasionally a simweb user has "died" in the cocoon. For healthy explorers there is no physiological effect resulting from simweb death, though there is evidence that simulated death can have severe psychological consequences. Such psychological damage must be administered by the gamemaster. Explorers who "die" in the simweb uniformly experience a period of depression — such a significant failure is bound to have some effect. Generally this depression lasts no longer than a number of days equal to 30 minus the explorer's INT. The explorer also loses all experience-checks gained in the death-session; his mind is on other things.

Occasionally a simweb experience has sparked a reaction in a user that did cause death — usually unfortunates waiting for heart transplants.

Sometimes an explorer who dies too often in a simweb becomes immune to simweb training — he or she closely associates the simweb with failure and possible death.

In rare instances, an explorer will generalize his or her simweb traumas to life in the real world, becoming convinced that real life is nothing more than a simweb experience. Such personalities may become extremely paranoid — or become extraordinarily foolhardy, convinced as they are that death is not real. Unless treated this condition usually results in severe injury or actual death.

The worst reaction is addiction. It is possible and legal on most human planets to arrange for the minimal financial and real-time support which allows the addict to permanently lock himself or herself in wondrous fantasy worlds of infinite variety and subtle beauty. Philosophers agree that the species is better off without such suicidal escapists, and that they should be allowed to resign from life.

Shared Simweb Adventures

Several simwebs can be linked in series. Each user then participates in the same quest or expedition, and each can fully interact with the other personalities. The gamemaster can use in-series simwebs to conduct a full evening's adventure while the explorers are in transit through space.

Play these adventures as you would conduct a normal adventure, though the explorers can only receive experience checks for the programmed skill or skills. The amount of explorer real-time that has passed at the adventure's conclusion is based on the skills percentiles of the most-experienced explorer.

Example: Sharki, Fred, and Xeolla Bella are three explorers about to share a simweb experience. Within several weeks they will be arriving at the pleasure-moon of Phoebe. Anticipating a chance for sport and relaxation, they decide to hone their mountain-climbing skills and, in addition, pleasantly while-away some time. Sharki has an Athletics/Climb skill of 45%, Fred has 30% in the skill, and Bella has 15%. To qualify for experience-checks in their Athletics/Climb skill, they must spend 45 hours (based on Sharki's skill) in a shared simweb experience, and the player for each explorer must succeed in a D100 roll of his explorer's Athletics/Climb skill.

Emergency Session Endings

A simweb session will normally last for its programmed length. Inevitably, crises will arise for the explorers when one or more of them are within a simweb cocoon. In 15 minutes the computer will devise a suitable transition and the users will awaken. If a sufficient amount of time has elapsed, some explorers may gain experience-checks if their players succeed in skill rolls. Simweb death can occur at this time.

Someone outside the adventure can immediately end a simweb session. Because of the shock, each user's player must succeed with a CON x 3 roll or his explorer must suffer the result of one roll on the aging effects table.

SINCLAIR MONOFILAMENT CHAIN

LENGTHS: 1, 5, 10, 25, 100 meter spools

WEIGHT: negligible

COST: 1 Star per meter; 2.5 Stars per hullmetal handle

BREAKAGE AND DESTRUCTION: except for the most enormous strains, Sinclair monofilament does not break. It is as strong as steel cable several centimeters thick. A flashlight laser can cut it, as can a Slaver disintegrator.

Sinclair monofilament chain is made up of a single, complex, artificially-reinforced molecule. The chain is so thin and tough that it can cut through normal matter with only a slight tug. Each strand of the wire is less than a micron thick.

Monofilament chain is used primarily for towing in space but occasionally appears as a weapon, and can be handy as an explorer's tool.

Monofilament chain cannot cut General Products hull material, scrith, or other monofilament chain, and only with difficulty cuts through hullmetal. Monofilament chain comes in a hullmetal dispenser, and has a hullmetal handle on the other end. If the chain is cut, a second hull metal handle can be attached to the loose end as needed.

In order to cut, monofilament chain must be under tension — its weight is too small for it to cut by itself. Cutting tension is directly proportional to the molecular strength of the material to be cut. If it is stronger than the hull metal handles, the chain will cut through the handles.

Monofilament chain cannot cut through any surface on which it cannot get a purchase. For example the monofilament chain would be unable to cut out from the inside of a featureless plastic cube, even if it was able to cut the plastic easily under normal conditions. It is impossible to create enough tension on the wire under these circumstances.

SONIC KNIFE
(Heartless Ent., Earth)

WEIGHT: 200 g

VOLUME: 2 x 2 x 8 cm

ENERGY USED: 0.01/im

POWER SUPPLY: battery 100/1/25g/N

SPEED OF OPERATION: cuts/seals 1 cm of material every 3 impulses

COST: 5 Stars

This hand-held unit opens normal boxes, cans, and other containers; it can also open and re-seal without a trace special plastic containers also made by Heartless Enterprises. This knife works best along previous welds and joints, and along natural molecular cleavages. The knife handle requires physical contact with the material to be cut or mended, and cuts normal materials at a rate of STR x 1 centimeters per impulse.

SONIC SCANNER
(Protek, We Made It)

MAS: 8 (50 kg)

VOLUME: 1.5 cubic meters

ENERGY USED: 2/im

POWER SUPPLY: generator

COST: 525 Stars

Through sound waves and magnetic fields, this device allows internal views of life forms. Often used by scientists and researchers, the sonic scanner has become an invaluable tool. Attached to a 3D imager, the sonic scanner can produce a working picture of any internal system, layers of the image can be peeled away to reveal what is underneath. Sonic scanners are not portable, but can be moved.

STASIS FIELD GENERATORS

Stasis fields retard the passage of time within them. They are 100% reflective to electromagnetic energy, and cannot be penetrated by any known weapon. A stasis field looks like a shining silvery object. The surface of a stasis field is very slippery. Deep radar easily detects stasis fields — only stasis fields, neutron stars, and scrith reflect it.

Table of Stasis Field Elements

quantum level	time inside	time outside	initial energy unit cost	generator cost (Stars)	generator weight	volume of generator
1	1	6 hours	20	100	200 g	500 cc
2	1	5.3 years	30	250	350 g	760 cc
3	1	50 years	50	500	425 g	1400 cc
4	1	450 years	110	1000	1.2 kg	2500 cc
5	1	4100 years	170	2750	2.5 kg	5000 cc
6	1	35000 years	220	unavailable	unknown	unknown
7	1	320,000 years	270	unavailable	unknown	unknown
8	1	20 million years	310	unavailable	unknown	unknown
9	1	1.5 billion UNS years	390	unavailable	unknown	unknown

Stasis fields operate at several quantum levels; the degree of retarded time varies with each quantum level. At the first level, one second within the field equals six hours outside. The highest known quantum level is the Slaver field in which one second equals 1.5 billion years.

There are nine known quantum levels, only five of which have been developed by humans — Puppeteer stasis fields probably excite higher resonances. Slaver stasis fields (possible developed by the Tnuctipun) use the ninth level almost exclusively, at least for the stasis boxes which humans have found. Numerous unstable quantum levels exist, at the lowest of which one second equals 8.6 minutes. Unstable levels can be maintained only through continuous expenditure of considerable energy.

The surface of the object to be put into stasis must be electrically conductive, either naturally or by applied coating; this establishes the stasis envelope. It is possible to spray the inside of a General Products hull with stasis-conductive material of various types, effectively yielding a conductive surface on the inside. The stasis envelope must be 100% unbroken. It is not possible to put a stasis shield over a patch without engineering the system properly. It is possible to rig stasis patches to close apertures in starship hulls.

Interior conditions are completely preserved within a stasis field. Stasis fields conserve mass, spin, charge, etc. Over time, however, local external conditions will leak in, though in a low-ratio field a shift in external gravity will be felt inside almost immediately. Initial velocity is not preserved — an object put into a stasis field at near light speed will not fly off in the direction or speed of its initial velocity when it is removed from the field.

A stasis field completely forms in one impulse after generation. To maintain any stasis field costs one energy unit per impulse spent within the field. There is no known way to prevent the formation of a stasis field once the formation has been initiated.

The introduction of a new stasis field around an existing stasis field causes the inner field to drop. Stasis fields therefore can be controlled in three ways.

The first way is through use of an internal atomic decay clock set to stop generation of the field after a preset amount of time has passed within the field.

The second way uses a switch which projects through the field. Pressing the outer button activates a tiny stasis generator which throws a transient umbrella field over the field running through the switch, cancelling it long enough for a control signal to reach the internal control mechanism and generator. This interruption need not be longer than a few nanoseconds. The Tnuctipun-developed mechanisms on Slaver fields work very well; human methods sometimes (5% of the time) fail.

The third method uses an external generator. When the power stops, the field drops.

It is possible to flicker a stasis field if another stasis field is handy, allowing the contents of the field to be photographed or destroyed without danger from the contents. Flickering an alien or unknown field — especially a Slaver stasis field — may reinforce the outer field. The internal field may be temporarily altered or eliminated entirely, but the alien stasis field generator may pump up the applied external field, unpredictably extending actual duration.

The fields of two stasis generators will meld if engineered properly using a stasis-conductive metal shell to link them, creating a new and larger single stasis box.

Antimatter can be confined within a stasis field if technology exists for containing the antimatter previously to its entry into stasis. Stasis fields are no more vulnerable to antimatter than they are to matter.

Cognitive psionic abilities, including Kzin telepathy, cannot penetrate stasis fields. Intuitive and Emphatic psionic abilities, depending on the situation, may or may not be able to penetrate a stasis field. Certain non-cerebral psi powers such as an imaginary limb may penetrate a stasis field to feel the internal contents. It is not guaranteed that such a talent will work but there is a chance that it might. In all cases the gamemaster has final determination.

There are no stasis beams extant in Known Space, though it is theoretically possible that a Human Protector would be able to design one, given time and resources. If any devices of this sort exist, the ARM has suppressed them.

TELESCOPE

MAS: 1 (4.25 kg)

VOLUME: 20 x 60 cm cylinder

ENERGY USED: 0.01/im

POWER SUPPLY: 1000/1/250g/R

MAGNIFICATION: 10x to 1800x

SPEED OF OPERATION: instantaneous

HOLOGRAPHY UNIT: finished print in 5 sec

COST: 180 Stars including enhancing/averager unit; optional high-resolution holo unit available for 40 Stars additional

This telescope is a 60-centimeter-long lumpy cylinder with a variable-length memory plastic mount. Selective filters and enhancement from the attached computer allow direct viewing or holographic reproductions of visible light or other particular portions of the EM spectrum; practical surface-to-surface magnification in a Terran atmosphere is about 400x. Under normal Terran visual conditions, this unit performs stellar resolutions to about the 20th magnitude. In unsteady conditions, the computer image-averaging can be engaged to produce rock-steady images from a wind-fluttered tube. A variable-speed tracking function can be activated.

TRACY
(Personal Tri-Dee)

WEIGHT: 35 g

VOLUME: similar to wrist watch

ENERGY USED: 0.75/im

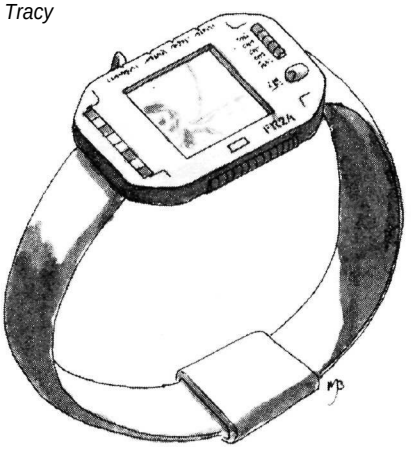
POWER SUPPLY: solar collector

RANGE: 1 km

COST: 10 Stars

A tracy is a short range tri-dee transceiver. It can pick up public band transmission as well as industrial transmissions routed to it.

Tracy



The pick-up has a 60-degree-wide field for transmission, but the holographic subtlety of the image is poor. The tracy is mostly used for face-to-face communications between explorers, and its limited (15 minute) recording capacity makes it something of a toy. Its display is 2.5 cm square. A tracy's range is about 2 km — somewhat more in open country, frequently much less among buildings or rocks.

TRANSPORT BOOTH
(Pelton Industries, Earth)

MAS: 5 (27 kg)

VOLUME: 1 .5 x 1.5 x 2.5 m

MASS TRANSPORTABLE: 10 tonnes

ENERGY USED: 40 units per transfer

POWER SUPPLY: city or building generator

SPEED OF OPERATION: 60 seconds maximum once all information is entered. Normally the transfer is completed sooner, but the doors will not open until 60 seconds have elapsed.

COST: 1 decistar per transfer; minimum of one transfer every 200 km. A home transport booth costs 10,000 Stars and 85 Stars monthly for the service contract. Only the rich have personal transfer booths.

A transport booth is shaped like a fat telephone booth. The enclosed booth transmits matter from within it to a second closed booth; in instantaneous operation, the two separated points become momentarily contiguous, and the transfer is automatically made. A transport booth will not transmit until the booth door is latched, destination selected, and payment made. It will receive a transmission by shunting anything inside of the receiving booth to another booth. All booths transmit and receive.

The maximum range of a transport booth is 200 km; some of Earth's Pacific islands are even yet unconnected by transport booths. For various physical reasons no planetary booth connects to an orbital booth. Louis Wu's statement at the beginning of *Ringworld* is an exaggeration; it actually takes quite a bit more than a few seconds and a decistar coin to get between Moscow and Sydney. Many transfers must be made; a single booth is useless. A standard transport booth can transport up to 10 tonnes of mass.

Failsafe booths prevent transfer to an already-occupied booth; the second party is shunted to third booth at no charge, and his transfer made from there at no additional cost, just as the 20th century telephone system shunted trunk calls from point to point until a call could be completed.

Most major human settlements have transport booth networks. The Earth is thoroughly networked, as are Wunderland, Plateau, and the habitable bands of Jinx. The rest of the human worlds have local networks but surface or air transport must be used for long-distance travel. Large cities have networks of up to a thousand transport booths, smaller towns have hundreds of booths, while outland areas and villages might have only one. On Earth, the expression "five klicks from a booth" describes a truly uninhabited area.

Table of Earth's Continental Codes

code number	*continent*
C	Africa, Madagascar
1	North America, Greenland
2	South America, Central America
3	East Asia, Philippines, etc.
4	West Asia, Indian Peninsula, Sri Lanka
5	Antarctica
6	Australia, New Zealand, South Pacific
7	Europe, Iceland, Mediterranean islands
8	private or internal government; requires unlisted address and owner permission
9	sensitive; requires special access card and thumb print; top-secret installations will require more

Examples of Earth's Regional Codes

code number	*region*
0-025	Addis Ababa
1-005	New York City
1-100	Topeka Base
2-560	Santiago
3-224	Beijing
4-100	Calcutta Base
6-100	Outback Field
7-777	Berlin

Transport Booth Addresses

Transport booths are addressed by a numerical code; on Earth the location codes are of ten digits. A transport booth address is entered as a one-digit continent code, a three-digit regional code, and a six-digit booth code: the lobby of UN headquarters in Berlin is coded 7-777-100000, and the Jinx terminal at Outback Field is coded 6-100-230550. Gamemasters will establish or assent to particular transport booth addresses. Local transfers do not require continent or region codes.

Using a Transport Booth

Having latched the transport booth door, the user may directly mark his destination by moving the cursor of the network scrolling directory to the desired location, or by slotting his booth address card and marking an entry from his personal directory. In either case, the booth always asks that the user okay the address. Then the screen and a voice ask for coin payment for the entire journey, or the device automatically subtracts the necessary amount from the debit file on the booth address card. If the booth address card is used for either procedure, the machine indicates that the card must be de-slotted before transfer can start.

If a long journey requires several intermediate transfers, the user does nothing as he flits from booth to booth. The screen in each intermediate booth flashes 'transfer continuing,' and the door will not open unless the emergency button is pressed, permanently halting the trip. Any refund due appears in the coin-return box. At the end of the trip, an audiovisual statement of location is made, and the booth door automatically opens.

Payment by coin prevents tracing of a journey; a directory card can always be traced.

Restricted booth addresses are accessible only if the user enters the correct number and slots a correctly-coded card. Such addresses are generally internal or executive booths in larger corporate or governmental offices, or the personal transport booths of wealthy citizens. Once reached, frequently such booth addresses will not unlock from the inside without additional measures — keys, thumbprints, etc. To have a restricted code put on a directory card, an explorer must have gotten permission from the owner or some other authority.

Sensitive booth addresses only operate using thumb print files. An explorer wishing to transfer to a sensitive booth must brush his or her thumb across a sensor in the transmitting booth, slot a specially-coded address card, and then manually enter the unlisted number. If any of this input is incorrect, the explorer's name and supposed destination are brought to the attention of the police who guard the addressed installation or office. Truly secure areas often require manual entrance through several tiers of transport booths. ARM agents and some others have full access cards, which can get to all restricted booths and to most sensitive booths.

TRI-DEE RECORDER (Portable)

WEIGHT: 1.75 kg

VOLUME: 0.3 x 0.5 x 20 cm

ENERGY USED: 0.25/im

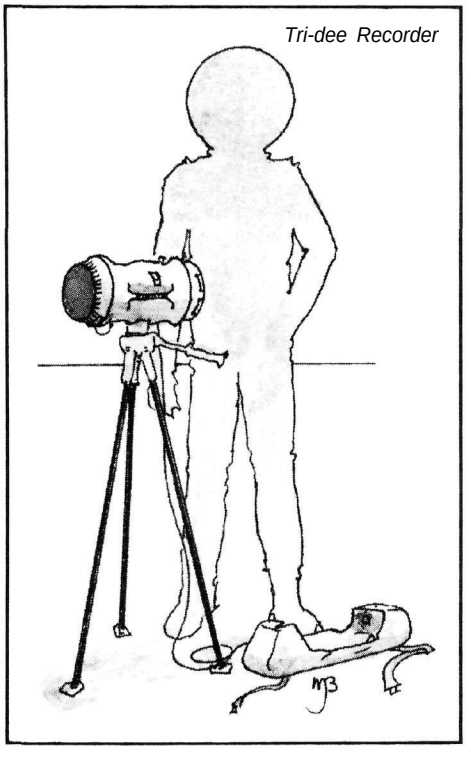
POWER SUPPLY: generator, battery (3600/1/.9kg/R), or memory-plastic solar collector

LENGTH OF OPERATION: 10-hour memory

COST: 67.5 Stars

This hand-held, portable professional recorder makes excellent tri-dee recordings.

Tri-dee Recorder



Fractional-field lenses allow the resolution of light to exactly the parameters of the human eye, providing a subtle vividness otherwise unobtainable. Light intensity is also standard human eye (pitch black to blindingly bright); the 1.2f lens can enlarge microscopic items 100X, or act as a telephoto zoom up to 400X. Recording is made on a standard 10-hour memory bubble. There is a built-in microphone, 10-30,000Hz, and provision for six AV inputs. A small visual monitor is included, as is a superconductor memory-plastic stabilizer.

VACUUM SUIT (Vac Suit)

MAS: 1.5 kg

VOLUME: fits human form

ENERGY USED: 20/im

POWER SUPPLY: fusion 1 generator

ARMOR VALUE: 4 points

COST: 500 Stars

The vac suit provides a safe personal environment in space or in unbreathable planetary atmospheres.

Human vac suits are flexible, form-fitting, one-piece outfits. A large fishbowl helmet made of -self-tinting plastic (which darkens over any spot where incoming light is too bright), and a back pack attach to the suit to make the outfit complete. At the wrists are adjustable attitude jets for movement in zero gee. Inside the helmet a small unit projects readouts showing outside temperature, pressure, and time on the helmet's transparent surface at the user's command. A comdisc fits into the headpiece. A vest covered with pockets and loops for tools is a useful attachment.

The vacuum suit skin is of pressure-resistant, self-sealing memory plastic. Small breaches in the suit, even doing enough damage to exceed the suit's armor value, automatically re-seal with negligible pressure loss. Breaches larger than 25 sq. cm. will not seal as quickly, and damage from pressure loss may be taken. Every vac suit comes with a patch kit for repairing particularly large holes and tears.

The suit can keep the inside pressure at a normal level under outside pressures varying from vacuum to 30 atmospheres, though the suit becomes quite rigid under higher pressures. Subtract one from DEX for each atmosphere of pressure over 20. At pressures over 30 atmospheres, the suit has a 10% chance to rupture per additional atmosphere; rigidity continues to increase.

Internal suit pressure can be varied from 0.6 to 1.7 atmospheres.

A solid, stabilized form of oxygen is stored in a backpack — enough to keep an active human supplied for 36 hours, and keep an inactive human supplied for up to 72 hours. Carbon dioxide is absorbed out of the system by a molecular sieve, and afterwards extracted and recycled into oxygen and carbon — the carbon being expelled or used in the food processor. Other atmospheric contaminants are also expelled.

The suit maintains temperature and humidity at comfortable levels, and maintains a stable ionization. Included is a miniature food processor which provides food syrups and water. Waste is recycled back into the food processor; unusable compounds may be expelled or saved in powder form for on-ship deposition.

The Kzinti vac suit looks like an assortment of ballons strung together over the alien's round body. An over-large helmet contains the suit's readouts and a tongue-operated control board. Puppeteer suits are three-legged balloons with padded mittens for the aliens' mouths, small clawed boots, and a hard, padded shield covering the cranial hump. Kdat vac suits are skintight with thin plastic plates protecting all areas but the joints, which are covered with tough material, sturdier and less flexible than human suits. Kdat helmets are large, opaque, and complex. They contain a radar-sensing device which translates the Kdat's sonar sense into radar and back again for understanding. Trinoc suits are lighter than human suits and less restrictive. They possess spherical plastic bubbles around their complex joints.

VARIABLE KNIFE
(Peerless Cutlery, Jinx)

WEIGHT: 220 g handle and blade; 350 g external unit

VOLUME: handle and retracted blade fit in large hand; external unit is 4 x 5 x 25 cm

ENERGY USED: 1/10 cm of movement; blade generator lasts 53 years and then self-destructs

POWER SUPPLY: battery 100/3/26g/R for external unit

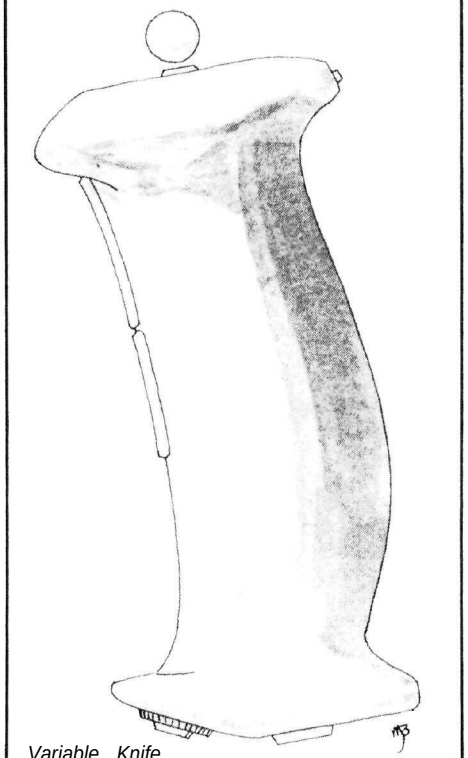
LENGTH OF OPERATION: 53-year blade stasis field

COST: 50 Stars; used variable knives of uncertain age are much less expensive

This limited range version of the variable sword is more often used as tool than weapon. This variable knife has a distinctly Jinxian sturdiness. It operates on the same principle as the variable sword: a length of monofilament chain, wrapped in stasis, extends from the handle to a maximum length of 30 cm. The variable knife cannot cut through scrith, General Products hull material, or stasis fields, and will cut very slowly through dense materials such as hullmetal and duralloy. The variable knife, like the variable sword, has a tiny red ball at the end of the blade, to help the user recognize the position of the blade. The blade is always kept completely retracted when not in use.

The quantum 2 stasis field generator in a variable knife is smaller than standard, and illegal for any use other than in the knife. The stasis field generator is powered by an internal battery which is drained after 10 seconds pass within the field. By time-retardation, the stasis field of the knife lasts for 53 years and then becomes useless. At that point a microcharge melts the generator, destroying the unit.

The blade extends and retracts by means of an external unit which attaches to the knife and flickers a selective stasis field and a directional impulse over the spool of monofilament chain within the handle. The external unit, usually worn on the arm using the blade, must be linked to the handle socket by a length of intercable (retracting into the external unit when not in use). The handle can be detached from the external unit at any time if the blade is not moving.



Variable Knife

VEHICLES

Vehicles are transportation devices which have specified capability to move through or on air, water, land, or space. Some of the vehicles mentioned here can cross interplanetary distances; none have interstellar capacity. The gamemaster can supply a starship.

In the hit location tables for this section, the percentage column is a threshold indicator; the hit location will continue to operate or to be usable until it has taken that percentage in damage of the general hit points of the vehicle. Occupants generally may make luck rolls to escape being hit; if they are hit by damage, roll for hit location and damage based upon the amount entering the ship or otherwise applicable.

Most planets license ownership and operation of vehicles, though exact requirements vary. Almost all require vehicle registration and licensing of the driver or pilot. Most planets tax the importation of vehicles, and may refuse entry to certain types. The gamemaster must decide if such a problem is relevant.

Vehicle Crew/Cargo Comparison

	crew (min/max)	*cargo (kilos)*
explor. Surv. ship	1/12	15,200
flycycle	1/ 1	50
lander	1/ 4	500
marinex	1/ 8	800
lift belt	1/ 1	–
thruster belt	1/ 1	400
shuttle	1/ 5	30,560
speeder	1/ 4	750
stasis blimp	1/ varies	varies
versatrak	1/ 7	700

Vehicular Propulsion Systems

FUSION DRIVE: Consisting of a fusion generator with a hole in a magnetic bottle, fusion drives were once the workhorses of Known Space, powering the vast majority of interplanetary and interstellar spacecraft. Fusion drives are hot, dirty, and life must be shielded from them. After the advent of the safe, efficient reactionless thruster, most civilians quickly discarded fusion drives. But they are still frequently built by military establishments, who remember the lesson of the first Man/Kzin war: "the effectiveness of a fusion drive as a weapon is directly proportional to its effectiveness as a drive."

MAGLEV: an abbreviation for magnetic levitation. MAGLEV systems use powerful monopolar magnetic fields to elevate vehicles from the ground. Reportedly the fabled floating cities of Ringworld are held aloft by MAGLEV systems. Fusion or solar power usually runs such devices.

REACTIONLESS THRUSTERS: reactionless thrusters are the most widely-used drive for starship normal-space travel and for smaller vehicles. Reactionless thrusters propel a vehicle forward without any exhaust. The reactionless drive is a normal space drive, cannot surpass the speed of light, and consumes large amounts of energy as the ship approaches that speed. The reactionless drive is popular because of its clean operation and relatively low energy consumption at moderate speeds. Reactionless drives are usually powered by fusion generators or (rarely) solar generators.

Vehicle Equipment

Devices and instruments essential to the basic duty of a vehicle can be assumed to be built in at no extra cost. While they may satisfy functional needs and safety standards, instruments such as sensors or computers probably will not be state-of-the-art. Explorers wishing excellent or extra equipment must negotiate with the gamemaster and have their money ready.

Equipment not stated as present probably is not present.

Large vehicles are made of hullmetal or duralloy; tiny vehicles (such as lift belts) may be of impact plastic.

EXPLORER SURVEY SHIP
(People's Industries of Orbital Down)

MAS 73 (15,000 kg)
VOLUME: a bloated hullmetal disk of 15m diameter and an oval cross-section of 8m at the thickest point.
SPEED: maximum lightspeed (hypothetical), cruising 1200kph at 1 atmosphere
MAXIMUM ACCELERATION: 10 kph/im
ENERGY USED: 5000/im at cruising speed
POWER SUPPLY: fusion 5 generator; optional independent fusion 1 generators for peripheral systems
APPLICABLE SKILL: Reactionless Drive
COST: 50,000 Stars
ARMOR: 20 points
HIT POINTS:400

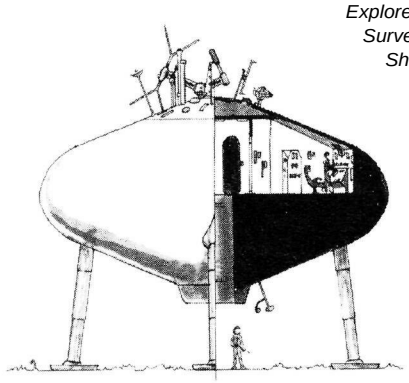
Location	*1D20*	*Armor/HP*
thrusters/main generator	01-06	20/240 (.60)
science deck *	07-11	20/200 (.50)
sleeping deck *	12-14	20/200 (.50)
command deck *	15-19	20/200 (.50)
sensor cluster	20	20/80 (.20)

** make luck rolls to see if crew is hit.*

The Explorer Survey Ship (ESS) is a field-research vessel designed to be hypertender-transportable; commanders of Terran-system survey and research efforts like to have one or more of these craft included in their mission assets. While the starships orbit, ESS and their crews land, inspect, encounter, and discover. An ESS is routinely on its own for weeks or months at a time, and is completely self-sufficient except for the lack of a hyperdrive.

A fully-crewed ESS holds 12, including a pilot/engineer and a co-pilot/electronics specialist. The other crew members are scientists, usually tailored to the requirements of the mission. For instance, if first-contact with a new sentient species were likely, the rest of the crew would consist of an anthropologist, a biologist, a botanist, a chemist/research assistant, a planetologist, a zoologist, a second research assistant, a contact specialist, a contact assistant of the opposite sex, and a generalist/UN representative. The four lab spaces would be rigged for biology, chemistry, planetology, and zoology, and specialized memory bubbles might be included — or signal traffic might be light enough that the starship's britannica computer could be routinely used.

Explorer Survey Ship



The ESS has a command deck, a research deck, and a sleeping deck.

The command deck contains the autopilot, a full selection of sensors and communications gear, deep radar, tri-dee imager, emergency stasis fields for pilot and co-pilot, 14 crash-webbed memory-plastic seats (12 around a meeting/eating tablespace), full-service autokitchen, clothing processor, manual flight controls, a minidoc, and an auxiliary life system. In the center of the deck a hollow cylinder, 1.2 meters wide, extends to the bottom of the ship — two escaladders lead to the other decks via it: in a few seconds the tube can be rigged as a gravity winch (capable of lifting up to MAS 52) in order to bring lab specimens aboard.

The sleeping deck is a half-deck, a little over one meter high; four entrances each lead to three private memory-plastic sleeping cubicles. Claustrophobia is relieved by selectable holographic imaging as desired; all of the cubicles are well sound-proofed. Long-term expeditions may equip the cubicles with simwebs. Generators and other gear occupy the rest of this space to the hull.

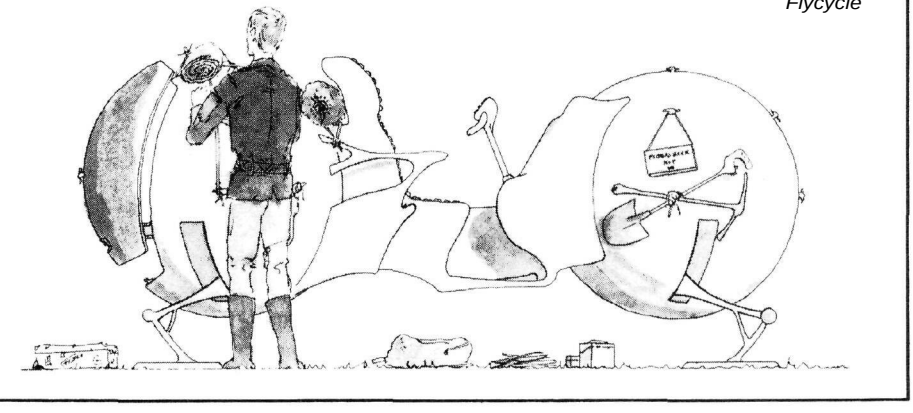
The bottom deck is for research; four standard labs can be re-equipped for any particular science — depending on the mission, all might be biological, for instance. There are 12 cubic meters of stasis field storage. At least two independent fusion 1 generators and 4 DsBs vizier or mate computers (or their equivalents) are on this deck.

Below this deck are limited-access compartments for the main fusion 5 generator, the gravity generator, the main life-support system, the reactionless thrusters, and some auxiliary MAGLEV floaters which allow the ship to hover or move slowly while the thrusters are off. The craft's pressure curtain can keep normal Earth atmosphere within the ship against an outside force ranging from 30 atmospheres to vacuum.

FLYCYCLE
(Sinclair Aeronautics, Earth)

MAS 32 (425 kg) - human model
VOLUME: 1,5m x 1.6m x 5m
SPEED: maximum 8000 kph, cruising 7000 kph
MAXIMUM ACCELERATION: 15 kph/im
ENERGY USED: 100/im
POWER SUPPLY: fusion 3 generator
APPLICABLE SKILL: Atmospheric Vehicle
COST: 10,000 Stars
ARMOR: 5 points
HIT POINTS: 75

Flycycle



location	*1D20*	*Armor/HP*
aft sphere	01-06	5/38 (.50)
seat area	07-10	5/19 (.25)
forward sphere	11-16	5/38 (.50)
control panel	17	5/4 (.05)
pilot	18-20	varies

Some say that this one-person, high-speed, highly-manoeuvrable atmospheric vehicle is an ultimate in quick and comfortable travel. Many sentients agree: flycycles are available in Kzin, Puppeteer (as 'skycycles'), Trinoc, Kdat, Grog (with special controls for use by

tiny non-sentient animals), human, and Dolphin models. In all cases a sonic fold protects the pilot from the blast of wind.

A flycycle resembles a pair of 1.25 diameter spheres, joined by a wasp-waist constriction consisting of instruments, a memory contour chair, and attitude gyroscope. Control joystick, dual pedals, and an inset command console are on the front sphere. The command console presents speed, energy levels, damage taken, a computer screen, limited-action keyboard, and a speaker grid for voice-activated commands and intercom functions. The intercom operates on a tri-dee frequency, and the faces of others using the intercom are displayed suspended over each individual control console. A rider can turn off his or her connection with the intercom at the flick of a switch.

The forward sphere also has a water dispenser and a small (food brick) autokitchen which can turn any organic material dropped into the hopper into a food brick of one of 50 rather uninteresting flavors. The vizier (or vizier equivalent) computer acts as navigator and autopilot, and automatically erects the sonic fold wind defense. The sonic fold protects the pilot from high winds, allowing the otherwise open vehicle to reach extremely high speeds.

The aft sphere contains the reactionless thrusters used for motive power, a fusion 3 generator, and 0.5 cubic meters of storage. The storage space cannot be accessed by a person sitting in the vehicle's saddle.

Flycycles are equipped with sophisticated autopilots which can independently fly the cycle with no more information than the coordinate location of the destination, and the altitude at which the living pilot wishes to cruise. The living pilot can sleep in safety while riding a flycycle — the autopilot will wake him or her if danger is perceived.

Four flat memory plastic feet (three on Puppeteer models) extend for landing, but retract during flight.

A group of flycycles can be slaved to one leader via a computer link-up. The slave cycles follow the master's actions exactly, though a safety override causes the individual autopilot to alert the rider if danger is perceived. Though the autopilot cannot take over from the master-slave circuit itself, this can be done easily via manual control.

Lander design dates from the second Man-Kzin war, when humanity carried the fight into the unknown interior of the Patriarchy. Planners needed cheap, sturdy planetary survey craft portable by tender through hyperspace; military leaders wanted handy little ships which could handle local trouble on their own. The compromise has been effective for generations.

This model is a squat cone, distorted so that the vertical axis is at about 80 degrees from the plane of the cross-section. With the bulky sensor package at the tip, the craft looks something like a woman's breast with a distended nipple, and there are many ribald nicknames for this small interplanetary vessel. It is driven by a gravity polarizer, supplemented by a series of small reactionless thrusters.

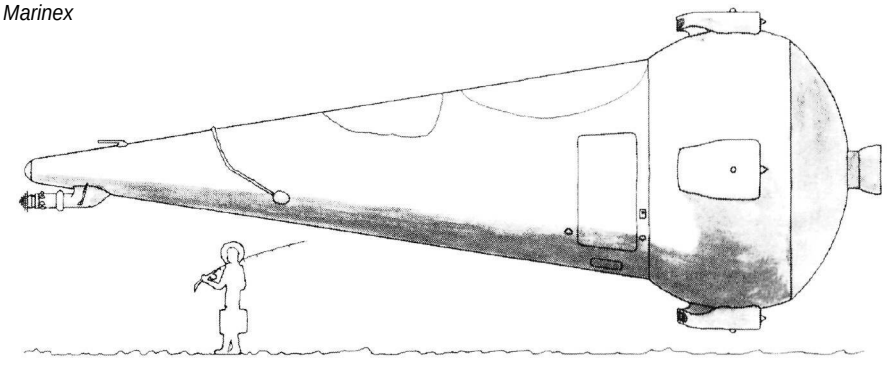
On the apex of the lander's off-center cone rests a weapon-sensor turret holding the ship's cameras, sensors, a com laser, and sometimes a large stunner or heavy laser.

Beneath the turret are wide, wrap-around windows which are armorable and tri-dee projectable, and which open into the flight deck, 16m in diameter. On this level are weapon and flight controls, usually a 10-subsystem DsBs autopilot, laser/microwave/broadcast communications gear, deep radar, an electronic telescope, a tri-dee imager, and four memory-plastic, crash-webbed seats. The tri-dee imager can exhibit communications or computer display, or show one (or all) of the views from the dozen recorders around the outside of the lander; the weapon/sensor turret has a larger, 2000x model. All the cameras have dialed light-intensity and wavelength modes.

On the 18m-diameter life deck are living quarters for four, a full-service (fully programmable) autokitchen, 20 cubic meters of storage space, and a minidoc (powered by an independent fusion 1 generator).

Below the living quarters are the lander's engines and the fusion 5 powerplant. Other systems on the lander are run by five additional fusion 1 powerplants. In emergencies, these plants can be used for propulsion if the main generator is lost. The lander's fully recycling life system is also located on this level.

Marinex



LANDER

(standardized design)

MAS 73 (15,100 kg)
VOLUME: 10x20m-diameter distorted cone
SPEED: maximum 5000 kph in one atmosphere (lightspeed hypothetical in space) cruising 1000 kph
MAXIMUM ACCELERATION: 30 kph/im
ENERGY USED: 3000/im for polarizer; other systems vary
POWER SUPPLY: fusion 5 generator; six fusion 1 generators
APPLICABLE SKILL: Reactionless Drive
COST: 40,000 Stars
ARMOR: 35 points
HIT POINTS:400

location	*1D20*	*Armor/HP*
sensor turret	01-03	35/80 (.20)
flight deck *	04-08	35/200 (.50)
life deck *	09-14	35/200 (.50)
drives and generators	15-20	35/280 (.70)

**make luck rolls to see if crew is hit*

MARINEX

(Starsea Enterprises, Silvereyes)

MAS 61 (5000 kg)
VOLUME: cone 1 5m x 5m diameter base
SPEED: maximum - 800 kph air; 90 kph on water surface; 1 5 kph underwater cruising — 550 kph air; 30 kph on water surface; 5 kph underwater
MAXIMUM ACCELERATION: 3 kph/im
MAXIMUM ACCELERATION: 3 kph/

MAXIMUM ACCELERATION: 3 kph/im
ENERGY USED: 3600/im
POWER SUPPLY: fusion 4 generator
APPLICABLE SKILL: Aquatic Vehicle, Atmospheric Pilot
COST: 14,000 Stars
ARMOR: 25 points (searchlight and sensors are unarmored)
HIT POINTS: 150

location	*1D20*	*Armor/HP*
sensors/searchlight	01	0/8 (.05)
crew quarters *	02-05	25/60 (.40)
passenger quarters*	06-12	25/75 (.50)
thruster and generator	13-17	25/60 (.40)
mechanical arms	18	25/38 (.25)
storage	19-20	25/15 (.10)

** make luck rolls to see if passenger or crew hit*

The marinex is an exploration, survey, and construction submersible of considerable flexibility, cruising at useful speeds in air or space, and submersible in water or other non-corrosive liquid to 300 atmospheres of pressure.

The standard crew is one pilot, a co-pilot/scientist, and 2 to 4 scientists or engineers. The absolute maximum long-term crew is 8.

Because of its conical shape, only about half the interior length of the marinex is usable for beings the height of a human; the forward portion of the marinex is crammed with thrusters, fusion generators, electronic gear, sensors, and dextrous mechanical arms; the arms emerge from the forward top hatch shown in the accompanying sketch.

The rest of the interior is axially split into two center-floored cabins; by use of gravity nets and generators, the crew stands 180-degrees opposed to each other on the two floors. The prominent door in the illustration covers a pressure curtain/air lock combination. The rear of the top hatches pops up over a pressure curtain to make a quick surface entrance or emergency exit for lift-belted crew. The main pressure hatch opens into the research and specimen floor of the marinex (which includes a lab); the top hatch opens into the control and sleeping areas. A grav lock allows movement between the two floors.

Quad attitude jets at the back of the marinex provide additional approach and directional control.

There are no windows in the marinex, but excellent holographic slips reproduce the outside precisely upon all blank interior surfaces; the reproduction can be opaqued or dimmed by sections. An excellent sonar set linked to a computer imager provides a constantly-updated three-dimensional model of surrounding terrain, fish, water pressure, and soforth.

If the life system has water and organic matter to draw from, it can give food, water, and air to the crew indefinitely. Lacking these necessities, the marinex can protect a crew of four for about 30 days without special preparations.

PERSONAL FLYERS

This short section discusses the two most commonly encountered personal flyers in Human Space. Both are small, light-weight units that are worn rather than ridden, and all are flown with simple speed and directional levers in the hand or on the front part of a securing belt.

LIFT BELT
(many indistinguishable makers)

WEIGHT: 2.2 kg
VOLUME: 5cm x 10cm x 20cm, with belt (or belt and back-brace), with crotch-strap
SPEED: maximum 120 kph, cruising 100 kph
MAXIMUM ACCELERATION: 5 kph/im
ENERGY USED: 24/im
POWER SUPPLY: fusion 1
CAPACITY: can lift 200 kg in one gee
APPLICABLE SKILL: Personal Flyer
COST: 180 Stars
ARMOR: 2 points
HIT POINTS: 20

Lift belts are commonly used to travel short distances when public transit is inadequate or inconvenient. On Earth, manual piloting is illegal, so lift-belts are not regularly seen, but even there enough people enjoy going to the lift-rink that most adults have some skill. On worlds other than Earth, lift belt licenses are easily acquired and universally held.

Small MAGLEV generators lift the wearer off the ground and propel him forward at the desired speed. Lift belts are sturdy and reliable, and are simple to operate. In-flight changes of altitude, course heading, or speed are made with a small pressure-sensitive joystick attached to the belt by a retractable length of intercable.

Lift belts work only in gravity wells; they are useless in deep space. On Ringworld, MAGLEV lift belts will respond to the surface.

Larger lift belts exist for freight transport. Most are radio-controlled from the ground or from an adjacent lift belt.

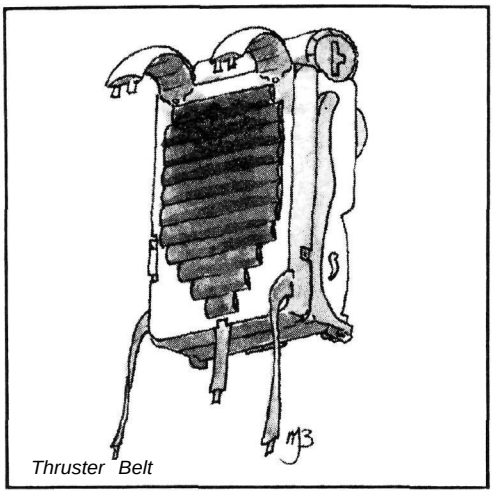
Ordinary Freight Belts

maximum MAS	*belt length*	*energy*	*cost in Stars*
53	3 meters	50/im	200
61	9 meters	70/im	500
69	12 meters	120/im	1000
79	20 meters	250/im	3000

THRUSTER BELT
(many indistinguishable makers)

WEIGHT: 6 kg
VOLUME: 8cm x 35cm x 70cm
SPEED: maximum 500 kph at 1 atmosphere; cruising 400 kph at 1 atmosphere
MAXIMUM ACCELERATION: 10 kph/im
ENERGY USED: 24/im
POWER SUPPLY: fusion 2 generator
APPLICABLE SKILL: Personal Flyer
COST: 750 Stars
ARMOR: 3 points
HIT POINTS: 25

These devices contain a generator and thruster within in a padded white-plastic shoulder pack. They are useful in any gravity.



Thruster Belt

A sonic fold protects the wearer from wind and climate. Like lift belts, these units are silent, and can hover.

location	*1D20*	*Armor/HP*
crew deck *	01	25/225 (.30)
bunk deck *	02	25/225 (.30)
bottom gulper	03-04	25/225 (.30)
rear gulper	05-06	25/225 (.30)
thrusters and generators	07-08	25/225 (.30)
cargo hold	09-20	25/525 (.70)

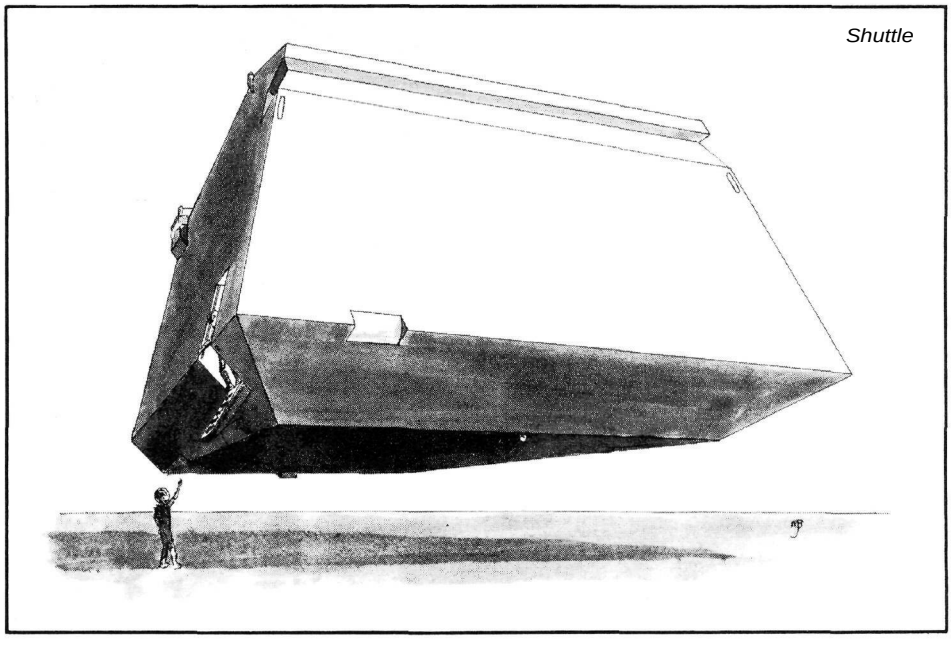
** make luck rolls to see if crew is hit*

Freight and passenger shuttles are the workhorses of local and interplanetary space. The accompanying illustration shows a surreptitious version of the popular JinxHaul, one of the sturdiest interplanetary ships ever designed. The command cabin is at the top rear; a real-light window slashes across the top front. To the left bottom is a ground-crew access hatch; to the center front is the loader-panel controlling the gulpers — the main cargo hatches.

Depending upon clearances, the JinxHaul can fully open either its base, shown here, or its ship-wide rear (to the right and behind) cargo doors, both allowing entrance and stacking of pre-loaded, ship-width gravity pallets. Two flush-plates marking massive safety hinges can be seen along the left leading edge of the base. The JinxHaul can be completely loaded or unloaded in ten minutes or less.

By adding adequate power sources and gravity generators, loaded gravity pallets can be stacked and racked along any convenient

Shuttle



SHUTTLE
(Dark Cargoes, of Serpent Stream)

MAS 84 (39,440 kg)
VOLUME: 17m x 19m x 35m
CARGO SPACE: 7,425 cubic meters; 30.560 kg average maximum load
SPEED: maximum lightspeed (hypothetical) cruising 100,000 kph
MAXIMUM ACCELERATION: 10 gees
ENERGY USED: 14,000/im loaded
POWER SUPPLY: fusion 5 generator
APPLICABLE SKILL: Reactionless Drive
COST: 80,000 new, 65,000 used
ARMOR: 25 point hullmetal
HIT POINTS: 750

parallel axis of gravity or acceleration. The cargo space therefore can be nearly 100% efficient.

The independently-pressurized control cabin and lounge is 3m x 3m x 6m; independently-pressurized bunkrooms and storage directly beneath are the same dimensions and connected by an escaladder. Emergency airlocks to the outside are found on the top of the command cabin and at the side of the bunkroom level.

Gravity/Pressure locks at the left front and center rear of the command cabin open on a metal catwalk which surrounds the vast cargo space at its very top. Escaladders beside the command cabin and halfway along the long sides of the vehicle lead down to the

floor. Lift belts could also be used for crew tours of the hold. Generators, fuel, thrusters, and so forth occupy the central peak of the shuttle.

Ordinarily, a pilot and co-pilot suffice to run a JinxHaul. Facilities exist for up to five crewmen to comfortably coexist on long trips to outer gas giants and Oort stations.

Standard equipment includes life system, food processor, memory bunks, tri-dee receiver, mate computer or equivalent with UN-standard subsystems, sensors, and navigation instruments.

SPEEDER: Mersault Commissar (Mersault Motion Systems, We Made It)

MAS 44 (1200kg)
VOLUME: 1.5m x 1.6m x 4m
SPEED: maximum 8900 kph
cruising 6000 kph
MAXIMUM ACCELERATION: 20 kph/im
ENERGY USED: 350/im
POWER SUPPLY: fusion 3 generator
APPLICABLE SKILL: Atmospheric Pilot
COST: 10,000 Stars
ARMOR: 10 points
HIT POINTS: 100

location	*1D20*	*Armor/HP*
communications equipment	01	10/10 (.10)
controls and displays	02	10/10 (.10)
passenger compartment *	03-09	10/35 (.35)
MAGLEV one	10-11	10/25 (.25)
MAGLEV two	12-13	10/25 (.25)
MAGLEV three	14-15	10/25 (.25)
thruster	16-17	10/30 (.30)
storage	18-19	10/15 (.15)
nose ornament %	20	10/1 (.01)

** make luck rolls to see if passenger hit*
% no performance effect

The fast and sporty speeder is one of many enclosed cars produced for long-distance travel across a planetary surface. With the introduction of the sonic fold, aerodynamically-correct designs became pointless; speeder-manufacturers marketed wildly unconventional and even anachronistic designs. The deluxe Mersault Commissar is an exemplary Ringworld-era speeder.

The manual controls of the streamlined Commissar are said to be the most responsive available in that speed/MAS range; explorers who must physically move long distances on a routine basis often choose it despite its cost.

This air car seats four comfortably (two in the front and two in the back), and can pack in six. Seat contours are moldable to the needs of the occupants. The pilot sits in the left front of the vehicle, and is supplied with a pushbutton control panel, a digital and pictographic display board (speed, acceleration, altitude, energy output, deep radar display, autopilot). The car has climate controls, 1000km A-V communications equipment, a miniature autokitchen generating food bricks in any of 20 flavors (but only one texture), and a waste-disposal facility beneath the left rear seat. Two cubic meters of storage space at the rear of the Commissar can be accessed only from outside the vehicle; .25 meters of storage inside the cabin exists under the right rear seat. There are two front doors.

The cabin is pressurizable to one atmosphere. The MAGLEV units can lift the car to 100 meters above the surface. Two reactionless thrusters at the rear propel the craft; the generator is in the rear beneath the thrusters.

STARSHIPS

Starships are the standard method of long distance transportation in Ringworld Era Known Space. They have been diversified, specialized, and modified to complete a plethora of transportation and cargo hauling tasks. But, since the main focus of this game is on the exploration of Ringworld, and most of the gameplay takes place on this huge structure, starships cannot be completely explained in this book. Some general information is provided to help familiarize the players with the interstellar transport available in human space. The gamemaster has a complete description of a particular starship. Further scenarios will include additional designs.

About Starships

Starships come in all shapes, sizes, and colors, from needlessly-streamlined playboy yachts to gargantuan sausage-shaped Jinxian battlecruisers, starsails, antique Bussard ramscoops, Orion-style nukeships, light-driven exotics, and so on. In general, older ships are slower and less comfortable, and newer ships are more expensive.

Ship Propulsion

In the Ringworld era, nearly every interstellar vessel possesses a quantum I hyperdrive shunt with which to jump from system to system. To navigate in and out of gravity wells (the dread singularities of hyperspace), all ships must have normal-space propulsion as well. The three most common types of normal-space drives are *fusion engines, gravity polarizers,* and *thrusters.*

Fusion engines are simply reactors with a hole in one end of the linear magnetic bottle. Electromagnetic radiation and high-speed ions pour from the hole at a furious rate, pushing the vehicle.

Thrusters are reactionless space drives which generate thrust, but emit no radiation or sub-atomic exhaust save bursts of neutrinos. Thrusters were sold originally by the Puppeteers; in fact, it is fairly certain that that paranoid species possesses an advanced thruster al-

GENERAL PRODUCTS HULLS: top left, number 1 hull; top center and top right, two sizes of Pierin Variant number 1 hulls; central foreground, number 2 hull; lower foreground, number 3 hull; lower background, number 4 hull.

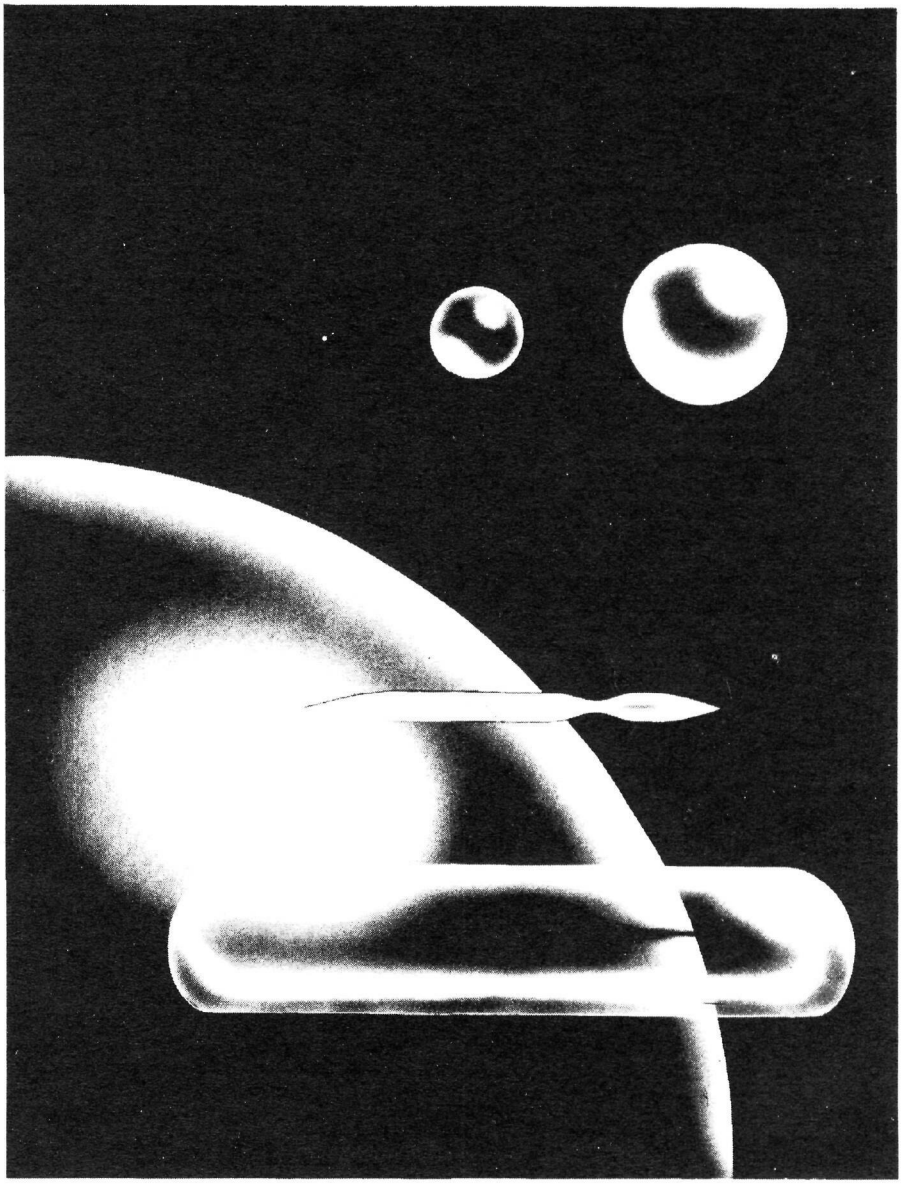


Illustration By Larry Todd

most ten times faster than the one standard in Known Space. (Given the Puppeteer fear of nearly everything, the ability to run faster than everyone must be highly prized; naturally, such thrusters are not traded to dangerous aliens, like humans.)

Although fusion engines are less efficient and not nearly as dependable as thrusters, they remain in use partly because of their handiness as weapons. A fusion engine's flame resembles a focused hydrogen bomb explosion. Many ships have both thruster and fusion engines.

Gravity polarizers are a third type of space drive used extensively during the Man-Kzin wars. With the development of reactionless thrusters, gravity polarizers became largely obsolete in Human Space, but are still widely used in technologically-backward colony systems. The Outsiders are known to possess a super-advanced reactionless, inertialess drive capable of 2500 gees. The selling price for this capability is one trillion stars. Planet-side propulsion methods include MAGLEV (magnetic levitation) generators which manipulate monopolar magnetic fields for thrust, and gravity generators, which are powerful but extraordinarily energy-hungry.

Inside the Ships

Every starship holds a life system — the pressurized and heated sections of the ship which can support life. A life system may support thousands, or a lone pilot, and is always tailored to the appropriate species: Kzin life systems are slightly cooler than human; Kdat systems are marginally warmer; Puppeteer life systems emit the sounds and scents of thousands of other puppeteers to keep the Puppeteer from feeling lonely. All life systems control cabin gravity, compensating for changes in ship speed. In addition to the flight deck, stasis-field-equipped crash couches, and quarters for passengers and crew, most life systems also contain recreation and exercise rooms, autokitchens, and mess halls. More expensive models feature sleeping plates, water beds, tridee libraries, and gourmet programs for the autochef.

The flight deck is the command center of a ship. From this area the pilot can monitor all ship's sensors, operate weapons, communicate with the autopilot computer, and watch the ship's mass detector — which warns the pilot of nearby singularities while the craft is traveling through hyperspace. The mass detector (also called a mass pointer) is a large crystal sphere with a number of blue and green lines radiating from the center. The direction of the lines indicates the singularity's location, and the length of the lines shows the mass of the normal-space body causing the singularity. The larger the mass, the farther the pilot must steer from it. Mass detectors are psionic devices requiring minds to operate them — hence the existence of living pilots in a universe with super-competent computers.

Hull and Ship Types

The following surveys a small fraction of the ship types of Known Space.

The most prized starship hulls are the General Products hull Nos. 1-4, once sold by the Puppeteer-owned company of the same name. They are the ultimate in safety. GP hulls have low mass, are perfectly rigid, and are invulnerable to all forms of normal matter. The hull substance is clear, transparent only to visible light and gravity waves. All other electromagnetic or sub-atomic radiation, regardless of intensity, is totally reflected by a GP hull. The transparent hull material is a single, fantastically-complex molecule whose bonds are artificially enhanced beyond even the power of the "strong" nuclear binding force. A GP hull is strong enough to plow headfirst into a neutron star and survive without a dent — though such a collision would destroy everything within the ship. Antimatter can disintegrate a General Products hull, but this fact was never advertised. To avoid the insanity caused by over-exposure to the hyperspace blind spot, opaque paint is often used over most portions of a GP-hulled ship's life system. Some types of GP hulls, built for at least one of the Puppeteer's alien customers, are transparent to wavelengths invisible to humans.

Indestructible hulls were one of the first products sold to humans by Puppeteer traders, and by the mid-2600s a large minority of all starships were built around GP hulls. But when the Puppeteers began their famous exodus from Known Space, they hastily liquidated all their assets. With General Products, Inc., dissolved, no more indestructible hulls were manufactured. Spacecraft corporations collapsed, followed into oblivion by hundreds of other companies. The stock markets on a dozen worlds crashed. The once-rich stepped off buildings without lift belts, or begged a final dose of boosterspice. The secret of producing indestructible hulls was put up for sale, at over a trillion stars. With the economic disaster, there were no takers, and the Puppeteers left with their secret. Humans have so far been unable to independently duplicate the technique.

In the Ringworld era, nearly every GP hull is still in service. Many have had a dozen different owners, and others have been passed from generation to generation. Few hulls have ever failed. Even though the indestructible hulls are still in use, the number of ships has grown so dramatically that less than a quarter of all spacecraft are now GP-hulled. The rest use hull metal, microsteel, or titan alloy. Since GP hulls cannot simply have a door or window cut into their side, all such openings were individually designed to meet original purchaser specifications. All GP hulls have at least one large cargo door and several smaller ducts for air locks and external conduit connections. The Puppeteers never sold warships, but many GP hulls have seen service refitted as military or police craft.

General Products hulls were delivered fully transparent — flare shielding, conductive coatings, opaque or reflective paint to be applied by the customer. Apertures for reaction-drive exhausts, instrumentation ports, hatches, retractable landing legs, and the like necessarily varied with the specific application of each hull. Since the Puppeteers often equipped their own ships with stasis-field emergency systems, they preferred hulls with as few openings as possible.

Flatlanders may find anonymity and lack of variety in the GP hull designs, but few seasoned travelers would trust their lives to anything less sophisticated. The view from inside a GP hull may take some getting used-to, since many have been left transparent. The curving walls, floor, ceiling, and inner partitions (when present) are glass-like and nearly invisible. Within the apparent emptiness glow the neon outlines of doors and hatchways; the passenger compartments, private cabins, drive, and life-support systems show as painted blocks of solidity. The field of view is excellent, but in hyperspace the appearance of the Blind Spot remains a serious psychological danger to the untrained human mind.

GP HULL No. 1 - The hulls of this type sold in Human Space are globes only 30 centimeters in diameter. Their reinforced-molecular bonds are as strong as any of the larger GP hulls. On a cost-per-volume basis, No. 1's are quite expensive. The tiny hulls have been used to probe the hearts of suns, as emergency beacons, and even as indestructible cannon balls. Two larger variants of the No. 1 hull, fully transparent to certain bands of infrared, were sold to the Pierin, but were never mass-produced in Human Space.

GP HULL No. 2 - This is the most common General Products hull used by humans. It is a slender spear six meters wide and 90 meters long, narrow and needle-tapered at both ends, with a slight wasp-waist constriction near the tail. Since these ships often are used as planetary vessels, most are fitted with fold-landing shocks, retractable attitude jets, and re-entry engines as well as hyperspace quantum shunts. GP No. 2 hulls comfortably accomodate a maximum crew of 12.

GP HULL No. 3 - These are cylindrical in shape, about 35 meters in diameter, and nearly 150 meters long. The ends are smooth hemispheres — giving the hull the semblance of a huge Jinxian sausage. The bottom of the hull is flattened for belly landings. Because of their size and relative scarcity, No. 3's are rarely used for anything but luxury liners and military cargo vessels. The Puppeteers are known to use a large proportion of No. 3 hulls, perhaps because their advanced drive systems and extra safety devices require a substantial enclosed volume.

GP HULL No. 4 - The largest GP hulls are the perfectly spherical, 300-meter-diameter No. 4's. These giants are far too expensive for purchase by individuals, or even most corporations. They are bought and traded by governments to ship entire prefab colonies and other bulk cargoes. Only No. 4 hulls are large enough to house the machinery of a quantum II hyperdrive shunt. There are rumors that the Puppeteers manufacture No. 4 hulls in four different sizes for their own use, including one mammoth globe 1500 meters in diameter.

GP HULL No. 1, PIERIN VARIANT - Modeled after a traditional Pierin design, the General Products-built Monitors use two variants of the GP No. 1 hull, 20 and 40 meters, respectively, in diameter. The molecular bonding of these hulls is less intense than in the hulls later sold in human space, to provide limited transparency to infrared wavelengths. The spherical main hulls are sunk nearly halfway through the centers of smoothly-tapering , aerodynamic disks of Puppeteer hull metal, 36 and 72 meters, respectively, in radius. GP-hulled Monitors are commonly equipped with reactionless thrusters and gravity generators. Such vehicles saw considerable use in the Pierins' defense of their colony worlds against Kzin invaders. The ships were renowned for their versatility in close planetary combat, especially in maneuvers such as atmospheric skipping, dive turning, and bait-and-switch tactics.

SINCLAIR INTERSYSTEM YACHT - Sinclair shipwrights are renowned throughout Human Space for sleek and innovative designs. The model 3518 intersystem yacht is a prime example of superior engineering. The ship is slender, bladelike, reaching 30 meters in length with a dozen outrigger pods for cargo

storage and attitude-jet control mountings. Some grizzled space veterans consider the vehicle an impractical playboy's toy, but none deny its aesthetic attractiveness.

SKYHOOK - A Skyhook is a class of medium-sized starships easily accommodating 400 passengers and considerable cargo. It has a 120-meter-diameter life system surrounding a central hyperdrive module. Its main reaction-motors are human-built thrusters and extremely efficient fusion engines. The detachable life system is an aerodynamic toroid bearing some resemblance to the ancient circular flying-wing ramships. Built by Skyhook Enterprises of Kansas City, Skyhook starships are the latest, most refined descendants of a long line of workhorse human interstellar craft.

SINGLESHIP - Singleships evolved from the one-man scout craft used by miners in Sol's asteroid belt during the early era of space colonization. The ships are squat, cylindrical jobs, about 12 meters in diameter and less than 18 meters in length. Singleships are frequently used as explorer scouts and rarely have crews larger than three or four.

LINER — Liners are passenger starships large enough to transport the population of a small town. These ships are at least 150 meters long, and the largest reach nearly 300 meters in length. The more luxurious liners include holotheaters, swimming pools, botanical gardens, and species-tailored cabins for non-human passengers. The largest, plushest liners are the *Imperator, Argos, President John H. Glenn, Jr., Mali Klondike Express, Aquitania, Kzzz-twee* ("Far-Swimmer" — a dolphin-owned craft), *Black Star,* and the unrivaled queen of space, the *Titanic II.*

TRANSPORT - These shipping vessels rarely make planetfall, remaining in high orbit while shuttles and carriers bring in the cargo. Transports are ellipsoid, 200-210 meters long, about 75 meters wide, and perhaps 40 meters thick. Within them are huge, unpressurized cargo bays, each colosseum-sized, with at least three loading docks.

OTHER SHIP TYPES - Some other starship hulls include intrasystem tugs, shuttles, police ships, Ripping Fang (Kzin) cruisers, Jinxian battle cruisers, Kdatlyno colony ships, the Kzin fighter class Merciless Slayer of Cowards, Trinoc explorers, planetfall launches, and escape pods.

STASIS BLIMP
(EF-Regal of Wunderland)

MAS 16 to 28 (balloon only)
VOLUME: 80,000 to 200,000 cubic meters
SPEED: maximum about 120 kph
cruising about 100 kph
MAXIMUM ACCELERATION: about 2kph/im
ENERGY USED: 120/im
POWER SUPPLY: fusion 3 generator
APPLICABLE SKILL: Atmospheric Pilot
COST: 9000 Stars, plus fittings; kit is 4000 Stars, plus fittings
ARMOR: stasis hull is invulnerable; passenger cabin has 10 point armor
HIT POINTS: stasis hull is invulnerable; 100 points for rest of craft

location	*1D20*	*Armor/HP*
hull	01-15	invulnerable
thruster one	16	10/40 (.40)
thruster two	17	10/40 (.40)
passenger compartment *	18-20	10/65 (.65)

** make luck roll to see if passengers hit*

The eccentric architect-inventor Karl Ehben-Feure assembled the first stasis blimp on Wunderland in 2710. The last heir to a Wunderland noble house, Ehben-Feure was obsessed by the concept of asymmetry. His most ambitious project was the planned construction of an entire asymmetrical city. The idea for the stasis blimp came as an inspiration during a Verguz binge.

Ehben-Feure saw the stasis blimp mainly as a medium on which to practice asymmetrical design. His regents and later designers have used the stasis blimp as everything from a baroquely-embellished showboat to an advertising billboard. The military has designed a streamlined blimp which uses the expanse of invulnerable hull to the maximum tactical advantage, hiding cargo and crewspace in tunnels deep inside.

A stasis blimp is manufactured in space. The builder creates a stasis-conductive shell in any shape he wants (a small mass is usually suspended inside the shell to adjust the center of gravity), then a stasis field of at least 500 exterior years is generated. Since the stasis field contains near-vacuum, the blimp is much lighter than air. After activation, the blimp is towed to the surface and anchored. A passenger cabin, system of propulsion, and ballast are added.

Stately asymmetrical stasis blimps often wander the Wunderland skies. They are also seen on Home, where they take more naturalistic shapes. On Earth, stasis blimps are strictly licensed, and used almost exclusively for advertising. On Gummidgy, they carry aerial tours across the wild surface in the relative safety of the sky. The only human world on which these machines never ply the air is We Made It — where seasonal gales render blimps impracticable.

VERSATRAK
(Exploration Inc., Down)

MAS 55 (3000 kg)
VOLUME: 3.25m x 4m x 6m
SPEED: maximum 85 kph land, 20 kph underwater; cruising 50 kph land, 15 kph underwater
MAXIMUM ACCELERATION: 5 kph/im
ENERGY USED: 490/im
POWER SUPPLY: fusion 3 generator
APPLICABLE SKILL: Ground Vehicle
COST: 20,000 Stars; 40 MAS-point stunner is 450 Stars
ARMOR: 20 point tracks, 1 5 point passenger compartment
HIT POINTS: 200

location	*1D20*	*Armor/HP*
track one	01-03	20/50 (.25)
track two	04-06	20/50 (.25)
track three	07-09	20/50 (.25)
track four	10-12	20/50 (.25)
generator and drive	13-14	15/20 (.10)
passenger compartment *	15-20	15/100 (.50)

** make luck rolls to see if passenger hit*

A sturdy vehicle, the versatrack is intended to be used as a secure mobile base for scientific exploration, survey, and study of regional fauna, flora, ecosystems, and terrain. Versatraks are not fast — a liability for long distances.

The versatrak is pressurized, and can function in vacuum, underwater, or alien air for up to 30 atmospheres of pressure.

The fusion 3 generator, electric motors, and deuterium tank are mounted between the variable-pitch, reversible tracks of the vehicle; the tracks themselves are quite wide; there are four independently-suspended track sections, any two of which will suffice to move the vehicle at half-speed. Particular care was taken in design to create tread housings which could not be jammed by random surface or plant materials.

The passenger compartment extends the length of the vehicle, but is only 3m wide. Polarizable windows surround the compartment; in front is a door to either side; in the rear is a larger single door which folds out and down to make a ramp. Within the right-hand front door is a pressure-curtain maintenance field which will hold 1 interior atmosphere against any exterior ranging from vacuum to 5 atmospheres.

Seats exist for a maximum of 7 passengers, and about 20 could be crammed in standing up, but normally the crew is 2 to 3 operator-scientists, who take turns driving, observing, studying specimens, and so on. Vehicle controls are simple, and there is an engagable autopilot which will steer a consistent course (though at only 30 kph), and beep for help if it meets something it can't cross, detour around, or understand.

Food processor, memory-plastic bunks, and waste-disposal systems are built in.

Vehicle sensors and navigation devices are unsophisticated, but adequate for such a low-speed vehicle. There is a built-in shortwave broadcast transceiver. Two infrared and two visible light searchlights are mounted atop the passenger compartments, and can be aimed from within, as can be the adjustable-fire sonic stunner (which can affect up to MAS 40) in a separate turret.

WEAPONS

DISINTEGRATOR, SLAVER
(Insta-Mining S.A., Belt)

MAS: 2.7 kg

VOLUME: large rifle

MAXIMUM RANGE: 10 meters

DAMAGE DONE: 5 points/im plus certain specific effects

ENERGY USED: 15/im

POWER SUPPLY: 300/1 5/.75kg/R battery in stock; optional external battery (20,200/15/5kg/R) unit, cable-connected

ARMOR: 2-point

HIT POINTS: 20

APPLICABLE SKILL: Heavy Weapon (energy)

COST: 300 Stars, batteries not included (batteries cost 30 stars, external battery costs 300 stars.)

The slaver disintegrator is a rifle like device with a single stocky barrel and a nor-

mally-placed trigger. A safety switch is near the trigger. As long as the trigger is depressed, and energy is still being supplied, the gun will continue to emit the disintegration beam. The effects of the beam will become more and more extreme as exposure continues, allowing the beam to cut out one cubic meter of stone every 30 seconds; for extended digging, a fusion 1 generator is recommended to power the disintegrator. The beam spreads to its maximum diameter, of 3m at its maximum range, 10m from the end of the barrel.

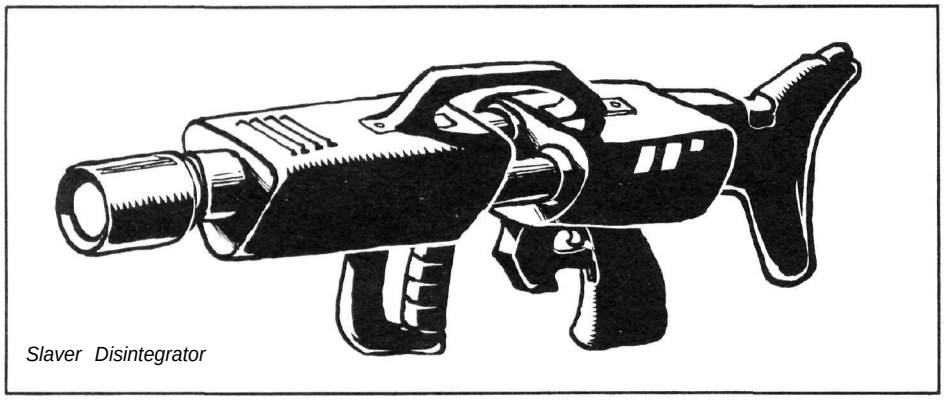


Illustration by Larry Todd

Slaver Disintegrator

The beam of the Slaver disintegrator disassembles its target sub-atomically. The short-range but rather wide beam changes the charge on the target electronics from negative to neutral, an alteration which quickly re-stabilizes itself, but not before the target has been disassembled into incredibly - fine molecular or atomic dust. It takes a few impulses for the effect of the beam to penetrate deeply into any sort of dense matter; many creatures can survive momentary exposures to this weapon.

Each impulse of exposure to the beam of a Slaver disintegrator does 5 points of damage to a target's general hit points. Such damage may not kill immediately, but is permanent in its effect. If a hit location is not within the confines of the beam area, or on the other side of the body from the source of the beam, it will not be affected. One impulse of exposure to the eyes causes permanent blindness. The first impulse of exposure also effaces body hair and outer epidermal layers (autodocs treating such victims quickly exhaust their skin transplant and plastiskin supplies). Each additional impulse incurs more permanent damage (in many ways resembling third-degree burns), and eventually death.

Slaver disintegrators have no effect on scrith, nor on General Products hulls. Sinclair monofilament chain, hullmetal, or duralloy is easily destroyed by a Slaver disintegrator.

Used in a limited environment (such as a space ship), a disintegrator will disintegrate significant amounts of air as well as the ostensible target.

In the Ringworld Era most mining is done using Slaver disintegrators, some of which are huge — able to dig great chasms in moments. Because of their usefulness, Slaver disintegrators are legal all over Known Space, but often they are licensed. Depending on circumstances, individuals may find it difficult to get a license.

DISINTEGRATOR, PUPPETEER
(General Products)

MAS: 2.2 kg

VOLUME: rifle-sized

MAXIMUM RANGE: 30 meters

DAMAGE DONE: 5/im, or explosion damage (see below)

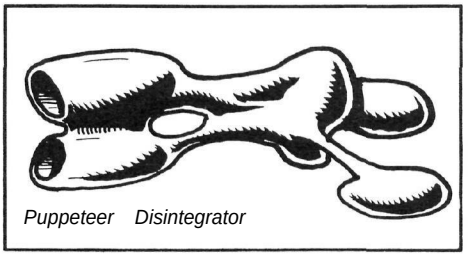


Illustration by Larry Todd

Puppeteer Disintegrator

ENERGY USED: 15/im; the Puppeteer disintegrator can be used in either mode with the same energy expenditure

POWER SUPPLY: 300/1 5/.75kg/R battery in stock: optional external battery (20,000/ 1 5/5kg/R, cable-connected

ARMOR: 4-point

HIT POINTS: 20

APPLICABLE SKILL: Heavy Weapons (energy)

COST: extremely rare in Known Space; 29th century collectors have paid up to 40,000 Stars for one

The Puppeteer disintegrator has the characteristic Puppeteer melted-metal design. There are two barrels: the first barrel fires a beam identical to that of the Slaver disintegrator, changing the charge on the electron. The second barrel suppresses the positive charge on the proton. When both barrels are fired together, an atomic explosion occurs at the point of intersection.

When only the negative charge suppressor is fired this disintegrator has an effect identical to the Slaver model.

When both beams are fired an explosion occurs: if the beam contacts gaseous substances at one atmosphere, only a sudden bang, some heat, and an inrush of air occurs; if a solid or liquid is the target of both barrels, the molecular bonds are negated, and an explosion occurs. It does 5D6 damage to anyone within 3 m; 4D6 to those 3-4.9 m; 3D6 at 5-5.9 m; 2D6 at 6-6.9 m; 1 D6 at 7-7.9 m; and 1D3 at 8-8.9 m.

The Puppeteer disintegrator has no effect on scrith or on General Products hulls.

Human Space Ranged Weapons Table

weapon	*applicable skill*	*energy input*	*range (meters) short/med/long*	*damage*
Disintegrator:				
Puppeteer	HW (energy)	15	30 max.	5 or explosion *
Slaver	HW (energy)	15	10 max.	5 + other *
Dueling Pistol, Jinxian	HG (energy)	1/2 MAS	20/30/50	knockout%
Hand Beamer	HG (energy)	10	20/50/100	1D4 + 6 **
Laser Pistol	HG (energy)	25	30/100/200	1D10+ 15 **
Laser Rifle	HW (energy)	40	100/200/400	1D10 + 30 **
Laser Cannon	WS	100	100/200/400	1D20 + 80 **
Pneumopistol	HG (projectile)	1	10/30/70	1D8+1 &
Pneumorifle	HW (projectile)	2	200/400/600	2D6 &
Stun Cannon	WS	5/MAS	50/100/150	knockout%
Stun Pistol	HG (energy)	1/MAS	20/40/100	knockout%
Tasp	HG (energy)	10	10 max.	pleasure ***

Applicable Skill: Handgun (HG); Heavy Weapon (HW); Weapon System (WS)
Energy Input: per shot or impulse, as appropriate

* beam through atmosphere leaves appearance of falling steam
% whine like burning-out electric motor
** brilliant blue-white or green pulse of light
& sharp sound like the crack of a whip
*** not observable

Human Space Melee Weapons Table

weapon	*applicable skill*	*energy input*	*range*	*damage*
Flashlight Laser	Flashlight Laser/VS	varies	varies	0 to 50
Variable Sword	FL/Variable Sword	1/meter	1m to 30m	1 D20 + 5

LASER WEAPONS

Laser beam light is coherent; all the light in a beam is of exactly the same frequency, and all of it travels in exactly the same direction. Laser light will not spread out — it will remain in a tight beam for kilometers. Since laser light can be aimed precisely, and since it can be intensified and launched in powerful pulses, lasers have the capacity to make effective weapons.

Since a laser beam is made up entirely of light, it can be reflected, refracted, and diffused. A reflective surface will bounce a laser beam in a direction away from the angle of the surface. Since laser light must be a single frequency, refraction changes the direction of the entire beam equally. Diffusion causes the light in the beam to lose focus, spreading it over a wide area and greatly reducing the destructive power and range of the beam. For protection against lasers and other weapons, see the protective devices section.

Lasers have difficulty cutting through surfaces of the same color as the beam, and laser beams do little damage in passing through transparent objects. Very powerful lasers will eventually burn through such objects given continued exposure and some refraction.

A laser can be built to any frequency, though some frequencies are more useful than others. Lasers of higher frequencies are more powerful than lower frequency beams, but cost much more energy. For communication purposes, choose a low-frequency laser; to burn through steel choose a higher frequency.

Lasers built for use in Terran atmospheres usually operate somewhere in the visible light spectrum; atmospheric gases tend to absorb other frequencies, limiting the range of lasers of lower and higher frequencies.

HAND BEAMER
(Leonhardt Electronics, Serpent Stream)

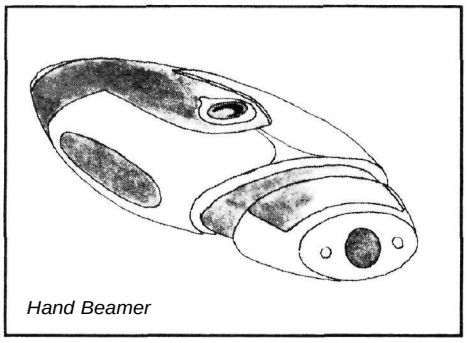
WEIGHT: 250g

VOLUME: 4cm x 7cm x 10cm

RANGE: short 20m, medium 50m, long 100m

DAMAGE DONE: 1 D4 + 6 points

ENERGY USED: 10/shot



Hand Beamer

POWER SUPPLY: 500/10/1 30g/N battery

ARMOR: none

HIT POINTS: 4

APPLICABLE SKILL: Handgun (Energy)

COST: 50 Stars, 5 Stars per battery pack

The hand beamer is a small, low-powered, easily-concealable attack laser, well-known for its distinctive oval shape. It fires a pulse of red light. The hand beamer is non-adjustable. The battery pack is good for 50 shots. Hand beamers, like all deadly weapons, are illegal on most Human Space planets, and even where legal are subject to strict licensing requirements.

LASER PISTOL
(Police Systems, Earth)

WEIGHT: 450 g

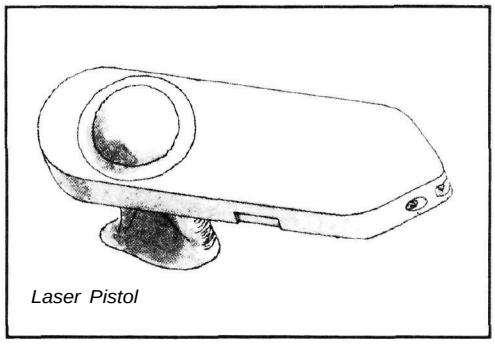
VOLUME: large pistol — 4cm x 18cm x 25cm

RANGE: short 30m, medium 100m, long 200m

DAMAGE DONE 1D10+15 points

ENERGY USED: 25/shot

POWER SUPPLY: 250/25/70g/R superconductor ring-battery fits over demisphere protrusion on pistol; takes one major action to change; or optional external battery (4000/25/1060g/R) and cable connector



Laser Pistol

ARMOR: 2 points

HIT POINTS: 8 points

APPLICABLE SKILL: Handgun (Energy)

COST: 100 Stars; 20 Stars optional external battery package, regular battery ring 5 Stars

The laser pistol illustrated is a compact officer's sidearm design. The weapon lies flat on the wearer's arm or at his belt, but when unholstered and properly squeezed, the memory plastic handle and trigger extrude. The gun is incapable of operation until this is done. Atop the pistol is a demisphere projection over which a superconductor ring battery fits. These battery rings are sold in packages of twenty (for 100 Stars each); spares are sometimes arranged in bandoliers or carried in a belt pouch. These battery rings provide enough energy for 10 shots.

Most laser pistols emit two beams. The first is a low-power, red sighting beam which operates continuously when the finger is on the trigger, but the trigger is not pressed. This aiming beam projects a spot of red target light along the axis of fire, and makes aim easier. Since enemies can see it as easily as the firer, the finger is sometimes left off the trigger until a target is sighted.

The second beam is a powerful pulse of blue-green light emitted when the trigger is depressed. This is the beam which inflicts damage. If the trigger is kept depressed, a pulse can be emitted every impulse.

LASER RIFLE
(UN military issue — sold widely to corporations and foreign governments)

WEIGHT: 1.2 kg

VOLUME: medium rifle - 70cm long

RANGE: short 55m, medium 200m, long 400m

DAMAGE DONE: 1 D10 + 30 points

ENERGY USED: 40/shot

POWER SUPPLY: 800/40/210g/R battery pack in stock; optional belt pack battery 4000/40/1.5 kg/R

ARMOR: 2 points

HIT POINTS: 12

APPLICABLE SKILL: Heavy Weapon (Energy)

COST: 250 Stars; mostly illegal in Known Space save for military use; available on black market

A standard military issue on most human planets, only the governments of Gummidgy, Margrave, the Belt, and the Serpent Stream allow private citizens to own laser rifles, and even these governments have licensing requirements.

This weapon has standard trigger and safety arrangements, and a self-contouring stock which conforms itself to the lines of the user's shoulder. The barrel of the rifle contains the laser tube, and a heat conversion system which spirals around the barrel just under the surface to convert local heat back into energy. That system lends the weapon a queer lumpy look.

The laser rifle fires a single pulse of blue-green light, a slightly different hue than the fire of the laser pistol. If the trigger is continuously depressed, the rifle will fire one pulse per impulse. The red-beam sighting system found on standard laser pistols are also used on these.

LASER CANNON
(UN Military, sold to corporations and foreign governments)

MAS 2 (10.2 kg) laser
4 (21 kg) mountings/energy re-converter
1 (5 kg) fusion 2 generator

VOLUME: 12cm x 1 m barrel; mountings and cooling system 1 cubic meter

RANGE: short 100m, medium 200m, long no maximum range

DAMAGE DONE: 1D20 + 80 points

ENERGY USED: 100/shot

POWER SUPPLY: fusion 2 generator

ARMOR: 10 points

HIT POINTS: 20

APPLICABLE SKILL: Weapons System

COST: 2000 Stars from government - 20,000 Stars on black market

This laser cannon is commonly used to guard military and official locations against small arms attacks. Also, laser cannons can be mounted on military vehicles. They are strictly prohibited to the civilian population of all human worlds except those of Margrave, Gummidgy, and the Serpent Stream, whose governments have strict licensing requirements.

Laser cannons are usually built into fortified emplacements which provide additional

armor and protection for the firer. Emplacements vary with tactical requirements.

Within the barrel of the cannon are the laser tube and an energy re-converter. Motion and reconversion controls are contained in the mount. The laser cannon can swivel in all directions. It fires a pulse of pure blue light; once per impulse if the trigger is kept depressed. The firer is supplied with a pair of goggles cable-linked to the gun, which place a cross over the exact spot the laser will hit if fired, and projects a digital reading of the approximate distance in meters to the first obstruction in the path of the beam. These goggles add 20% to the firer's chance to hit after all modifications.

These lasers are often mounted on vehicles or small fighter spacecraft. When in action, they require a full-time operator.

LASER GUNSIGHT
(UN Issue)

WEIGHT: 200g

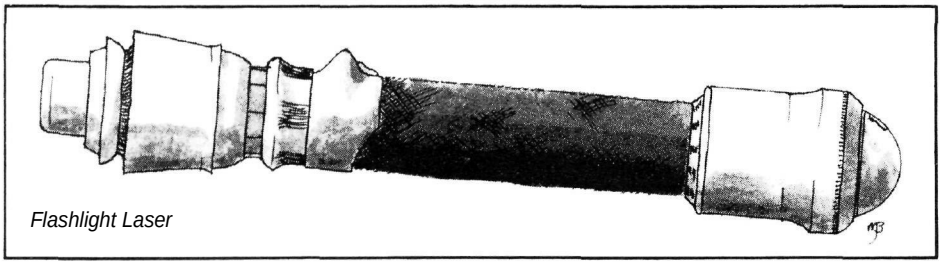
VOLUME: 3cm diameter x 6cm tube

ENERGY USED: 1/minute

POWER SUPPLY: weapon's power supply

APPLICABLE SKILL: none

COST: 25 Stars



Flashlight Laser

This apparatus increases by 20 percentiles an explorer's chance to hit with the weapon to which it is attached, after all other modifications. The red-laser sighting beam is visible to enemies as well as friends, and may not be desired by a person wishing to fire from a concealed location. Nominal magnification increase of the sight is 30x under all lighting conditions.

The laser gunsight is usable with most weapons, and can be moved from one weapon to another, but the mechanism must be recalibrated after each such transfer, requiring a successful Repair roll and several minutes.

FLASHLIGHT LASER
(General Products)

WEIGHT: 1.1 kg

VOLUME: 3cm diameter x 6-10cm tube

RANGE: short 5m, medium 25cm, long 50m

DAMAGE DONE: varies, see below

ENERGY USED: varies, see below

POWER SUPPLY: 1000/50/260g/R battery manufactured specifically for use in the flashlight laser — the weapon cannot accomodate other batteries. Occasionally flashlight lasers are linked by cable to a fusion 1 generator worn in a backpack

ARMOR: 1 point

HIT POINTS: 10 points

APPLICABLE SKILL: Flashlight Laser/ Variable Sword

COST: 500 Stars; supercoolant cartridge 25 Stars each, must be changed every time the battery is recharged

The Puppeteers invented the flashlight laser, and it shows their influence. This device can be used either as an ordinary flashlight or as one of the most deadly personal weapons conceivable. The Puppeteers claim that the high-powered, narrow-beam setting only allows the weapon to function as a cutting tool; cynical non-Puppeteers disbelieve this statement.

The flashlight laser is the only available continuous-beam laser hand-weapon. Other continuous-beam lasers have not been marketed because of energy consumption, problems with heat exchange, and the plasma interference created with a continuous beam. The flashlight laser uses a Puppeteer-made supercoolant cartridge which human engineers have not been able to duplicate.

Flashlight lasers come in a variety of designs, but all are 15-20cm tubes. Puppeteer models have a melted-metal look, and are flatter and wider at the rear for easy manipulation by the Puppeteer mouth. Human models have a more cylindrical, machined-metal appearance, with projections from the tube at the front and rear (see accompanying illustration). The rear projection is removed to replace battery and cooling cartridge. At the rear of the forward projection is a switch with ten settings — this governs the intensity of the beam.

Flashlight lasers, due to the continuous beam, are used differently than other lasers in *Ringworld.* The method used to fight with the laser is much like that of the variable sword, as both are long range, with almost weightless 'blades.' For ease of interpretation, all swings are horizontal unless bizarre circumstances force another interpretation.

The flashlight laser has ten intensity settings. The lowest setting is a wide beam best used as a flashlight (it illuminates up to 1000 meters away); the highest is a powerful beam focused to a pinpoint which is capable of burning through steel at 5cm/im. The laser emits a green light on all 10 settings.

Flashlight Laser Intensity Table

intensity setting	*energy/impulse*	*beam width*	*damage done*
1	5	3m at 20m	none
2	5	1m at 20m	none
3	5	10cm at 20m	5/im at close range
4	7	5cm at 20m	7/im at close range 5/im at medium range
5	10	1cm at 20m	10/im at close range 5/im at medium range
6	15	1cm at 20m	15/im at close range 10/im at medium range 5/im at long range
7	15	1 mm at 20m	1 5/im at any range
8	25	,01mm at 20m	25/im at any range
9	35	.01mm at 20m	35/im at any range
10	50	.01 mm at 20m	50/im at any range

Though it can be used against single targets, the flashlight laser is really for group effect. The slower the beam moves, the greater will be the damage to the targets. The total damage done by the beam in an impulse is divided among all those struck by it. If a laser with an intensity of 8 were to strike 5 targets in a single impulse (presumably swept across them in a swath), the total damage is divided evenly among the victims, each taking 5 points of damage. Drop fractions. An extremely dextrous individual might be able to allocate damage among those struck by the beam by carefully timing the period in which each is struck by it.

Damage to each target must be divided among hit locations. The attacker should roll a hit location for the first target; the result of this roll is the location of the first hit. Additional locations hit depend on the direction of the moving beam, as stated in advance by the attacker. If the beam is moving to the right and the first location hit is the target's left leg, the right leg will next be hit, and then the beam will advance to the next target.

For each target hit, another hit location is rolled, but at his option the user may modify the numerical result of the roll by 5.

A flashlight laser may be swung effectively to a maximum arc of 180 degrees in one action ranking.

If a target is facing away from the source of the beam, the left and right hit location table results must be reversed.

If all of the targets are at approximately the same distance from the user of the laser, the player need make only one attack roll against all opponents fired upon in one impulse. If the opponents are at varied distances from the user, a separate attack roll must be made to hit each of them. If one target stands directly behind another (gamemaster ruling), he or she takes damage done by the laser in excess of twice the person in front's locational hit points.

If the laser is being fired at a widely-spaced group, the total damage done is halved before it is divided up among the various targets because much of the beam's energy is wasted on open air rather than victims.

For purposes of this rule, any group in which the average density of targets exceeds one per square meter constitutes a crowd for which the total damage does not have to be halved. Since 'average' is susceptible to marked abuse, the gamemaster always defines it so.

General Example: after his player special-failured an important Fast Talk roll which could have swindled some hominids out of an interesting artifact, five hostile sword-toting Herders have cornered Dr. Uwe Frieburg. He is left with no means of escape except his trusty flashlight laser.

Frieburg chooses to use the laser in a single sweep against the entire group (they have spread out to give themselves sword room). He knows that more damage will be done to each target if he swings his laser more slowly and decides to take three impulses to swing the beam across the Herders (two for each of the first two impulses, and one for the third), hoping that none are fast enough to reach him with a sword before he can get them all with the laser.

IMPULSE ONE: Dr. Frieburg surreptitiously slides the intensity switch of his flashlight laser to maximum.

IMPULSE TWO: he levels the weapon and presses the firing button. During the second impulse, the gamemaster makes Observe rolls for the Herders: the first and third from the right from Dr. Frieburg (Herder A and C, respectively) succeed.

IMPULSE THREE: the laser beam appears and Uwe begins his attack upon the two Herders furthest right (A and B). Herders A and C saw Uwe's motion, and simultaneously shout a warning and begin their sword strikes — each have action rankings of 4. All the Herders see the beam.

Uwe is 50% with a flashlight laser; his player rolls a 25 — Herder A is hit, and in the left arm. (Since Dr. Uwe is swinging his beam to the right, he cannot hit any more areas on Herder A.) Dr. Frieburg does not need to re-roll to check if Herder B was hit — only one roll is made for all targets in an impulse. The second Herder is also hit in the left arm, but the gamemaster deems that it is unlikely that the left arm would be hit alone, and states that the beam traversed Herder B's right arm and chest to get to the left arm.

So the 50 points of damage is equally divided between the two hominids, 25 points to Herder A's left arm, severing it, and 8 points each to Herder B's right and left arms and chest. Both have lost consciousness and possibly life.

IMPULSE FOUR: Uwe continues his swing, as does Herder C (who spotted Uwe's action early). Herders D and E begin sword swings which will be completed on impulse 7 if they survive. To hit Herder C, Uwe's player rolls and succeeds with another attack roll. The hit location is the left arm again (roll of 18), which Dr. Uwe chooses to modify to a roll of 20, the head. Herder D is hit in the chest, and this roll stands unmodified. Herder D's right arm is missed, but the gamemaster states that his left arm was low enough to get caught in the beam as well. Hominid C takes 25 points to the head and crumples in two parts and Hominid D takes 12 points of damage each to his chest and left arm and falls as we/l.

IMPULSE FIVE: only Herder E is still coming. Uwe attacks, but his roll is an 85 — the beam slides harmlessly just over Herder E's head — the brute is ready to decapitate the good doctor.

IMPULSE SIX: Uwe spends this impulse changing the laser's direction of swing, while the hominid continues his swing.

IMPULSE SEVEN: Uwe's DEX is 16; the Herder's DEX is 12. Uwe's attack occurs first. His player rolls a hit, and the laser does 50 points of damage to Herder E. The player states that the beam is now returning, moving to the left.

For hit locations, Uwe's player rolls an 18 (another left arm result) for the initial hit location. This is the first hit of the swing, so the number is unmodified. The beam will hit only the left arm and chest, since the right arm is raised in sword-stroke. The damage to each location is divided by two — 25 points to each location. The Herder falls, and Uwe survives unscathed to begin another nefarious scheme. He turns off his flashlight laser on impulse 8. He has had his weapon activated for seven impulses, costing his battery 350 points of energy. Since it was fully charged before the battle, he still has 650 points left.

PNEUMOPISTOL
(Survival Systems LTD, Earth)

WEIGHT: 700g

VOLUME: typical pistol; 3cm x 8cm x 20cm

RANGE: short 20m, medium 30m, long range 70m

DAMAGE DONE: 1D8 + 1/shot

ENERGY USED: 1/im compressor

POWER SUPPLY: battery, 250/1/70g/R

ARMOR: 1 point

HIT POINTS: 10 points

APPLICABLE SKILL: Handgun (Projectile)

COST: 45 Stars; 2 stars for optional 30-round compressed air clip for vacuum or low-pressure conditions.

The pneumopistol fires projectiles composed solely of compressed air, eliminating the need for stored ammunition if the weapon is used in an atmosphere. Weapons of this sort were first experimented with as early as the 20th century. Pneumopistols are legal on most Human Space worlds, but are strictly licensed. The pistol holds a miniature compressor which draws from and compacts enough surrounding atmosphere for one shot per impulse. In light atmospheres it may take the compressor two or more impulses to compress enough air to fire the weapon. Firing, a pneumopistol makes a sound like a cracking whip.

The pistol's 'bullets' begin to dissipate rapidly; subtract 2 points from the damage result for each 50 meters or fraction thereof the target is removed over 100m (minimum damage of 0).

High winds (30kph or more) halve the final chance to hit with this weapon.

PNEUMORIFLE
(Survival Systems LTD, Earth)

WEIGHT: 1.4 kg

VOLUME: rifle; 80cm long

RANGE: short 200m, medium 400m, long 600m

DAMAGE DONE: 2D6/shot

ENERGY USED: 2/shot fired

POWER SUPPLY: 1000/6/290g/R battery

ARMOR: 3 points

HIT POINTS: 17

APPLICABLE SKILL: Heavy Weapon (Projectile)

COST: 120 Stars; 2 Stars for optional 30-round compressed air clip for vacuum or low-pressure conditions

The compressed-air-firing pneumorifle has a more powerful compressor than its pistol counterpart, giving it longer range and superior damage-causing ability. Like the pistol, the pneumorifle cannot be used in an airless environment without a container of pre-compressed air. The pneumorifle is frequently legal on less-developed human worlds, and strictly licensed or illegal on populous worlds. The rifle fires up to 3 compression-bullets per impulse; a setting controls the rate of fire. Firing, a pneumorifle sounds like a cracking whip. When firing more than one bullet per impulse, treat the fire as a burst; roll 1 D2 or 1 D3 as appropriate to determine the number of bullets that actually hit a target with a successful skill roll.

The compression bullets dissipate at long ranges; subtract 3 from actual damage done for each 100m the target is over 300m (minimum damage of 0).

STUNNERS

This section includes three types of stunners commonly available in Human Space: the police stunner, the Jinxian dueling pistol, and the stun cannon.

Stunners fire an invisible beam of subsonic vibrations which produce instant unconsciousness on contact with any susceptible creature whose MAS is small enough. Though it is theoretically possible to build a stunner which cannot be heard by the human ear, all stunners built in Human Space emit a distinctive harmonic whine, as though a small electric motor was nearing burn-out. Stun cannons cause vibrations in the surrounding terrain similar to a continuing minor earthquake. There are also stunners built to operate on an electromagnetic wavelength instead of sonically, but in Known Space these are less efficient and only used by those who are likely to need to stun someone in vacuum or a low-pressure environment.

Stunners have varying beam widths, and the results vary with ratios of energy output to target MAS and with the weapon model. The effect of a stunner is obtained through the disrupting effects of low frequency vibrations on the entire body — earplugs and the like are not an effective defense against stunner fire. Stunners fire wide beams which have no particular locational effect; no hit location roll is made for successful stunner attacks. A stunner beam is stopped by any large mass or any sound-absorbing substance; metal or plastic armor reduces a stunner's MAS rating by 1 point per 2 points of damage the armor absorbs. Some bounce might occur. Stunner fire cannot penetrate sonic folds.

Unless manufactured prior to the first Man-Kzin war, a Human Space stunner operates in

non-Terran atmospheres without difficulty. The range of effect, as well as the cone of dispersal, will differ; denser atmospheres will broaden the cone of effect proportionately according to the density. Planets with thin atmospheres will not effectively propagate the sound waves, and the range decreases to 0 in a vacuum, though the field of fire stays precise.

Stunners operate under water, with consequences similar to those for dense atmospheres.

Stunner fire cannot be sent through a radio or any other transmitter/speaker device, though some specially-designed speakers are made for use with security systems are able to generate their own sonic effects.

Stunners affect creatures according to their MAS. Each type of stunner can affect creatures of up to a stated MAS, depending on the actual energy put into the beam. Most human made stunners have adjustable energy settings which can be set by the user. It takes an impulse to change settings.

If a stunner hits a creature of more than 4 MAS beyond the MAS-energy setting of the stunner, the creature will feel a tell-tale tingle, and may receive a headache, but that is all.

If a stunner hits a creature of a MAS between four more than the setting and four less than the setting, the creature will fall unconscious to the ground.

If a stunner hits a creature of a MAS five or less than the MAS-energy setting of the beam, the creature will take damage. For the fifth, and each additional MAS-energy unit setting above the actual MAS of the target, one point of damage will be done to the creature's general hit points. The creature is also knocked unconscious. Participants in stunner battles often involuntarily kill small animals which happen in the way of a beam.

For example: a stunner with a MAS-energy setting of 12 will not affect creatures with a MAS of 17 or more; will knock out creatures with a MAS of 8-16, and will damage creatures with a MAS of 7 or less. A creature with a MAS of 5 would take 3 points of damage.

Unconsciousness rates vary with individual stunner types.

MAS carried by a target does not alter the target MAS needed to be affected by the stunner; only body MAS is considered.

STUN PISTOL
(Police Systems, Earth)

WEIGHT: 600g

VOLUME: large pistol; 4cm x 12cm x 16cm

RANGE: short 20m, medium 40m, long 100m

DAMAGE DONE: unconsciousness, possible damage to small targets

ENERGY USED: 1 to 25/im, varies with setting

POWER SUPPLY: battery in handle 500/25/130g/R; or belt pack battery unit connected by intercable, 4000/25/1060g/R

ARMOR: 3 points

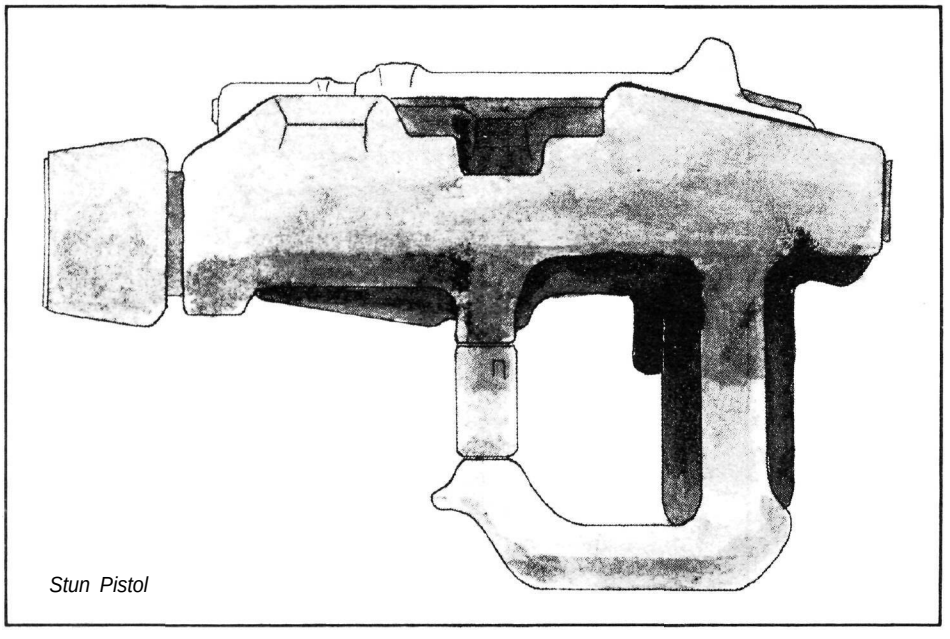
HIT POINTS: 10

APPLICABLE SKILL: Handgun (Energy)

COST: 56 Stars, 20 Stars for the optional belt pack battery

The so-called police stunner is also taken on missions of exploration. For each unit of energy expended, one point of target MAS is affected. The maximum energy setting is 25, giving a normal target range at that setting of 21-29 MAS. The cone of fire for the effect expands at a constant rate: 5cm at 5m, 50cm at 50m, 100cm, at 100m, etc. Any creature of affectable MAS within this cone of fire will fall unconscious, though obstructions (including other creatures) will stop the stunner fire. The stun pistol loses one point of MAS-effectiveness for each 10 meters past 100.

A victim of police stunner fire is unconscious for about 10 hours. If the victim makes a successful Health roll, unconsciousness lasts only 1 D10 hours. Stun pistols are illegal on all but frontier worlds in Human Space. Penalties for possession vary greatly by planet.



Stun Pistol

DUELING PISTOL, JINXIAN
(Code of Honor Inc., Jinx)

WEIGHT: 400g

VOLUME: small handgun; 2cm x 8cm x 10cm

RANGE: short 20m, medium 30m, long 50m

DAMAGE DONE: unconsciousness and possibly additional damage

ENERGY USED: 1 to 12, varies with setting

POWER SUPPLY: battery in handle 240/12/75g/N, or optional belt battery pack 4000/12/1060g/R

ARMOR: 3 points

HIT POINTS: 6

APPLICABLE SKILL: Handgun (Energy)

COST : 25 Stars; 20 Stars for belt battery pack

This is the stunner usually encountered on the civilized worlds of Human Space. For each point of energy used, creatures of another 2 MAS points can be affected. When the gun is set to project 1 2 points of energy, targets centering around MAS 24 (specifically, targets from MAS 20 to MAS 28) are affected with unconsciousness alone. The cone of fire reaches a maximum width of 50cm at 50m from the barrel of the pistol. For each meter beyond this point, the stunner loses one MAS-point of effectiveness. Unconsciousness lasts for 10 minutes. If the victim makes a successful health roll, unconsciousness lasts for only 1 D10 minutes. Jinxian dueling pistols are legal on most worlds, but must be registered. The penalties for illegal ownership of a dueling pistol range from small fines to short-term imprisonment.

STUN CANNON
(UN government manufacture, sold to corporations and governments)

MAS 2 (10kg)

VOLUME: 20cm x 1 m barrel, mounting and controls 50cm x 50cm x 50cm cube

RANGE: short 75m, medium 250m, long 500m

DAMAGE DONE: unconsciousness, possible additional damage from excessive energy

ENERGY USED: variable - up to 500 pts

POWER SUPPLY: fusion 3 generator

ARMOR: 25 points

HIT POINTS: 25

APPLICABLE SKILL: Weapons System

COST: 5000 Stars for projector and mounting, not including generator; illegal for private use on every Human Space world

The stun cannon is a scaled-up version of the hand stunner; it was designed in the late 22nd century for crowd-control operations.

The beam is spread to cover up to a 35m-maximum diameter area, affecting all within. The energy setting is adjustable. For every 5 energy units supplied, the stun cannon generates one MAS-energy point affecting all creatures within the beam, up to a maximum of MAS-energy 50. Unlike other types of stunners, the stun cannon is a continuous-beam weapon: each impulse that an explorer is within the beam, he or she takes damage from any excess beam energy. Any explorer accidentally running into the beam will be immediately affected. The affects last 12 hours. A successful health roll allows the victim to come to in 2D6 hours. Stun cannons are usually powered by fusion 3 generators.

TASP
(various underground manufacturers)

WEIGHT: 1.3 kg

VOLUME: a somewhat cylindrical shape, 3 to 7 cm wide and 35 to 65 cm long

RANGE: short 10m

DAMAGE DONE: pleasure-drunkenness

ENERGY USED: 10 per shot

POWER SUPPLY: battery, 1000/10/252g/R

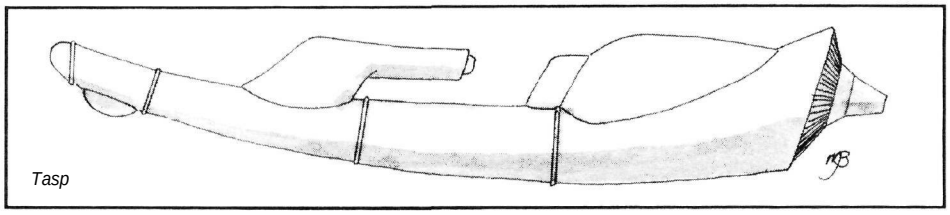
ARMOR: none

HIT POINTS: 10

APPLICABLE SKILL: Heavy Weapon (Energy)

COST: 70 + 1 D100 Stars; prices vary widely

Tasps come in all shapes and sizes, but human-made tasps are rifle-sized and usually suggestively symbolic in shape. The Puppeteers, who invented the weapon, have so far miniaturized it that they can wear tasps as surgical implants. Humans cannot make tasps which affect aliens (though their tasps affect most Ringworld hominids nicely), but it is known that the Puppeteers have tasps effective against Kzinti and Humans, and probably against all races possessing pleasure centers.


Tasp

Tasps emit an electrical impulse which momentarily stimulates the pleasure centers of the brain. This seemingly benign gift is profoundly dangerous to all but the most strong-willed beings. An explorer hit by a tasp must receive a luck roll or he will merely stand about, pleasure-drunk, oblivious to his surroundings. If the luck roll succeeds, the explorer can somewhat withstand the pleasure — however, he is still distracted, and, though his action ranking is not increased, chances for success on all skills is halved. This state will last for 1D10 + 10 impulses, then fade rapidly.

Unfortunates who receive a special failure on this test may have to accept consequences far beyond an unexpected, overwhelming burst of pleasure. The sensation can be addictive, and some people descend into the base life of a wirehead after only a few such experiences.

Tasps are illegal on all Human Space worlds, but are not difficult to manufacture. Often pranksters wait in ambush in parks to "make someone's day" •- the popular, cynical phrase for this act.

VARIABLE SWORD
(UN Government manufacture)

WEIGHT: 800g, external unit 1.2 kg

VOLUME: 3.5 cm diameter x 1 5 cm tube

RANGE: variable maximum extension

DAMAGE DONE: 1D20 + 5, but if used purposefully, severs almost anything

ENERGY USED: 1 per meter of blade extension when activated + 1/im to keep point-marker lit.

POWER SUPPLY: 310/1 +1m/350g/R

ARMOR: 4 points; stasis field is impenetrable

HIT POINTS. 10; stasis field is impenetrable

APPLICABLE SKILL: Flashlight Laser/Variable Sword

COST: 100 Stars; illegal to private citizens on most worlds

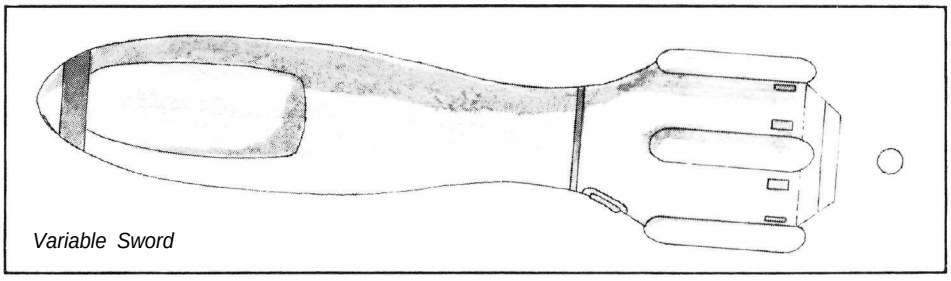
The variable sword is a modern melee weapon, possibly more useful in close combat than any ranged weapon. The variable sword resembles an oversized jumprope handle with a minute glowing red ball suspended by no visible means directly in front of it. Within the variable sword is a length of monofilament chain, wrapped in stasis, extendable up to 30 meters from the tip of the handle. The monofilament chain is extended by micro-flickers a selective stasis field and a directional impulse over the spool of monofilament chain. The external unit need not be attached to the handle if the blade is not changing in length.

The blade is nearly weightless, and close to invisible, making the variable sword quite different in function than normal melee weapons.

A successful attack with a variable sword is resolved like that of other melee weapons with a few exceptions. If the sword does damage greater than twice the hit points of a location, all additional damage will be passed on to another location. This second location can either be a different location in line with the first area hit, or it can be a location on a second foe within the blade's reach. Either the gamemaster decides which location is hit or a hit location roll is made. Areas brought to twice hit point damage by a variable sword are severed completely. If the spot is a vital one, the victim dies almost immediately.

Variable swords can be effective at considerable distances, but users should be careful when the blade is extended far from the handle, for variable swords can be as dangerous to holders and friends as to enemies. Fumbles with the variable sword can be devastating.

The variable sword cannot cut through General Products hull material, the surface of a stasis field, or scrith. It cuts very slowly through dense substances such as hullmetal and duralloy (and may take several minutes of sawing to penetrate), and even normal stone and metal require some effort to slice through. The blade of a variable sword is absolutely rigid and has no point (if the marker ball were removed, the field would collapse), so the sword cannot cut into a flat or concave surface with no exposed edges. For example, an explorer cannot cut his way out of an enclosed room even though the walls are made of mere steel — there is no place for the cutting edge of the sword to come into contact with the walls.


Variable Sword

second-long interruptions of the stasis field, keeping the blade rigid.

The quantum two stasis field generator within the handle is smaller than standard, and incapable of covering a larger surface area than the minute area represented by the almost infinitely-thin wire. The variable sword generator is powered by an internal battery which will run out of energy after 10 seconds pass within the field (53 external years).

The sword blade is extended and retracted by an external unit, attachable at the rear of the handle by a length of intercable. This unit

PROTECTIVE DEVICES

Technology wars with itself; as weapons become powerful enough to break through the most sophisticated armor, new types or approaches to armor occur. As armors seemingly become impregnable, new methods of attack are found. In the 29th century, humans have discarded heavy armor in favor of maneuverability and speed. The Patriarchy is rumored to have developed a super-powered, ultra-light suit of armor for top-level Kzinti operatives. On human worlds, multi-armor which protects against various attacks is available, as are many specific-defense armors and devices.

ANTI-LASER AEROSOL
UN Army Surplus

WEIGHT: 150 g

VOLUME: 4 x 8 cm pressurized cylinder

ARMOR VALUE: reduces laser effectiveness to 25%; lasts for 10 + 1D6 impulses

SPEED OF OPERATION: fully effective on 4th impulse after emission

COST: 3.5 Stars per disposable cylinder

Explorers and combat units normally carry several of these protective devices to defend against handheld laser fire. This aerosol is a pressurized cylinder filled with a prismatic dust specifically designed to disperse incoming laser beams (outgoing laser fire is equally dispersed). Each cylinder holds one application.

The aerosol, either in a hand-thrown form or as the payload of a small missile, normally is used for personal defense. A dialed setting allows the aerosol to emit from 2-10 impulses after launch; a default setting emits aerosol 2 impulses after release. Upon release, the cylinder pours out a cloud of crystalline particles for 10+1D6 impulse; the user's player rolls 1 D6 at the end of 10 impulses to determine how much longer it lasts. In that time the cloud has filled an area large enough to protect 90 degrees of arc around the user. After the suspension time expires, the prismatic flakes fall to earth (in a normal gravity) and leave a sparkling coating of dust. (In zero-gee, the cloud disperses in the direction of the arc of protection, and is unusable as a defense after 5+1D3 impulses.)

As it forms, the prism cloud only protects a specific location. If the cylinder is being held, on the first impulse the head is protected, on the second the head, chest and arms, on the third the abdomen is covered as well, and on the fourth impulse the full body is protected. If the cylinder is thrown on the ground to activate, the coverage will be in reverse order. Gamemasters will have to consider the exact circumstances.

Laser beams passing through the cloud are dispersed, their attacks reduced to 25% of normal. For simplicity, a beam does 100% on the impulse after the cloud has dispersed, but the gamemasters may want to pro-rate a percentage increase in effectiveness. Further, the attacker's chance to hit is reduced by half while the cloud is in effect.

The crystals disperse light into peculiar prismatic displays; with laser light and sunlight glancing from it, users of the aerosol will be unable to see without polarized goggles or other protective eyegear. The prismatic flakes are actually an organic, biodegradable molecule, which makes the throat dry if breathed, and possibly causes (luck roll) the breather to sneeze.

Sonic stunner beams cause the crystals to resonate, emitting a sound some have likened to the chirping of birds.

PROTECTIVE VALUE OF NORMAL MATERIALS

Material	*Protection per cm thickness*
wood	2
light plastic	2
ultra hard plastic	3
aluminum	4
iron	8
steel	12
Hull metal	20
General Products hull material	invulnerable
Scrith	invulnerable

In wartime, vast areas were covered with this stuff, delivered by many different weapoins systems. Flatlanders now buy anti-laser aerosol as a cosmetic to make hair and skin sparkle prettily. Anti-laser aerosols in many colors have become available on the retail market.

DIFFUSION-FIELD GENERATOR

WEIGHT: 1 kg

VOLUME: 10 x 20 x 5cm

ENERGY USED: 1/im

POWER SUPPLY: battery 1000/1/250g/R. Often diffusion fields are attached to generators if they are needed to stay in operation for an extended period of time.

ARMOR VALUE: reduces ranged weapon attack skills percentiles by half; reduces damage done by specified energy weapons to 25% of normal

SPEED OF OPERATION: one impulse to warm up; field in operation on second impulse

COST: 1500 Stars, + 100 Stars per set of goggles

This compact device generates a field diffusing electromagnetic radiation passing through it, appearing visually as a fuzzy smeary sphere of light cut off at the bottom by the surface on which the generator rests.

The diffusion field generator creates a 2 m-radius field around the device, acting like a lens to diffuse or divert applicable EM wavelengths to fill the whole field. Therefore aiming at a specific object in the muddled mass of images within the field is impossible. Explorers firing most weapons into the field have their percentage chances to hit reduced by half. Sonic stunner percentiles will not be reduced — the beam is wide enough to make up for the aiming difficulty. But reduce the chance to hit with narrow-beam weapons such as lasers to one-quarter normal.

Persons within the field have as much trouble seeing out as attackers do seeing in unless they wear the goggles provided with the field generator. The goggles are linked to the shifting resonance of the field, and are worthless if unlinked to the target generator. Persons within the field can see within the field with no difficulty.

Diffusion fields are seldom used for their intended purpose. Most are sold to the rich as exotic party props.

FLAK-SUIT

WEIGHT: jacket 200 g, leggings 100g each, sleeves 100 g each

VOLUME: human

ENERGY USED: none

ARMOR VALUE: protects against projectiles, archaic weapons, and lasers — 6-point jacket and helmet, 4-point sleeves and leggings

COST: 20 Stars for jacket or helmet; 10 Stars per limb

Flak-suits impede DEX by 1 point per pair of limbs covered. The jacket covers the chest and abdomen. If a location covered by a flac-suit takes damage equal to five times the suit's locational protection value, the coverage for that location is destroyed.

FRICTIONLESS ARMOR
ZG Tools Inc., Belt

WEIGHT: 1.2 kg

VOLUME: to a particular human size

ENERGY USED: none

ARMOR VALUE: with a successful luck roll, deflects all small projectiles and archaic melee weapons

COST: 100 Stars + 10 Stars per wearer point of MAS above 1 5. On the black market the asking price might be as much as four times the normal retail price.

Known Space technology can produce nearly frictionless surfaces. Belt miners originally developed frictionless armor as a protection against gravel storms, but in the Ringworld era frictionless armor is used to protect against projectile fire, such as bullets. A projectile or archaic missile weapon striking the frictionless surface ricochets harmlessly away unless it strikes directly perpendicular to the surface. If a primitive melee weapon is deflected, the attacker's player must successfully make a DEX x 3 roll or his explorer drops the weapon.

The player of the wearer of frictionless armor should make a luck roll every time the explorer is hit with a projectile, or a primitive melee weapon. If the luck roll is successful the projectile will be deflected harmlessly off in a random direction. It is unlikely that this ricochet will hit another target, but if the gamemaster decides that it is possible he may ask explorers in the path of the ricochet to make luck rolls. When a projectile bounces off frictionless armor it loses 50% of its original energy, and damage causing potential.

Projectiles of considerable MAS or speed do normal damage if they hit; be reasonable — no one will survive an avalanche or a crashing asteroid because they wear frictionless armor.

Completely frictionless armor is unusable; it needs a number of Achilles points — including the soles of the feet, the palms of the hands, elbows, knees, joints, etc. A special success hit on a wearer is assumed to have hit an Achilles point, doing damage unmodified by armor. A transparent frictionless visor covers the face of the wearer.

Frictionless armor impedes DEX by 2 points.

An explorer who falls while wearing frictionless armor has difficulty getting back to his or her feet. The explorer's player must roll the explorer's DEX x 2 or less on D100 before the explorer can stand.

Occasionally vehicles designed for dangerous missions are given frictionless hulls. These are extremely expensive.

Frictionless armor is legal in the Belt, the Serpent Stream, and on some frontier worlds, but most worlds prohibit it to private citizens. It is readily available on various black markets.

IMPACT ARMOR
General Products

WEIGHT: 1.4 kg

VOLUME: human dimensions

ENERGY USED: none

YEARS OF USE: varies; weakens with use

ARMOR VALUE: stops 25 points of impact damage at full strength

SPEED OF OPERATION: NA

COST: Available only to Puppeteer-financed expeditions; secret of production available for 900,000,000 Stars lump-sum from the Outsiders; an individual owner (if he could be found and were of the right MAS) might part with an individual suit of new impact armor for about 500,000 Stars.

Impact armor was marketed by General Products prior to the Ringworld era; this prized protection is not now sold, and therefore is mostly unavailable to non-Puppeteer-outfitted expeditions. In its inactive state this somewhat comfortable, soft, flexible body suit is about 1cm thick. Even this thickness impedes wearer DEX by 1 point.

Upon contact with any object moving at a high velocity, impact armor becomes as rigid as tungsten steel, distributing the impact over the area of the suit, thereby reducing incurred damage. This requires no energy input, but thousands of wearings weaken the effect. For every UNS year in which a suit of impact armor has been in use (as opposed to being in existence) it will have a 1% chance to be ineffective. Gamemasters should establish the percentage of effectiveness, and resolve the actual price through the use of the Bargain skill.

Impact armor responds to changes in pressure, not to the pressure itself. Thus a character who is hit and pinned by a large object will have the protection value of the armor subtracted from the initial impact damage, but none will be subtracted from damage received due to the sheer weight of the object.

Impact armor protects the user against projectile weapons, all archaic weapons, and all other sharp impacts doing 25 or less hit points of damage. Variable swords and energy weapons are unaffected by impact armor. Impact armor will stop the first 5 points of damage received from a Slaver disintegrator, but will be destroyed by it.

Impact armor has no effect against damage from falling, or other types of damage in which the energy which causes the damage is held by the wearer himself. The suit becomes rigid upon impact and the wearer will be crushed by his or her own velocity inside the armor. Impact armor will not protect against damage incurred from high pressures, such as an explorer being run over by a versatrak, though the armor becomes rigid on initial contact.

Impact armor retains its rigidity for two impulses after impact. The wearer can take no physical action during this time. The armor responds only to quick changes in pressure, not to pressure itself. An explorer wearing impact armor who is pinned under a rock takes full crush damage caused by the rock's weight, but did not take full kinetic damage when the rock fell on him.

A character wearing impact armor must succeed with his or her dodge roll each time the armor goes rigid or lose his or her balance and fall.

It is possible to keep incapacitated an explorer wearing impact armor by administering a series of sharp impacts. After four impulses of rigidity, the explorer must receive a successful DEX x 2 on D100 or fall; after six impulses, he must get a DEX x 1 roll, and after eight impulses he definitely will fall.

General Products developed a thinner, lighter suit of impact armor which did not cause a DEX penalty. It protects for 10 points.

The Outsiders have offered to sell the secret of impact armor; the Patriarchy may already have bought the right to produce Kzinti impact armor.

REFLECTIVE ARMOR
ZG Tools Inc., Belt

WEIGHT: 600 g per hit location covered

VOLUME: human form

ENERGY USED: none

ARMOR VALUE: reflects a percentage of laser fire.

SPEED OF OPERATION: NA

COST: varies by efficiency of reflection —

For 25% chance to reflect, pay 100 Stars + 10 Stars each MAS point above 15

For 50% chance to reflect, pay 150 Stars +15 Stars each MAS point above 15

For 90% chance to reflect, pay 250 Stars + 25 Stars each MAS point above 15

For the black market, multiply prices up to five times indicated

Reflective armor reflects the stated percentage of infrared, visible, or ultraviolet light striking the wearer. Reflection is in a random direction away from the wearer.

When an explorer wearing reflective armor is hit with an energy beam within the spectrum that is reflected, that percentage of damage from the beam equal to the rating of the armor is subtracted, deflected by the armor. Always round up any fractions. Remaining damage burns through the armor and strikes the wearer. If the gamemaster feels that a reflected beam possibly will hit another explorer, he should ask the players of affected explorers to make luck rolls for them — either in random or low-to-high DEX order. The beam strikes the first explorer to receive a failure.

Forward head armor is always 10%-efficient over the eyes so the wearer can see. A special success hit in the head from the front reflects only 10% of the beam.

Reflective armor impedes DEX by 2 points. Explorer vision may be dimmed slightly by brightness and reflections.

The efficiency of dirty reflective armor drops quickly. The surface must be kept extremely clean. In the third Man-Kzin War, desperate Kzinti defenders even tried paint grenades.

Frictionless reflective armor is available at 25% reflectivity. The ARM, and the Belt's marines are rumored to have 90% reflective frictionless armor.

FLATLANDER RIOT HELMET

WEIGHT: 500 g

VOLUME: the size of a human head

ENERGY USED: 0.001/im

POWER SUPPLY: battery 100/1/.25kg/R

ARMOR VALUE: 6 points against archaic weapons, projectiles, and lasers

SPEED OF OPERATION: NA

COST: 25-75 Stars, if available

Riot helmets are relics of ancient Earth, generally dating to before institution of the Fertility Laws. Working (or easily-restorable) riot squad helmets are still available in military surplus and curio shops on Earth.

These black plastic helmets completely enclose the head, filtering the air, and using miniature audiovisual transceivers to show the world outside.

Some models include radio receivers and transmitters (range — 1 km). A miniature public address system is included in each helmet, allowing the wearer to intimidate and command bystanders.

The wearer of a riot squad helmet has his or her vision restricted to a 1 20 degree arc to the front.

SONIC FOLD

WEIGHT: 1.5 kg generator

VOLUME: 15 x 10x 22 cm generator; fold is 3 m from center of generator

ENERGY USED: 1/im

POWER SUPPLY: portable unit with battery: 400/1/1kg/R

ARMOR VALUE: deflects projectiles and protects against wind resistance, rain, snow, etc.

SPEED OF OPERATION: instantaneous upon activation

COST: 1400 Stars; portable versions at survival shops and colonist equipment centers. Often installed as part of a vehicle

The sonic fold is a standing acoustic shock wave, capable of stopping incoming low frequency vibration and of diverting kinetic resistance and shock. The compact sonic fold generator erects a spherical sonic fold about 3 meters away from the center of mass of the generator. To use a sonic fold, the generator must be a fraction more than 3 meters from the ground, allowing the fold to be completed.

Sonic folds deflect wind during high speed travel in an open vehicle. They can also deflect high-velocity projectiles up to bullet-size or slightly larger. The projectile is deflected randomly. Slow-moving objects and beings can 'wade' through the fold and get inside, but the effort costs one impulse per hit location, and one additional impulse for each large extended object such as a spear, musket, or laser rifle. Variable swords penetrate the fold without noticeable difficulty.

The invisible sonic fold may become visible in rain or fog, something like a dirty plexiglass sphere. Most people can hear the sonic fold as a high-pitched whine.

Radio equipment must be used to communicate from inside to outside the fold.

A sonic fold cannot be used within 25 meters of a diffusion field as they tend to interfere with each other. If they do come within this distance (measured as the distance between generators) both will fail. This can be extremely dangerous to a person traveling at high speeds in an open vehicle. Sonic folds may be made in other shapes and sizes.

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Larry Niven's

Ringworld

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CREATURES BOOK

Larry Niven's

Ringworld

CREATURES BOOK

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This book presents important Ringworld creatures with which and with whom the explores are likely to interact. Many are those which Larry Niven chose to include in the Ringworld *novels and supporting stories. In this game, 'creature' includes every entity other than the explorers; creatures is a general term encompassing non-player entities and animals. There are five sections: Aliens, Pak, Hominids, Animals, and Flora.*

ALIENS — presents the characteristics, skills, hit locations, etc., for selected Known Space aliens. These profiles could be used for creating explorers if the gamemaster desires; the Kzinti and Puppeteers have been provided with special notes for creation in the explorer book.

PAK — this is an extensive discussion of the relationship of the Pak to Ringworld and Known Space; notes provide for creation of Protectors of any hominid species.

HOMINIDS — a dozen Pak-descendant hominid species have been selected. A gamemaster can choose to allow them to be run as explorers; some of them have the virtue of little culture, making it easy to create background.

ANIMALS — this section contains short descriptions for the unintelligent creatures in the game. Some animals lack one or more characteristics, especially INT, EDU, and APP.

FLORA — a sampling of the tremendous plant life of Ringworld, including some (such as the Slaver sunflower) which are interactive.

Format

The materials in this chapter are presented in a uniform fashion.

Name. *Each entry begins with the English translation of the Interworld term or phrase for the entity described. Within each of the three general sections, the creatures are presented alphabetically.*

Armor. *This entry notes any natural armor and any artificial armor that the creature might wear. The appropriate hit location table will be designated here.*

Weapons. *Here are listed the base attack percentage, damage roll, and use descriptions, Any artificial weapons which the being commonly employs will be noted here, as well as the general level of that creature's technology.*

Common Skills. *This entry presents the skills which the creature would be likely to have learned to a percentage higher than the base chance. A typical skill % for an adult member of that species from a typical culture is given as well. The base percentages for all skills are listed on the Skills Base Chances for Hominids and Aliens table on page 19; average skills for animals appear in their individual statistics.*

Any Knowledge or Communication skill possessed by an alien will be in its perception of that skill and thus in human terms will be xenologically qualified. Assume that alien characters have alien skills: for instance, a Kzin archaeologist will in human terms have Kzinti Archaeology. Always assume that an alien has skills from his, hers, or its background. Treat Ringworld hominids in the same way — their skills are perceived by humans as having the Ringworld modifier attached to them. Of course, aliens and hominids will see human skills as xenologically qualified, too — but that must be indirectly played in the game.

Other Features. *Features important to play but which do not fit into previous entries will go here — psionic abilities or poisonous effects, for instance.*

Description. *This section outlines creature appearance, ecology, habits, culture, and behavior.*

Data. *Every creature's characteristics ranges are given in terms of D6 rolls and numerical modifiers. For gamemaster convenience, averages of characteristics are also presented, as are average scores for hit points, action rankings, and speeds. Animals may not have INT, APP, or EDU.*

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ALIENS

BANDERSNATCHI

Bandersnatchi had needed men to tell them about the stars.

Bandersnatchi were discovered along the shorelines of Jinx's inhospitable oceanic belt in 2097 A.D. by early colonists. At first, the strange creatures seemed non-sentient monstrosities. Massing 30-60 tons; a Bandersnatch resembles an enormously-magnified white slug with smooth, slick skin. A brontosaur-like neck with no head rises up from the beast's front, in a conical slope from a base as wide as the creature's 'shoulders.' The thick, rounded tip is featureless but for two tufts of black bristles, the sense organs. In motion, a Bandersnatch looks something like a tailless albino sperm whale swimming through sand, its tapered neck swaying from side to side. The sense bristles writhe gently, as though blown about by gusts of light wind — even though the air may be calm. Moving on its rippling belly-foot, a Bandersnatch can cover ground rapidly despite its great bulk. A wide, toothless mouth located just ahead of the belly-foot is designed for scooping up quantities of yeast and scum from thick, soupy sea-swamps.

The first clues to the origins and abilities of Bandersnatchi came from their strange internal makeup. They lack cell walls, and normal mechanisms of cell reproduction. In structure, their nerve fibers are somewhat similar to those of human neurons, but have no cell bodies or nuclei — Bandersnatch nerves are merely specialized protoplasm. The deeply convoluted brain is long and narrow, packed into a canoe-shaped bony shell at the elevated, tapering tip. This skull is one end of a jointless, flexible, internal cage of tough bone-like connective tissue. The circulatory system is driven by six hearts weighing five kilograms apiece. Odd-looking tissues in the left side function as budding apparatus, in lieu of sexual organs. The pale skin of a Bandersnatch changes to an icy light-blue color under intense sunlight, such as is found in the midlands of Jinx, which orbits Sirius A.

Bandersnatchi are the only sentient species known to have survived the collapse of the Thrint empire, nearly two billion years ago. This was no accident, since Bandersnatchi were not a normally evolved race, but had been created as meat-animals by one of the Thrint slave-races — the Tnuctipun. Secretly, Bandersnatchi were also given intelligence, an extreme resistance to random mutation, and an immunity to the telepathic Power which the Slavers used to impose their will on other races. The Bandersnatch *(whitefood,* as it was known to the Thrint) had been a Tnuctip trap. Bandersnatchi were designed for espionage; because every part of a Bandersnatch except the skeleton was edible (and delicious), the creatures became integrated into every corner of the Slaver empire. The large brain of the whitefood was justified by the Tnuctipun for its extraordinary tastiness.

There came a day when the Thrintun Slavers found that many of their biologically-engineered Tnuctip gifts were traps. The rebellion had been a long time building, and the Slavers had underestimated their slaves. To win the war, the Slavers finally were forced to use thought amplifiers to order not only the Tnuctipun but every other sentient species in their empire to destroy itself. Then, without slaves, the Slavers too had died. Because of the Bandersnatchi immunity to the Thrint power, they lived through the rebellion. On a number of worlds, these great aliens may have survived unchanged, grazing on the cheesy gray food yeast filling the oceans of former Thrint food planets.

For eons, the Jinxian Bandersnatchi spent their long lives in hot, pressurized fog, feeding continuously along the shores on both sides of the ocean. Few data reached their senses but the taste of yeast, the everlasting gray mist, and the company of other Bandersnatchi. Though making only occasional forays beyond, their complete domination of the soupy lowlands was a serious obstacle to the evolution of Jinx' other native life forms.

Bandersnatchi communicate with each other by touching and interlocking their sensory bristles; by gentle rustlings and subtle oscillations of the tufts; by ground vibrations; and by plowing along the wavy tracks left by one another in the sand. Over the passing millennia, they gradually lost whatever detailed knowledge of their origins and purpose they once may have possessed. How and when they came to Jinx (perhaps long after the Slavers' demise, because of the age of Sirius) remains a mystery. Among Bandersnatchi, the idea of stars as distant suns shining on other worlds became just one story among countless thousands told and retold, and altered, and told again.

The arrival of humans on Jinx brought a welcome change in this monotonous existence. After some early skirmishes, the colonists grew to recognize that the Bandersnatchi were intelligent — and making attempts at communication. These gigantic, lost souls still remembered snatches of a Tnuctip science-language, which they wrote with their bodies in enormous script across the sands. Eventually an information exchange was established, and the Institute of Knowledge was founded on Jinx. Slowly, fascinating historical and technical date from the time of the Slaver empire have accumulated. Considering Bandersnatch origins, human researchers have paid only moderate attention to their potential danger: the possibility that they could be controlled by some as-yet-undiscovered Tnuctipun device remains open.

The Bandersnatchi gained economic power by marketing their bodies as food and for scientific study, and by selling hunting licenses to adventurers, under strictly-enforced regulations. Hunters' weaponry and other equipment is limited to specific items — ensuring that hunters' odds of success seldom exceed 3:2. The Bandersnatchi receive 80% of the license fees, and they benefit also because the hunts help to moderate their numbers. Finally, they enjoy the challenge of the game which, after all, they win much of the time. Their proceeds often go to buy artificial prosthetic Hands and other appendages, which can be connected surgically to the Bandersnatch nerve network. Now integral to Jinxian civilization, the Bandersnatchi have proven invaluable in exploring and developing the high-pressure lowlands and ocean-belt of that egg-shaped colony world.

A number of Jinxian scientists specialize in communication with Bandersnatchi, often using psionic-contact units basically similar to those developed for Cetaceans. The power consumption, size, and complexity of these machines is much greater, though — their use requires high aptitude and skill, and even then the results may often be confusing.

On Ringworld, the Map of Jinx is known to contain Bandersnatchi, but they have never been contacted. They have evidently mi-

BANDERSNATCHI

Char.	Range	Average	
STR	2D10+30	41	Average Hit Points: 103
MAS	4D10+60	82	Speed: 10m/im
CON	2D10+10	21	Action Ranking: 6
INT	2D6+6	13	
POW	3D6	10-11	
DEX	2D6	7	
APP	3D6	10-11	

Age: unknown

ARMOR AND HIT LOCATIONS: Bandersnatchi have heavy skeletons of tough, bone-like, connective tissue worth 6 armor points. The brain case is even thicker and thus provides 10 points of protection. Hit locations for Bandersnatchi are determined on the bandersnatch hit location chart (below). Bandersnatchi have 100% of their total hit points in their bodies, and 50% in their brain case.

Location	D20 roll	Armor/HP
Body	01-18	6/103 (1.0)
Brain Case	19-20	10/52 (.50)

WEAPONS: Bandersnatchi can crush opponents with their huge bulk. If a bandersnatch can overtake an explorer it may inflict one crush attack, unless the victim's player can make a successful Dodge roll. If the victim is land-bound the bandersnatch will be allowed one crush attack for each impulse during which it is on top of the victim (bandersnatchi are 1/10 of a meter wide and 1/2 meter long for every two mas points possessed.) If the victim is airborne he or she may escape if his or her vehicle is not destroyed by the bandersnatch's initial attack. Bandersnatchi can crush multiple victims in the same impulse if the victims are in close proximity. All bandersnatch crush damage affects total hit points. Each Impulse of crushing does the bandersnatch's MAS/10 in D6's as damage, round normally. For example a bandersnatch with a MAS of 88 does 9D6 per impulse, per victim being crushed.

COMMON SKILLS: Astronomy 45%, Bargain 30%, Biology 50%, Chemistry 25%, Debate 35%, History 90%, Languages 85%, Strategy 55%, Physics 55%, Sense (like Scent or Observation, but using bandersnatchi sense organs) 95%, Theology 50%

grated, *or* have been transported, off that Map — for they have been seen in primitive freshwater swamplands far from the Great Ocean, and their skeletons have been found in great floating City Builder trophy rooms.

DOLPHINS, The Humans of the Sea

The conviction of wisdom
is the plague of man. — Montaigne

Dolphins and Men

Millions of years before primitive hominids walked the drifting island-continents of Earth, dolphins were the world's dominant sentient species. Probably they were the first. Throughout oceanic realms covering most of our planet's surface the delphinids' strange and watery culture spread. No trace remained of their mysterious origins on land, except in their mammalian physiology and in a few fragments of early scientific mythsong. At the dawn of human civilization, dolphins possessed a cultural heritage reaching back in some areas farther than the existence of *Homo sapiens* as a distinct species. Human beings, compared to delphinids, are still rapidly-evolving, precarious latecomers upon the Earth.

In classical antiquity, many seafaring human cultures shared with dolphins a mutual natural harmony. Coastal dwellers knew of their high intelligence, expressive language, learning abilities, their playful spirit, boundless vitality, inventive and eager sociality, and unfathomable kindness. (The dolphin ethic, *humans are not to be killed or injured,* dates from this age.) Recognizing dolphins as friendly and helpful, ancient mariners looked upon their companionship at sea as an omen of good fortune. Dolphins often warned ships of tempests, navigated others through dangerous shoals, and occasionally even rescued drowning sailors. The Greek minstrel Arion sang songs of the dolphins; some Minoans sang *with* them, joining in their laughing, soaring, plunging, splashing blue-green dances. The shield of Odysseus bore a dolphin's image, and Orion is said to have ridden the dolphin's back. Wonderful tales of delphinid adventures and of close human/dolphin friendships have survived in accounts of Aristotle, Pliny, and Plutarch. Many more perished tragically, though, in the burning of the Great Library at Alexandria, and in the many dark centuries which followed.

For 2000 years the light was gone. Records and memories of interspecies contact vanished, branded as unspeakable, blackest heresy. A narcissistic theological hegemony held a death-grip upon the minds and souls of reasoning men whose ancestors had laughed with dolphins. Humanity retreated from knowledge, as ideology denied the validity of direct experience. Renamed *porpoises* (from the Latin, meaning "pigfish"), dolphins lost all identity in human thought distinct from other "monsters of the sea:" non-sentient true porpoises, barracuda, shark, sturgeon, seal, sea-calfe, dorado-fish, *loup-de-mer,* and grampus. Religious authorities declared dolphins to be fish, to be hunted and eaten as such. Well past the Renaissance, scholars conditioned to reject all notions of non-human intelligence in the natural world used their monstrously-distorted concepts of scientific rigor to perpetuate such barbaric nonsense. Dolphin meat became "porpoise beef." In the early Americas, thigh-high boots of porpoise-hide were common. The most obscene use of the dolphin dates from the age of the witch-craft trials: for lubricating a witch, "some find porpoise oil to give the most uniform satisfaction."

Hanging Person (description p. 27) — notice the elongated limbs and fingers.

In the 19th century, Social Darwinists brought anthropocentric narcissism to a new extreme, demanding acceptance of "western" civilization as the pinnacle of evolutionary progress. Industrial nations viewed cetacea as an economic resource to be exploited, greedily and with thoughtless cruelty. In the human experience dolphins persisted only as emblems whose original symbolic significance had been expurgated, and as colorful names for devices and bits of nautical equipment. Experts in every field laughed at the ignorant, fanciful superstitions of ancient philosophers and poets.

During the 20th century, humanity's long self-inflicted segregation from other sentient terrestrials finally began to diminish. Increasingly, men saw themselves as an integral part of the natural order. In 1986, world-wide statutes restricting the wholesale slaughter of cetacea were enacted. Neurophysiological studies illuminated the superb complexity of the impressive dolphin brain. Using hydrophones and frequency-transform bio-computer models, early delphinologists established the dimensions of dolphin intelligence and acoustic/sonar language. Breakthroughs in the field of interspecies communication (following the pioneering work of Lilley, *et. al.,* and the later Institute of Delphinological Studies) brought a growing public awareness.

A radical new age of human/dolphin collaboration began with passage of the Cetacean Rights Act of 2017, which banned all whaling, and granted to sentient cetacea the legal protections of full human equivalence. Dolphins entered the UN, interspecies treaties were negotiated, and coastal embassies were established world-wide, off Newfoundland, St. Thomas, Baja, Hawaii, Opononi, Sydney, Sri Lanka, Brazil, and Japan, and in the Sea of

DOLPHINS

Char.	Range	Average
STR	3D6+8	18-19
MAS	3D6+12	22-23
CON	2D6+6	13
INT	2D6+6	13
POW	3D6	10-11
DEX	2D6+6	13
APP	3D6	10-11
EDU	as for humans	
AGE	1 D6 on age table	

Average Hit Points: 35-36
Speed: 7m/im (water); 2m/im (on land, in walker suit)
Action Ranking: 4

ARMOR AND HIT LOCATIONS: dolphins have two points of natural armor due to their thick skin and blubber. Dolphin hit points are distributed as follows; 25% in the flukes and fins, 30% in their head and hind-body, and 35% in the forebody.

Location	D20 roll	Armor/HP
Flukes	01-02	2/9 (.25)
Hind-body	04-08	2/11 (.30)
Forebody	09-13	2/13 (.35)
Right Fin	14-15	2/9 (.25)
Left Fin	16-17	2/9 (.25)
Head	18-20	2/11 (.30)

WEAPONS: A dolphin can ram a target if it is in the water with the dolphin. The ram does 1D10 damage, and the dolphin has a base 50% chance of success. There are a variety of technological weapons manufactured for use by dolphins, also. A dolphin wearing a walker suit can not use the ram attack, but a dolphin supplied with Hands can use any standard weapon.

SKILLS: Dolphins have access to the entire Known-Space skills list. They will be particularly skilled with knowledge and communication skills, though dolphins have learned to use all the technical skills; a dolphin liner pilot would not come as a surprise to any resident of Known Space in the Ringworld era.

Dolphins can use any human agility skill if they are equipped with Hands. When a dolphin first gets his or her hands he or she must to learn to use them from scratch (starting at the human base percentages in the new skills) and can never increase past the DEX times five of the hands.

Azov, the Mediterranean, and elsewhere. On behalf of all cetacea, dolphins immediately instigated lawsuits seeking damages for past depredations by mankind — but over the centuries no settlement has been reached, apparently mostly due to the entertainment value which the ever-more-complex litigation process has to dolphin jurists. On paper at least, the mounting legal costs and incrementally-adjusted reparation figures have reached astronomical proportions.

Physiology, Perception, and Attitude

Of the large-brained sentient delphinids, probably the best known among humans is *Tursiops truncata,* the bottle-nosed dolphin. Easily distinguished by the distinctive beak (short, flattened, and slightly upturned), tursiops have dark-brown to black coloration on their backs, lightening to a white belly below. Some are albino. A prominent, curving dorsal fin projects above the thickest part of their sleek, streamlined body, which tapers elegantly fore and aft to rostrum and tail-flukes. Powerful, precise swimmers, typical adult *Tursiops* are 2-3 meters long, and weigh from 1 50 to 200 kilograms. Their dangerous-looking jaws are armed with numerous small, pointed teeth: they can snap a 2-meter-long barracuda in half with a single bite. But delphinids rarely use their mouths as lethal weapons in combat, even in self-defense. When necessary, their deceptively-bulging "forehead" becomes a heavily-padded battering ram. The huge brain is situated farther back, well-protected, behind the crescent-shaped blowhole. Their vision is sharp, their olfactory sense nonexistent, their taste sense acute enough to follow minute trails of flavor through the sea. Dolphins are primarily fish-eaters, but also feed on squid, cuttlefish, and occasional molluscs and crustaceans. Like all mammals, they are warm-blooded air-breathers unable to drink seawater. For their fresh water they use fluids from their prey. For temperature regulation they rely heavily on water-flow: their finely-oiled, exquisitely-sensitive skin must be wet and cool, or their brain overheats and they die. Dolphins sleep 4-5 hours a day, taking short, alternate-eye naps, but opening both eyes for each breath. (Belters in singleships made considerable use of this technique.) Dolphines (female dolphins) bear their young singly, nurse them with milk, and care for them with great tenderness.

Man's intelligence is inevitably linked to his prehensile, grasping hand, and expressed primarily through his use of tools. For centuries, vestiges of opposable-thumb chauvinism *(thumbists* were once a recognizable social faction on Earth) led most humans to regard dolphins as one of the Handicapped species: sentient but sadly lacking in ability to manipulate the environment. Early entrepreneurs of Garvey Ltd. in fact built fortunes supplying dolphins with waterproof psionic/prosthetic waldos called *Hands.* But dolphin hands are not missing: rather they are frozen. The delicate and mobile flipper actually contains all the bones of a human hand, plus those of the arm, tied together. (Dolphin sonar penetrates the skin, allowing subtle 'hand gestures' to be read.) Moreover, most dolphins traditionally view physical manipulation of the environment as a dubious and crude form of entertainment. Creatures of a different medium, dolphins refer to humans and other ambulatory sentients as *walkers.* Spacesuits, and the aquasuits which permit dolphins to move about on land, are known as 'walker suits.'

Dolphins never cease to be amazed, fascinated, and occasionally appalled at the human obsession to conquer territory, accumulate wealth, and rearrange physical objects. Their boundless curiosity, though, in every respect rivals or surpasses our own — and once they understood human economics concepts, dolphins proved very able bargainers!

Nonetheless, the use of tools by dolphins revolutionized terrestrial civilization. New marine industries flourished, carefully controlled and monitored. Dolphins undertook the management of commercial fisheries and seafarms, and supervised the operation of marine energy-systems. Sonic walls made beautiful undersea parks safe for the enjoyment of delphinids and humans alike. Military use of the oceans declined. Navigation, exploration, salvage, and rescue techniques changed radically as dolphins gained access to satellite networks via relay-buoys and undersea cornlinks. The sciences of oceanography, marine biology, sea-floor paleontology, geohistory, acoustics, and cybernetics took giant strides. Oceanaria became interspecies schools. In government, religion, psychiatry, philosophy, music, education, economics, ecology, metalinguistics, literature, and social ethics the impact of delphinid culture grew. Dolphin Studies degrees became common in the liberal arts. New international laws influenced by cetacean ethics discouraged further human intrusions into the lives and habitats of other sentient species. (The UN Interspecies Division later became its Bureau of Alien Affairs.) Natural arenas for dolphin talents were the entertainment industries and the creative arts; the Theatre of the Sea was founded to celebrate delphinid drama.

Water, a difficult medium for vision, is an excellent one for sound. The speed of sound in water is 1524 meters per second, about 4.3 times its speed in air. Consequently, as sea-life diversified, the wild murky depths of Earth's oceans became a complex, noisy environment. Whereas humans are primarily visually-oriented, dolphins (and other cetacea) evolved auditory sonar senses far more effective than human hearing. Dolphins 'see' and communicate primarily with their acoustic-processing systems. Every dolphin has three independent sonic/ultrasonic transmitters, two in the blowhole and one near the larynx, which produce a wide variety of sounds, and permit 360° solid-angle or tight-beam sonar views. (Two dolphins may sound like six separate individuals.) The range of frequencies emitted is much greater than that of human vocalization. Echoes returning from submerged objects, signals from other delphinids (even kilometers distant), and diverse ambient underwater sounds — channeled from the dolphin's sensitive ears through its superbly-convoluted brain — allow each individual to maintain in exquisite detail a meaningful three-dimensional acoustic representation of its surroundings. Dolphins can communicate this knowledge very rapidly, even to other cetacea, much more efficiently than humans can transfer equivalent visual information. Current computer-translator systems owe much to the researches of early delphinologists; the *Dolphin's Ears,* small analog transducers which allow skin-diving enthusiasts to localize objects underwater, are well-known.

Among themselves, dolphins use an amazingly fast and powerful sonic-picture language *(delphinese),* which most humans refer to as dolphinese. It is impossible for humans to understand or to duplicate precisely, so computer-translators are often used. In the human range, what can be heard of it sounds like a rapid stream of high-pitched clicks, whistles, squeaks, grunts, moans, bleats, quacks, wails, creaks, hoots, toots, burps, and burbles. When delphinids are upset, they add additional sharp barks and angry buzzes. Human speech seems very slow to dolphins, and falls in a limited low band of their frequency-spectrum. Dolphins, however, learn human languages easily; while some humans have managed an unsophisticated pidgin-dolphinese lacking ultrasonic overtones. Like humans, each dolphin has a distinct voice and style of speaking, but few can scale down their voices below the high-pitched falsetto of a human child, usually with a Donald Duck accent. Humans do much worse with delphinese: unable to pronounce impolite-sounding dolphin names such as *Bra-a-ack, Pszzzz-Tweeee,* or *'Kjwalll'-kje'k'koothailirkjek,* they often use rude substitutes like Lulu, Sissy, Charley, or Moby. Like humans, dolphins also use gestures, physical contact, and other signals for non--verbal communication.

The exotic world-view of dolphins, so rich in complex, meaningful sounds, can be experienced directly by humans in two ways, each requiring a rudimentary telepathic aptitude. Crystal-iron contact helmets, complicated psionics devices first developed in the 21st century, allow partial interspecies transfer of memory patterns and temporary superimposition of personality factors. (These units have also been used to contact Bandersnatchi and once, disastrously, the Slaver Kzanol.) It is said that from direct human contacts, dolphins caught the urge to reach the stars, and from dolphins, humans gained their first clear comprehension of a wholly extra-human perspective. Some telepathic humans, able to bypass the technological interface entirely, can hear the "true voice of the dolphins." Without exception, these adepts describe the experience as transcendental — a magnificent procession of evocative, intensely-beautiful sensations sharing a common similarity of essence with music, memory, dream, delight, euphoria, visionary art, wonder, joy, and pure-white logic. The acoustic dreamsongs of great dolphin philosopher-historians have given human beings insight into the process of revelation. The songs of their natural scientists illuminate the processes of nature: images of events, their consequences and causes, logical proofs, and aesthetic ideas seem to flow as one to coalesce in the consciousness. Few humans are yet capable of returning in kind what they have received in understanding from these eloquent masters of the sea.

Dolphins, like humans, are highly social, gregarious creatures. Much of their communication concerns social relationships, and in fact social isolation is much harder on dolphins than on many humans. Though they have universal codes of social ethics, their culture (like that of humanity) is hardly monolithic: for example, many dolphins have permanent mates while others prefer larger associations. Close, enduring friendships (and even physical relationships) have often arisen between humans and dolphins. Dolphins have fallen in love with humans, as have humans with dolphins. Delphinophiles describe dolphins as gentle, affectionate, compassionate, considerate, patient, sensitive, sensual, sensible, intelligent, ethical, philosophical, *eager,* imaginative, jolly, generous, and altruistic.

GROGS (Adult Female)

Char.	Range	Average	
STR	1D6+3	6	Average Hit Points: 28
CON	2D6+6	13	Speed: NA
MAS	1D6+12	15	Action Ranking: 5
INT	1D6+12	15	
POW	3D6+18	28-29	
DEX	3D6	10-11	
APP	3D6	10-11	
EDU	no need		
Age	unknown		

ARMOR AND HIT LOCATIONS: Sessile grogs have thick skin useful as two points of armor. The interior of a grogs mouth is unarmored. Grogs never don artificial armor. Sessile grogs have but one hit location, in which are 100% of the grogs hit points.

Location	D20 roll	Armor/HP
Body	01-20	2/28(1.00)

WEAPONS: Grogs never bother with weapons; their psionic power is vastly more effective.

SKILLS: All knowledge and communication skills are available to grogs, as are any technical skills which require only the use of the grog's tongue. A grog's percentage with any of these skills is equal to the percentage held by the most skilled person that the grog has had occasion to study, or to the highest percentage held by anyone with whom the grog is presently in contact when the skill is used. A grog can learn skills through the study of minds at a rate of 1 percentile per hour of study. For the study to be effective the subject must be fully conscious. An ambitious grog could learn the same skill with several different Xenology-qualifiers, if she so wishes, to any percentage, by finding study subjects of the appropriate species.

PSIONIC POWER: Grogs possess the most powerful psionic ability known extant in the Ringworld era. They not only can read minds but can control them as well, and can implant ideas which the uninitiated will interpret as their own. Some believe the grogs to be extremely ethical in the use of their power; and others believe that grogs are secretly manipulating humankind, using the same method as the slavers — only more subtly.

If a grog wishes to enter a mind, it must successfully overcome its victim's POW with its own POW. If the subject is willing or is completely unsuspecting, the grog can make the attack at twice its normal POW. Once a grog has entered a mind, it can suggest any action to the victim. The victim's player may then (if the victim has felt the influence of a grog before, and has reason to identify it) make a Luck roll. If the roll succeeds the victim will realize that he or she is being manipulated by a grog, though he or she will still not be able to resist committing the action.

The range of a single grog extends to her POW x10 in meters. Though grogs cannot work together to increase their total power, they can transfer information to one another like a telegraph net. A whole population of grogs will be informed of any important fact within moments.

Whether or not the grogs are ethical in their actions is left to the gamemaster. The gamemaster should in either case carefully and subtly use the grogs' powers, attempting to arouse no more than the suspicions of the players and their explorers. It is strongly recommended that grogs be disallowed as explorers.

Although far less prone to violent behavior than humans, it is nonetheless self-delusionary to view all dolphins as preternaturally-enlightened, benign, super-visionary pacificists. Nor are individual delphinids without their particular faults: "there are dolphins and there are dolphins." Human influences inarguably have extended the range of dolphin personality. Some peculiarly-human vices have rubbed off on them at times; a notorious dolphin gang once even highjacked a starship. To date, however, no dolphin is known to have attacked a human, unprovoked, and with malice aforethought.

In the Ringworld Era

Humans and dolphins share an equal stewardship of the planet Earth and a common destiny as swimmers among the stars. Dolphins have colonized the oceans of many worlds, including Wunderland, Silvereyes, Home, Down, and Canyon. A few have ventured to Gummidgy and Margrave, and some have seafarmed one of We Made It's smaller algae-laden maria. In the Solar System, there are several water-filled dolphin asteroids, of which the largest is Elvar. The total population of dolphins in Human Space is probably 8-10 billion. Most large interstellar stations and starports have at least cursory dolphin facilities. Space travel is still infrequent and costly for dolphins, but they have unexpected aptitudes for it: they are at home in buoyant, reduced-gravity environments, learn fast, and have a natural tendency to think in three dimensions. They excel at computation. Because of their natural acoustic/sonar language abilities, dolphins Kdatlyno in situations where humans would have failed. They have provided invaluable insight into social-language concepts that cannot be learned from isolated individuals, and enhanced the exchange of ideas among species whose wisdom, aspirations, and inspirations are not tied to the accumulation of wealth or the use of tools.

Extensive interspecies contact between humans and dolphins ultimately has tempered man's aggressive territoriality, reducing his hostile impulses and narcissistic, xenophobic instincts. Some scholars argue that dolphins are actually more intelligent than men. Others speculate that humanity would not have survived its early nuclear age lacking the perspective taught us by dolphins, and that in any case our far-flung ventures to the stars and our encounters with sentient aliens would be meaningless without a parallel, increasing awareness of the vast, ever-growing universe within — an awareness growing (perhaps) one day to approach that possessed by present-day delphinids.

Long ago, humanity opened itself to the possibility of contact with alien intelligences; some humans dreamed of communication with extraterrestrial life, and even strove to achieve it. As a whole, though, humans clung arrogantly, desperately, to the notion that we would always be the sole, supreme, undisputed masters of the Earth. Some still do. The attitude of many, though, is reflected in the casual remark of a 23rd-century novelist, still often quoted, "Remember, dolphins are human, too."

GROGS

An enemy could destroy Down, but no enemy could invade Down!

The Grogs are a bizarre and mysterious sentient species native to Down, a former Kzinti world annexed by humanity at the close of the first Man-Kzin War. The Kzinti never suspected that adult Grogs were intelligent, let along telepathic. The Grogs themselves were circumspect enough to conceal their abilities from the ferocious Kzinti, thus avoiding extermination or enslavement. (Lone Kzinti hunters may have fallen victim to Grog hypnotic telepathy.) Early human colonists, too, regarded Grogs simply as a peculiar local life form.

There are two distinct phases in the odd life-cycle of the Grogs. During the first stage, they are small, fierce quadrupeds with roughly the intelligence of a dog. The female looks like a careless attempt to make a bulldog: no nose, the mouth a flat, lipless slit hiding two serrated, horseshoe-shaped cutting surfaces. The forepaws have four long, spreading toes resembling oversized chicken feet. The males are about the size of chihuahuas. Both sexes are covered with long, coarse, reddish hair the color of the deserts of Down as lit by its red dwarf sun. The temperament of young Grogs is as unsavory as their appearance. In this motile stage, snapping, snarling, and eating prodigiously, they grow up fast and mate. Then the female finds a rock, settles down, and continues to enlarge. When big enough, she starts having children. The males are kept as pets, eventually to die without ever entering the second, sessile phase of the life cycle. Sessile Grogs may live several centuries.

An adult Grog is a rather comical hairy cone about 1.5 meters high. Her brain has enlarged drastically, but her limbs have become useless. She is firmly attached to her rock and is no longer capable of movement. Her base averages 1.2 meters across, with long, straight, reddish hair brushing the rock like a floor-length skirt. A few centimeters up, two small widely-separated paws poke through the curtain of hair. Roughly the size and shape of a Great Dane's forepaws, they are naked and pink. A meter higher, two vestigial hands poke through. The digits on them are extended to form curving, useless fingers. Above the forepaws is a meter-long lipless gash of a mouth, half-hidden by hair. Closed, it curves slightly upward at the corners in a gentle grin, but it opens wide enough to swallow a man. Coiled on the cavernous floor of a Grog's mouth is a very long prehensile tongue, which can lash out almost invisibly-fast to catch sand rats or other prey at considerable distances. Though the tongue is a Grog's only manipulative organ, it can be controlled with sufficient competency and precision to operate tools or computer terminals. The cone's top is featureless, rounded, and bald. There are no eyes or

ears. Sessile Grogs look like a Stone Age humorist's attempt to carve an idol, using a fat lap-dog in begging position for a model.

Though the spinal cord and most of the motor nerves are degenerate, the brain of an adult Grog grows bigger than a basketball, and weighs nearly 25 kilos. Its incongruously large size puzzled scientists at the Laboratory for Xenobiological Research on Down for many decades after colonization of the planet by humans. Terrified and utterly helpless, a number of sessile Grogs starved to death in captivity rather than risk revealing their species' telepathic ability. Finally, in the mid-27th century, they contacted humanity — through a representative of Garvey Limited, makers of the Dolphins' Hands.

The enigma of the Grogs was solved. With their awesome telepathic ability, Grogs don't need to move about. They can control any animal within hundreds of meters, perhaps many kilometers, of their rocks, simply calling their food to them when hungry. No conventional senses are necessary since they can use the eyes, ears, noses, and other senses of any creatures within range, including humans. They can direct the behavior of scavengers or potential predators with specific commands — and they can lodge irresistible suggestions and convictions in the conscious or unconscious minds of sentient beings (it is no wonder that research about Grogs progressed so slowly). No knowledge of a particular language is needed for a Grog's power to work on an individual, and the only known defense is the rare latent Slaver mind-shield present in a few telepathy-prone humans. It is possible, however, to learn to recognize ideas and beliefs implanted by Grog telepathy. Such thoughts appear suddenly, and are held with utter conviction, seeming to float with crystalline certainty amid the normally-amorphous sea of doubt and probability characteristic of the human mind.

Grogs cannot control Bandersnatchi, who were made immune to Thrintun Power by the Tnuctipun. They generally can reach any other life possessing any significant mind. Non-sentient organisms such as microbes, or creatures lacking highly-centralized nervous systems, (such as primitive vertebrates and invertebrates) are not susceptible to Grog hypnotic telepathy.

Grogs and Men

During the two centuries before the Ringworld era, Grogs have emigrated to a number of human worlds, as tourists and as permanent residents. Away from Down, they require special protection from ultraviolet — enclosed travel couches massive enough to support both a Grog and the rock to which she is permanently anchored. Communication with Grogs is generally indirect, via printers or computer links, since most humans prefer to avoid direct mental contact. Grogs run fabulous zoos, in which they themselves appear as exhibits; and they direct tricky operations on animals when necessary. Their abilities have proven valuable in explorations beyond Known Space. They also act as translators, security guards, and recently have become veracity-verification officers in certain legal proceedings, where their power enables them to serve as infallible courtroom lie-detectors.

On their native world, the Grogs tend extensive herds of herbivores for human colonists, many of whom live far above in the orbital wheel-cities. Much of Down's surface remains in its natural state, as the Grogs prefer it. In exchange for their services, Grogs receive cattle and other dietary delicacies. They are also supplied with monkeys, birds, raccoons, and other animals dextrous and mobile enough to offer substitute hands, legs, and senses. Grogs have become proficient with prosthetic Hands, and have learned how to operate telepathically-controlled tools riding on tractor treads. They have also earned education, and have been permitted to read some of the best minds of Known Space. The Grogs seem completely friendly, cooperative, and well-intentioned. They have made no (known) attempts to manipulate other races by means of their telepathic powers, and they have made a substantial and positive contribution to Known Space cultures.

Despite the overwhelming evidence of good will, the very existence of the Grogs seems to inspire deep paranoia among some species (such as humans). To this day, there are occasional calls for the extermination of all Grogs because of the potential threat they pose. Their psionic control ability appears to be rather similar in kind to the Power of the telepathic Thrintun Slavers, who died out at least 1.5 billion years ago. Some (including noted xenologists) believe the Grogs degenerated rather than evolved, and that the Grogs are in fact devolved descendants of Slavers. They point to biological and physiological similarities, such as the fingers (though the Grogs have four, rather than three) with tiny claws set around a minuscule palm, like a minute mechanical grab. Other experts disagree, pointing out that Down is not now, and never has been a Thrint-suitable world, nor does it fit the criteria for a food planet. There is no evidence of any other Slaver food-animal species or Tnuctipun-bred plant (such as the stage tree) on Down. Unlike the Thrint, the Grog female is dominant and sentient. Also, Grogs are far more intelligent than the decadent Thrint, and these scientists feel it is unlikely that evolutionary pressure would have enhanced their sentience. Most xenobiologists believe that Grog intelligence arose after the telepathic ability, as a secondary attribute. The questions are still being debated.

To allay fears of those suffering from Grogophobia, a huge antique fusion ramship in operating condition orbits near Down's sun. Were it ever to be turned on, the ship's electromagnetic ramscoop field would cause the star to flare, emitting enough ultraviolet radiation to destroy unprotected native life forms on the planet (UV is far more lethal to Grogs than to humans). Even this gesture does not satisfy truly paranoid extremists, who suspect that the Grogs already have taken over Human Space, but that no one realizes it! In all fairness to such radicals, it is easy to doubt the Grogs' claim that their power reaches no farther than halfway around Down, with all of them working together at maximum strength in a relay network. (The ancient Slavers could not coordinate their individual abilities; neither species' power is additive.) It is easy, too, to doubt the assertion that devolving Slavers couldn't have survived 1.5 billion years on Down. The haunting apprehension remains that anyone boarding the old ramship would report it ready to fire, no matter what its actual condition, due to Grog mental interference. Flatlanders clamoring for a solution to The Grog Problem have urged that Bandersnatchi be space-lifted from Jinx to control them — an impractical and very expensive undertaking.

On Ringworld, Grogs were limited originally to the Map of Down in the oval Great Ocean. Perhaps the Grogs control the sea life in the vicinity of the island cluster. Their powers may be greater or lesser than their cousins on Down, or even non-existent. They may have mutated and, like Bandersnatchi, have spread elsewhere on the Ring. All that is known of the Map of Down is that Kzinti exploration teams sent to it never returned.

KDATLYNO

He didn't LOOK like an artist....

Nightmarish in appearance to most humans, Kdatlyno evoke images of monstrous devouring giants from the myths of Earth's dimmest past. These intelligent, physically-imposing aliens stand improbably erect, are 3-4 meters tall, and may attain weights in excess of a ton. Their thick, dark-brown hide, tough enough to turn a hullmetal knife, might be the skin of a dragon. Bipedal and roughly human in overall design, Kdatlyno have great, flat-clawed feet, massive legs, and broad, burly arms long enough to brush their knees. Their powerful hands are those of some demonic strangler. Eight retractile claws at the knuckles, usually filed sharp and buffed to a lustrous glow, protrude when the fists are clenched. From armored knees and elbows, curved horns project silver-tipped spikes. In motion, Kdatlyno are swift, silent, and efficient, despite their towering bulk. Unlike Kzinti, Kdatlyno enjoy immersion in water: in fact, they swim surprisingly well.

Kdatlyno are blind to visible light. A sophisticated sonar sense is their primary window on the world. No nose, ears, or eyes show on a Kdat's head. There is a wide gash of a mouth, with sharp teeth indicating a varied diet, and there are small, flat olfactory sensoria. But above the mouth one finds only a goggle-shaped organ covered by skin stretched drumhead-taut. This sensitive membrane, the only unarmored part of the Kdat body, is an acoustic transducer. Throughout its life, each individual sends out a unique whistle, a single ultrasonic tone inaudible to humans. Bounced off solids, liquids, and gases in the environment, echoes of this sound return through the alien's tympanum, giving him a detailed picture of the objects' distances, directions, temperatures, textures, and motions. At extreme range, the ultrasonic radar is of relatively limited use unless mechanically augmented. Up close, though, Kdatlyno can "see" to varying depths into normal materials, depending on the exact shape, reflectivity, composition, distance, and size of an object. On a liner, for example, a Kdat can sense access-tubes running behind closed doors. He can feel corridors leading all around the ship. Naturally, Kdatlyno can perceive nothing whatever through a spacecraft's hull (a disturbing sensation), or across vacuum. In unfamiliar settings, Kdatlyno cannot tolerate small, enclosed areas. They feel trapped, and may panic. Kdatlyno need room in which to be comfortable — room enough to feel.

Kdatlyno also possess an exquisite tactile sense, and their memories and pattern-recognition abilities are formidable.

The World of Kdat; Kdatlyno History

The planet Kdat circles the K-type sun Ghurnt (Puppeteer star catalog no. KC-0454), 27 light years from Earth. It has a close, red-sulfurous moon, Skaf, similar to Io, which is rarely visi-

ble from Kdat's surface. The gravity of Kdat is 1.34 gees, and the planet's atmosphere is thick, warm, and murky. Some of its more volatile constituents are human gaseous anaesthetics. With occasional supplements, Kdatlyno can easily breathe terrestrial air, and they temporarily can metabolize certain human food-proteins if Kdat food is unavailable — but the reverse does not hold for humans.

The landscape of Kdat is always semi-dark, except for the violent flashes of occasional lightning storms. Hissing volcanic vents and other tectonic phenomena are commonplace. Meteor impacts happen more frequently than on any world where humans feel safe. Between minor catastrophes, though, Kdat may feel oppressively calm and unnervingly quiet to human visitors.

Within such foreboding gloom, the carbon-based Kdatlyno evolved intelligence and mastered the use of tools. Their planet was rich in the raw materials requisite for industrial development. Eventually they achieved a peaceful, modestly-advanced technical civilization.

Mapping the skies with powerful radio and radar telescopes enabled their astronomers to verify the long-disputed concept of a vast external cosmos. Kdat philosophy holds that every great revelation carries with it an even greater challenge, and that ideas unsculpted by action are unaesthetic. A heroic effort began to explore the Ghurnt system and, in enormous ships propelled by primitive nuclear-ion engines, the Kdatlyno set out to colonize the worlds of several nearby stars. Hoping to contact other sentient life, Kdat scientists also began broadcasting messages beamed on the 21-cm interstellar hydrogen band. Unfortunately, the Kzinti responded first.

The Kdat-Kzin war was long and inconceivably savage — but its outcome was never in doubt. Invasion fleets ultimately reduced the Kdatlyno to a single planet of property-less slaves. For their inspired resistance the Kdatlyno won considerable respect from their conquerors. A few Kdatlyno evaded enslavement, escaping to the textured volcanic tunnels, deep-vaulted chambers, and hidden geothermal pools used by their ancient ancestors, and here they kept alive an ember of their culture. For centuries the Kzinti used forced Kdat labor to mine their own world and to build Kzin's interstellar warships. Not until the second Man-Kzin war, when human fleets wrested their system from the Patriarchy, did the Kdatlyno regain their freedom.

The status of the newly-freed Kdatlyno was wretched, though a definite improvement over slavery. Their culture had been nearly obliterated, their technology destroyed, and their solar system looted. They were poor. Humanity had been happy to liberate them, but felt no urge to give them massive aid. Earth and her colonies had their own problems, and the Kdatlyno seemed antisocial, ungrateful, and altogether too alien to flatlanders. If they could rebuild and prosper, humanity would approve. But no human tears would be shed if the Kdatlyno failed.

For a century few interstellar commodities came from Kdat. Humans gradually perceived, however, that Kdatlyno possess an extraordinary aesthetic sense, expressed in unique and intriguing art forms. One such form, touch-sculpture, became the most valuable of Kdat's exports. Pure, traditional touch-sculpture is meant to be sensed solely by ultrasonic radar. For Kdatlyno, its oscillations and reflections carry strong emotional themes, as well as a combination of what humans might call visual, verbal, and musical content. In light visible to humans, such works often appear grotesque or unfathomably bland; to Kdatlyno, the soul of the art is in its internal forms as well as the external surface impressions. The grand blend of substances, contoured boundary-layers, contrasting reflectivities, refractions, re-emissions, and inner resonant cavities — these are the elements of its nature. Humans, lacking the ability to feel texture at a distance, must physically touch the sculptures to appreciate their qualities. (Some works do emit audible undertones.) Contact with aliens inspired an innovative school of touch-sculpture, originated in the late 2500s by Hrodenu and Lloobee. Their works were the first to integrate human representational concepts with classic Kdatlyno ideas — some heroic busts of humans even had warm, fleshy textures. Of ever-increasing value, early touch-sculpture masterpieces remain highly sought-after throughout Known Space. The art form is also popular with amateurs, though it requires extreme skill, special tools, and great patience to create a worthwhile piece of touch-sculpture.

Exportation of art treasures is hardly enough with which to underwrite the rebuilding of a planetary economy. To gain major interstellar credits, the Kdatlyno negotiated substantial industrial service contracts. Many found work in fields where their special sensory talents and great strength put them at an advantage: as acoustic holographers, quality-control engineers, building inspectors, diagnosticians and surgical assistants, security officers, and the like. After 400 years, the Kdatlyno are finally entering fully into the Known Space economy — but are yet at a distinct, though narrowing technological disadvantage.

On alien worlds, some Kdatlyno use sense-transposers to gain access to the human-visible spectrum. Though such perceptual aids in the past have been expensive, mentally taxing, and of limited effectiveness, newer Dolphin-engineered models seem to hold great promise. Kdatlyno have mastered Interworld and other suitably-presented alien languages with ease, but they often find alien social concepts difficult. Old Kdat script remains virtually inaccessible to humans — its script is a topographic, metatactile alien braille. A single irregularly-shaped slab of Old Kdat with its nearly-featureless outer surface may conceal several internally-textured planes of text, readable only by ultrasonic radar. New Kdat is a less-expressive mixture of abbreviated, low-relief Old Kdat and Interworld, with some Kzinti.

KDATLYNO

Char.	Range	Average
STR	3D6+12	22-23
CON	3D6+6	16-17
MAS	2D6+30	37
INT	2D6+6	13
POW	3D6	10-11
DEX	2D6+6	13
APP	3D6	10-11
EDU	as for human	
Age	unknown	

Average Hit Points: 54
Speed: 6m/im
Action Ranking: 4

ARMOR AND HIT LOCATIONS: Kdatlyno have extremely heavy skin which acts as 4 points of armor. Kdat hit locations are determined on the standard hominid chart, and their hit points are distributed in the standard manner.

Location	D20 roll	Armor/HP
Right Leg	01-03	4/16 (.30)
Left Leg	04-06	4/16 (.30)
Abdomen	07-10	4/16 (.30)
Chest	11-15	4/19 (.35)
Right Arm	16-17	4/14 (.25)
Left Arm	18-19	4/14 (.25)
Head	20	4/16 (.30)

WEAPONS: Kdatlyno have access to all Known Space weapons technology. Often they are quite skilled with projectile weapons, actually feeling the projectiles reach their target. Similarly Kdatlyno often are particularly skilled with the variable sword because they can feel the blade as well as their victim. Kdatlyno's powerful claws can do 1D8 damage per hand. They can attack with both hands in the same impulse.

SKILLS: Kdatlyno have access to all the standard known space skills, and are especially proficient with agility, technical and perception skills. They have a special skill called Touch (base 40%) which is the ability to finely manipulate the Kdatlyno sense of touch.

Behavior and Reproduction

Most aliens are overtly cautious and ill-at-ease in the presence of a Kdat, whose formidable size and featureless gaze are fundamentally disturbing. Humans generally believe Kdatlyno to be touchy, unpredictable, and easily-angered by trivial matters. Even though Kdatlyno have learned to emulate human speech to a degree, humans find them uncommunicative and rude. Unfortunately, much of the casual contact between aliens still takes place in the claustrophobic confines of buildings or spaceliners, where Kdatlyno are likely to be at their worst. Nonetheless, Kdatlyno often do seem irritatingly aloof and wary; the behavior of most aliens frequently annoys them. Few leave their home world without good reason.

Kdatlyno are not a militaristic species, but they are assuredly more prone to attack without apparent provocation than the average sentient alien. Primitive Kdatlyno hunted large

prey by stalking, then making a quick charge. Their complex traditions of social vengeance (which sometimes worry aliens) probably reflect such early techniques. Kdatlyno have a strong sense of personal revenge: any deliberate insult or injury must be avenged, severely and directly if possible. Sometimes only the death of the transgressor, by whatever means are immediately available, may satisfy Kdatlyno honor. In other cases, satisfactory revenge comes much later, the result of 'pursuit-with-publicity' or of subtle schemes rivalling or surpassing any in *The Count of Monte Christo.* Kdatlyno will avenge relatives, and even strangers on occasion, but not with the fervor reserved for personal foes.

Vengeance wrought by a Kdat mother is probably the most terrible to contemplate. Female Kdatlyno (Kdatlyn) are sentient, larger than the males, and noted for their fierce devotion to family interests. They generally are the more aggressive, xenophobic, and territorial of the two sexes. Insult or injury to an offspring may be avenged by the mother, or, under her supervision, by many other family members. Rare affronts to a mother by an offspring also are swiftly punished.

Males and younger females jointly conduct affairs of state, science, and industry — but Kdat society's long-term social structure is predominantly matriarchal. When a Kdatlyn experiences the imperative to breed, she mates with 5-1 5 compatible, younger males over a period of 20-60 days, collecting their immature sperm packets in her reproductive pouch. Usually some fathers' contributions are lost, or even discarded, before true fertilization takes place and gestation begins. Multiple births of mixed parentage are the rule among Kdatlyno.

To date, the Kdatlyno never have been in a position to enforce any vengeance as a species. Some experts suspect that the Kdatlyno are in the midst of a long-term plot to avenge themselves on the Kzinti — with whom they presently trade amicably.

Humans poorly understand Kdatlyno social codes and behavior, tending to focus on only a few sensational aspects of their entire culture, and unfairly characterizing it as an unending cycle of feuds and retributions.

KZINTI and PUPPETEERS

A much-fuller explorer generation system for both species can be found in the explorer book.

KZINTI

Char.	Range	Average	
STR	5D6+12	29-30	Average Hit Points: 37
MAS	4D6+10	24	Speed: 5m/im
CON	2D6+6	13	Action Ranking: 2
INT	3D6	10-11	
POW	2D6+6	13	
DEX	2D6+12	19	
APP	3D6	10-11	
EDU	as for humans		
Age	1 D4 on age table		

ARMOR AND HIT LOCATIONS: Kzinti have no natural armor. They do though, wear various modern powered armors. Kzinti value lightness in armor, usually disdaining armor which decreases their DEX. Kzinti hit locations are determined on the standard hominid hit location table, and their hit points per location are determined normally.

Location	D20 roll	Armor/HP
Right Leg	01-03	0/11 (.30)
Left Leg	04-06	0/11 (.30)
Abdomen	07-10	0/11 (.30)
Chest	11-15	0/13 (.35)
Right Arm	16-17	0/9 (.25)
Left Arm	18-19	0/9 (.25)
Head	20	0/11 (.30)

WEAPONS: Kzinti have access to all the standard Known Space weapons technology, as well as to a panoply of kzinti-specific weapons and torture devices.

These great carnivores have sharp claws and teeth which they expertly use in combat. At each of its Action Rankings a kzin can slash or grab with each claw, for 1D8+2. If the kzin attacks successfully with both claws he can hold on to his victim, automatically doing 1 D8+2 per impulse thereafter to the location he is holding. A kzin who is holding may also bite on his next action ranking. The bite does 1 D6 damage and the kzin can choose the location bitten from among those closest to the head of the kzin.

SKILLS: Kzin specialize in combat skills, but do not ignore other specialties. Most kzin who come in contact with humans will be well trained in diplomatic skills. Usually, the sciences are not taught beyond rudimentary levels to Kzinti who have not yet earned their name.

PUPPETEERS

Char.	Range	Average	
STR	2D6+6	13	Average Hit Points: 26
MAS	2D6+6	13	Speed: 5m/im
CON	2D6+6	13	Action Ranking: 4
INT	1D6+15	18	
POW	3D6	10-11	
DEX	2D6+6	13	
APP	3D6	10-11	
EDU	30 + normal procedure		
Age	Unknown		

ARMOR AND HIT LOCATIONS: Puppeteers have one point of armor in their fore-bodies, bone covering their brains, and no other natural armor. It is likely that the puppeteers have developed various forms of advanced armoring systems and energy fields for their own use. Impact armor is an example of puppeteer technology in this field. Puppeteers legs and hind-bodies have 30% of total hit points, their forebodies have 35%, and each head has 25% of total hit points.

Location	D20 roll	Armor/HP
Right Fore-Leg	01-03	0/8 (.30)
Left Fore-Leg	04-07	0/8 (.30)
Hind-leg	08-10	0/8 (.30)
Fore-body	10-14	1/10 (.35)
Hind-Body	15-18	0/8 (.30)
Right Head	19	0/7 (.25)
Left Head	20	0/7 (.25)

WEAPONS: Puppeteers claim that they are too cowardly to use weapons effectively, and that therefore they manufacture no weapons. Nevertheless, Puppeteers are masters at creating weapons hidden within otherwise useful devices. All puppeteer created devices have a characteristic design, a melted look, with no sharp corners or jagged edges which might possibly harm the user.

A puppeteer, if cornered can deliver a deadly kick with its hind leg, doing 2D6+2 damage. In combat, puppeteers can use their wide field of vision to their advantage. They can keep up to two target of opportunity ranges active simultaneously, keep up one while committing some other action, or use a perception skill while committing other actions.

If engaged against obviously superior odds most puppeteers become catatonic, and be of no further help to their comrades, whatsoever.

SKILLS: Puppeteers are fully capable of learning any skill offered on the standard list, except Hyperdrive. Puppeteers are generally quite skilled; an individual will usually have 10 Knowledge branch skills, 5 Technical Branch skills, and alt the communication skills at 50% or above.

OUTSIDERS

Char.	Range	Average	
STR	1D6+2	5	Average Hit Points: 14
MAS	2D6	7	Speed: 1 m/im
CON	2D6	7	Action Ranking: 4
INT	2D6+6	13	
POW	3D6	10-11	
DEX	2D6+6	13	
APP	3D6	10-11	
EDU	unknown		
Age	unknown		

ARMOR AND HIT LOCATIONS: Outsiders have no natural armor and never wear artificial armor. Outsiders have 10% of total hit points in each tail and 50% in their "handle".

Location	D20 roll	Armor/HP
Handle	01-10	0/7 (.50)
Tail 1	11	0/1 (.10)
Tail 2	12	0/1 (.10)
Tail 3	13	0/1 (.10)
Tail 4	14	0/1 (.10)
Tail 5	15	0/1 (.10)
Tail 6	16	0/1 (.10)
Tail 7	17	0/1 (.10)
Tail 8	18	0/1 (.10)
Tail 9	19	0/1 (.10)
Tail 10	20	0/1 (.10)

WEAPONS: Outsiders have never been observed to use hand weapons of any type. Species, even Kzinti, who have dealings with the outsiders know better than to attack them.

SKILLS: Outsiders have access to all branches of all knowledge and communication skills, including xenologically-qualified branches. They are also reportedly quite proficient at dexterity based skills, though humans have little opportunity to observe this aspect of outsider life.

OUTSIDERS

The thing about buying information is that you don't know what you're getting until you've got it.

Outsiders are cold, fragile beings adapted to life in the vacuum of space. They are the most unearthly of the alien races so far encountered by humankind. As technologically-advanced as any known species in the galaxy, the Outsiders remain quite mysterious. Their metabolism is based upon liquid helium, and thermoelectricity generated from starlight. Outsiders resemble black cats-o'-nine-tails with grossly-swollen handles. In the "handles" are their brains and sense organs. Except for extremely-sensitive eyespots, their sense receptors are not visible externally. In the whip-ends of their cluster of mobile root-tentacles are weak gas jets, used in crossing open, airless voids. In the Ringworld era, dozens of odd varieties of helium II life-forms are known, but all are planet-bound, non-sentient, and vastly more primitive than the Outsiders,

Evidently the Outsiders' ancient ancestors were plant-like creatures native to some cold, small moon of a gas giant, perhaps near the galactic core. They are unable to tolerate high gravity, high temperatures, substantial pressure, or intense light-levels. They thrive on thermoelectricity, basking with their branched tails in shadows and their bodies in weak sunlight, absorbing light energy. The temperature differential sets up currents which recharge their biochemical batteries. Periodically, they dip their root-tentacles in shallow food dishes containing nutrients suspended in liquid helium to draw in trace elements necessary to keep them alive and growing. (When in free-fall, they sometimes thrust their tentacle tips into floating globules of nutrient and helium.) Outsider bases and ships always have extensive areas of broken light and shadow for motionless, undisturbed basking. Their lifespans are extraordinarily long — possibly over a million years. Physically, though, they are weak and vulnerable: a mere hour in the gravity of Earth's moon would be fatal to most. In zero-gee environments, Outsiders are dexterous and agile, skillfully using their tentacles to grasp and manipulate objects.

The Outsiders trade in information and knowledge with many species. They are honorable, but shrewd and careful in business dealings. Most of them live in the gulfs between the stars, in city-sized slower-than-light ships the sophistication of which varies enormously — from photon sails to drives theoretically impossible according to human science. Outsiders consider hyperdrive vulgar, always preferring to travel through Einsteinian space. They enjoy the trip, sightseeing and taking their time. Hundreds of times, though, alien species in more of a hurry have been able to purchase the secret of the hyperdrive from

Razor-wasp (description p. 41) — here a razor-wasp hovers briefly over a grilsqik (not described) a fresh-water creature prized by Sea People as a delicacy.

passing Outsiders, as did the human colony on We-Made-It.

As it approaches Known Space, an Outsider ship with information to sell typically sends out an exchange offer ahead of it, on broadband. The prices are always more clearly defined than is the specific knowledge available from the incoming craft — which is called by its number, never a name. Outsiders sell high, and pay top sums when they buy, usually in the form of credit or debt-reduction. Occasionally, they sell or lease equipment (such as advanced drive systems) or offer ferry services. Proceeds of their transactions are used to establish a credit base for future ships, and later to purchase territory and food soil. (Even so, Outsider operations are decentralized; subsequent Outsider ships often have little information from previous ones.) When a planetary system harbors a suitable world and holds enough potential customers, the Outsiders may lease space for trade centers, rest and recreation areas, and supply dumps. Some 500 years before the Ringworld era, they leased Nereid, the smaller moon of Neptune, as a base in the Solar System. Though information-buying is a tricky business, Outsider credit remains virtually unlimited in the banks of Human Space.

Outsiders never haggle or dicker, once they set a fee, and (unlike the Puppeteers) do not engage in blackmail as normal business practice. Moreover, Outsiders do not consider danger as a factor in their basic transactions — useful cautionary information, as available, simply costs a little more. Their prices, though high, usually turn out to be quite reasonable values. Outsiders like to make sure that their alien customers will remember their unimpeachable ethics, even a century later.

The Starseeds

One of the great mysteries about the Outsiders is their interest in starseeds, which their ships spend much time tracking through the void. Starseeds are big, mindless beings which swarmed in the galactic core before it exploded, feeding on the warm, hydrogen-rich interstellar gas. On fantastic egg-laying flights, starseeds travel to the edge of intergalactic space to deposit their fertilized eggs at the tips of the spiral arms. Riding the photon winds, newly hatched starseed-chicks must make their way home across 50,000 light years of space, at an average speed of 0.8 lights. Many experts believe that at least some eggs are launched outbound, toward the globular clusters, the Clouds of Magellan, or in the direction of Triangulum or Andromeda. Most of a starseed's time is spent folded into a compact ovoid, two or three km in cross-section, falling through the galaxy on its own momentum. Now and then, it will execute a course change. The photon sail then comes free, slowly streams away and unfurls, like a silver parachute with four threadlike shrouds pointed at the sun it has just rounded. The sail is a silver mirror "thinner than the paint on a cheap car," but thousands of kilometers across. A cross-shaped thickening in the material of the sail is the living body of the starseed itself. In a knob hanging from the shrouds is more living matter. In that knob are muscles to control the shrouds and set the attitude of the sail — and there is the egg, fertilized at the core, launched near the galactic rim.

Where starseeds go, Outsiders often follow. Naturally, they advertise as for sale the secrets of their connection with this strange life form at their apparently-standard rate for truly interesting questions: one trillion stars. Private knowledge about the Outsiders is always very costly.

Puppeteers and Outsiders

The Puppeteers are known to possess a device (which they claim to have invented thousands of years ago) for attracting starseeds and, consequently, Outsider ships. This starseed lure causes a sun to emit electromagnetic signals that attract starseeds as surely as a candle flame attracts moths.

Puppeteers have traded with Outsiders for at least 250,000 years. Long ago, the Puppeteers purchased advanced drive systems from them, which eventually were used to set in motion the Puppeteer Fleet-of-Worlds. This was reportedly a credit deal, and the Puppeteers still are making payments. The secret of this powerful inertialess drive is still for sale, but no Known Space civilization can meet the price, even on credit.

The Puppeteers claim to have originally purchased the location of Ringworld from the Outsiders. They are said to have had secret agreements with the Outsiders concerning the safe and unrestricted use of Einsteinian space, sharing (for different reasons) a dislike of hyperdrive.

Outsider Ships and Origins

An Outsider interstellar ship is mostly empty space. Though its population may be that of a small city, it is even bigger than would be expected because of its design. In many craft, a cylindrical metal pod at or near the center of mass houses a reactionless, inertialess drive, capable of accelerating at hundreds (sometimes thousands) of gees. There generally is no hyperdrive unit. Some ships commonly use other methods of propulsion, such as light sails. Mounted at the end of a pole 4 kilometers long is a light source. The rest of the ship consists of metal ribbons winding in and out, swooping giddily around themselves and each other, until the ends of each tangled ribbon stop meandering to join the drive capsule. There are a thousand or more such basking-ramps, each the breadth of a wide city pedwalk. A landing ramp for more conventional vehicles is located next to the looming convex wall of the central cylinder. From that vantage point, the artificial light source appears about as small and yellowish-white as Earth's sun seen from Neptune. Shining through the interstellar vacuum, it casts a complex network of sharp black shadows across all the rigid, looping strands that form the cityship. Along every light-shadow interface, Outsiders bask serenely. To flatlanders, Outsider ships, like the aliens themselves, induce disquiet and anxiety, even dread. Such feelings are without rational justification. Outsiders have never threatened anyone in Known Space, and have always remained overtly neutral in political disputes and military conflicts.

There are some indications that Outsiders may not be originally native to the Milky Way. They have shown curiosity as to how the species of Known Space plan to deal with the onslaught of radiation from the core explosion, but they have evidenced little concern for themselves. Possibly their interest in the starseed population may be part of a galaxy-wide conservation effort, but a few alarmists maintain that the Outsiders' casual indifference means only one thing: the cataclysm at the core was far less severe than Known Space species have been led to believe. Or perhaps Outsiders simply are immune to its effects.

Past or present information about the Pak may be possessed by the Outsiders, but so far no one has tried to obtain it. Many mysteries remain concerning Outsider culture and biology. Their mode of communication is certainly not sonic — but their characteristic translator-walls and audience-rooms are quite sophisticated, even to the timbres and other nuances of human speech. Riding through the interstellar gulfs, Outsiders may "feed" on the streaming, tenuous hydrogen gas, possibly deriving energy from it through some slow, atom-by-atom, cold-fusion process.

There are no Outsiders on Ringworld, so far as is known. Because of the Earthlike conditions there, they could not survive. Using gravity-generators to maintain zero-gee in a cold, vacuum chamber capsule, it would be possible for an Outsider to explore the surface of the Ring, though. And, of course, they could easily explore the exterior side.

TRINOCS

Your species is insufficiently suspicious. It is a wonder that you have survived!

Direct contact between Trinocs and humanity began only 20 years before Louis Wu's first trip to Ringworld — though the Puppeteers had traded with the Trinocs (largely through robots) for centuries. The Trinoc sphere of settlement is somewhat larger than Human Space. The Trinoc worlds lie toward the constellations of Hercules, Ophiuchus, and northern Scorpius, in roughly the opposite direction from Earth as the most heavily-populated human colonies. By treaty, Trinoc Space begins seven light years past Margrave.

The Kzin long-kept the existence of the Trinocs a secret from humanity. Never conquered by the Kzinti, though often harassed, the Trinocs succeeded in checking the Patriarch's expansionist efforts in their region. On Earth, rumors occasionally surfaced concerning classified UN reports of a methane-breathing alien civilization beyond the fringes of Known Space.

The first well-publicized meeting between human and Trinoc took place in an unexplored system of a yellow star some 40 light years from Sol. In 2830, Louis Wu entered the system, searching for artifacts in Slaver stasis boxes. A chance confrontation developed with a Trinoc scout craft near a mysterious ball of neutronium orbiting an uncharted terrestrial planet. Small, conical, and green, with darker green markings, the alien ship used a highly-sophisticated reactionless drive capable of 30-gee accelerations. It accommodated a crew of six. Initial contact was established via conventional com-lasers and autopilot-translators.

Trinoc Appearance

Appallingly ugly to most flatlanders, a typical Trinoc stands only 1.5 meters tall, and from a distance appears to be made up mostly of its two legs — nearly a meter of skinny legs. Balanced atop the legs is a keg-like torso with no discernible neck. Folds of chrome-yellow skill fall in thick rolls around the bottom of the head, hiding anatomical details. There are two long arms, spindly but muscular. Some complicated-looking joints knot the elbow, wrist, ankle, knee, and hip locations. Three-

TRINOCS

Char.	Range	Average
STR	3D6	10-11
MAS	2D6+3	10
CON	2D6+6	13
INT	2D6+6	13
POW	3D6	10-11
DEX	2D6+6	13
APP	3D6	10-11
EDU	as for humans	
Age	unknown	

Average Hit Points: 23
Speed: 3m/im.
Action Ranking: 4

ARMOR AND HIT LOCATIONS: Trinocs have no natural armor, though some Trinoc pressure suits are useful as armor. Trinoc hit locations are determined on the standard hominid hit location table, but their hit points are distributed differently. Hit points are distributed equally to all locations, with 30% of total hit points in each.

Location	D20 roll	Armor/HP
Right Leg	01-03	0/7 (.30)
Left Leg	04-06	0/7 (.30)
Abdomen	07-10	0/7 (.30)
Chest	11-15	0/7 (.30)
Right Arm	16-17	0/7 (.30)
Left Arm	18-19	0/7 (.30)
Head	20	0/7 (.30)

WEAPONS: Trinocs have full access to Known Space weapons, as well as some weapons which the Trinocs themselves have not made known.

SKILLS: Trinocs are fully capable with all of the standard skills.

clawed hands with mutually-opposable fingers give the Trinoc considerable dexterity.

A Trinoc's head appears to be all triangles. Its shallow, conical head provides adequate cranial capacity. Sense organs are clustered around its triangular mouth, in which yellow bone-knife teeth show serrated edges behind three gristly lips. Three round, blank eyes with green pupils stare out from deep-set sockets. Though well-protected, each eye has only a limited field of vision. Their sight is trinocular, suggesting that name for them to Wu during his encounter with them (Interworld for what Trinocs call themselves is "we-who-see-undeceived"). A human normally cannot read expression from a Trinoc face, but when rattled or agitated a Trinoc's mouth may work disturbingly around the edges of its jagged teeth.

Its 'universal socket' joints allow a Trinoc to abruptly whip its head around to face straight backward, then flick the head forward again in the same instant. This unsettling motion makes it difficult to sneak up on a Trinoc. The gesture also seems to betray the Trinoc dry, ironic sense of humor, a humor seldom expressed overtly.

A Trinoc is surprisingly agile when it must be, even wearing its standard transparent, shaped-bubble pressure suit.

Trinocs and Aliens

Trinocs are a highly-intelligent, technically-advanced species. Their spacefaring civilization has expanded less rapidly than humanity's, but it is considerably older. Adult Trinocs rarely live longer than 85 UNS years, but they can travel interstellar distances at sub-light speeds in a state of natural hibernation: lowering their metabolic rate enables them to withstand extreme cold for extended periods. Until recently, Trinocs made only limited use of hyperdrive ships procured from the Puppeteers. They never developed hyperwave communications, though they now buy systems of human manufacture. Trinoc weapons are astonishingly efficient; the most formidable of them are suspected to involve implosive partial-annihilation of matter. Among aliens, Trinocs almost never go unarmed, though they respect sentient life and will not kill if they can avoid it. They neither hate nor fear alien races, and as a species they are not belligerent or manipulative. They will attack only if they perceive others as posing serious threat to their activities. Human governments have signed treaties regarding indiscriminate terraforming of Trinoc-habitable worlds, and the UN has sponsored a small Trinoc base on Titan. On terrestrial planets with oxygen atmospheres, Trinocs must live in environmental chambers or wear breathing-suits. Compact, portable airmakers can sustain a Trinoc in such a suit for at least three weeks.

Non-communicative and cryptic by nature, Trinocs are not sociable among aliens. Many humans see them as hostile and paranoid, a characterization not entirely fair. Trinocs are skeptical and suspicious, and masterfully conceal their own interests, intentions, strengths, and weaknesses. To a Trinoc, "the process of living is a game of chance. Trying to avoid chance is insanity — but one must take only the risks required to win the game." Trinocs claim to follow the odds, gambling only when necessary for survival. Though they do not appear to enjoy games, they play them well. It is probably unwise to sit in a poker game with a Trinoc.

[For a sociological analysis of Trinoc culture and their scientific explorations, see the prize-winning holodocumentary *Interlude, With Trinocs,* UN hd:2835.806/71 by Niven, Wu, and Hewitt.]

Trinoc Origins and Physiology

The home world of the Trinocs orbits the Sol-type star 18 Scorpii, nearly 50 light years from Earth. Few humans have visited it. Trinoc is a cold planet with a gravity of .71 gee. Its biosphere is inhospitable to all other sentient Known Space species. From space, its surface features are hidden below a shroud of noxious orange-brown haze, which lightens to a glaring bluish-white in the low latitudes. Only the equatorial regions can be glimpsed occasionally through the cloud cover. Unbearably tropical for most Trinocs, this zone is a harsh subarctic climate to most humans.

The Trinocs have established nearly two dozen major colonies on similar planets and moons of gas giants. One of these circling the Puppeteer-cataloged star NC-2365, is heavily-populated and considered the second Trinoc home world. It is even more distant from Earth, and is off-limits to humans.

The planet Trinoc has a primordial reducing atmosphere composed mainly of methane, ammonia, water vapor, carbon dioxide, and nitrogen — a mixture of hydrogen-rich gases somewhat similar to that of the primitive Earth. Even without its noticeable traces of hydrogen cyanide, hydrogen sulfide, and formaldehyde, the air would be toxic to humans. There is little free oxygen. In Earth's solar system, only the gas giants have similar atmospheres. Had Saturn's moon Titan been massive enough to retain much more hydrogen, it might have resembled Trinoc.

Terrestrial air, in turn, poisons the anaerobic Trinocs. Oxygen is highly reactive, rapidly destroying organic material of all types because of its characteristically-reduced (high hydrogen content) composition. Carbon-based life on Earth survives in an oxygen atmosphere only because it has evolved sophisticated biochemical mechanisms to prevent direct tissue-contact with oxygen, to repair oxidation damage, and to divert molecular oxygen to non-injurious, metabolically-beneficial reactions. Trinocs never needed to evolve such elaborate systems. Though their metabolic processes are slower than humans', their foodstuffs have a higher energy content and their internal chemistry more closely reflects their environment. Average daytime temperatures on Trinoc seldom rise far above the freezing point of water; but the planet would be cooler still without its blanket of infrared-trapping methane.

Life on Trinoc arose independently in primitive reducing micro-environments. Similar sequences of events may have occurred on Earth, long before the Slavers seeded it with food-yeast. The prebiotic medium was probably a cold, thick porridge quite different from the hot dilute consomme that was a favorite of Haldane and other early xenobiologists. Nucleotide synthesis may have taken place initially on the surfaces of clay-like substances containing the flat-plate crystals of magnesium, aluminum, and silicon, aided by metal-ion catalysts. Carbon compounds formed in the upper atmosphere (or in cometary debris) may have enriched the primordial soup, introducing organic catalysts. Cold temperatures would have concentrated the nucleotides and helped prolong their life-times. Eventually, self-replicating aggregates developed, based on primitive RNA-like molecules which possessed both functional and information-carrying properties. Flecks of metal-ion substrate, a great variety of molecular structures, and complex three-dimensional foldings carried genetic and metabolic codes — a role fulfilled by the long, uniform double-helix of DNA in terrestrial biology.

Though not strictly cellular, Trinoc lifeforms became compartmentalized and specialized over the ages; their modern internal chemistry still strongly reflects their origins. The working fluid is ammonium hydroxide saturated with polymerized sulphur compounds. At very low temperatures, ammonia and methyl alcohol act as antifreeze. Compared with humans, Trinocs seem to have a loosely-organized metabolism: they can tolerate a relatively-high rate of copying errors during protoplasmic growth, and they function well with excess concentrations of random polymers in their systems. In reality, Trinoc biochemistry has a beautiful probabilistic harmony of complex, cooperative hypercycles: a multitude of quasi-organic molecules catalyze each others' synthesis. Terrestrial genes are too fine-tuned for this kind of music.

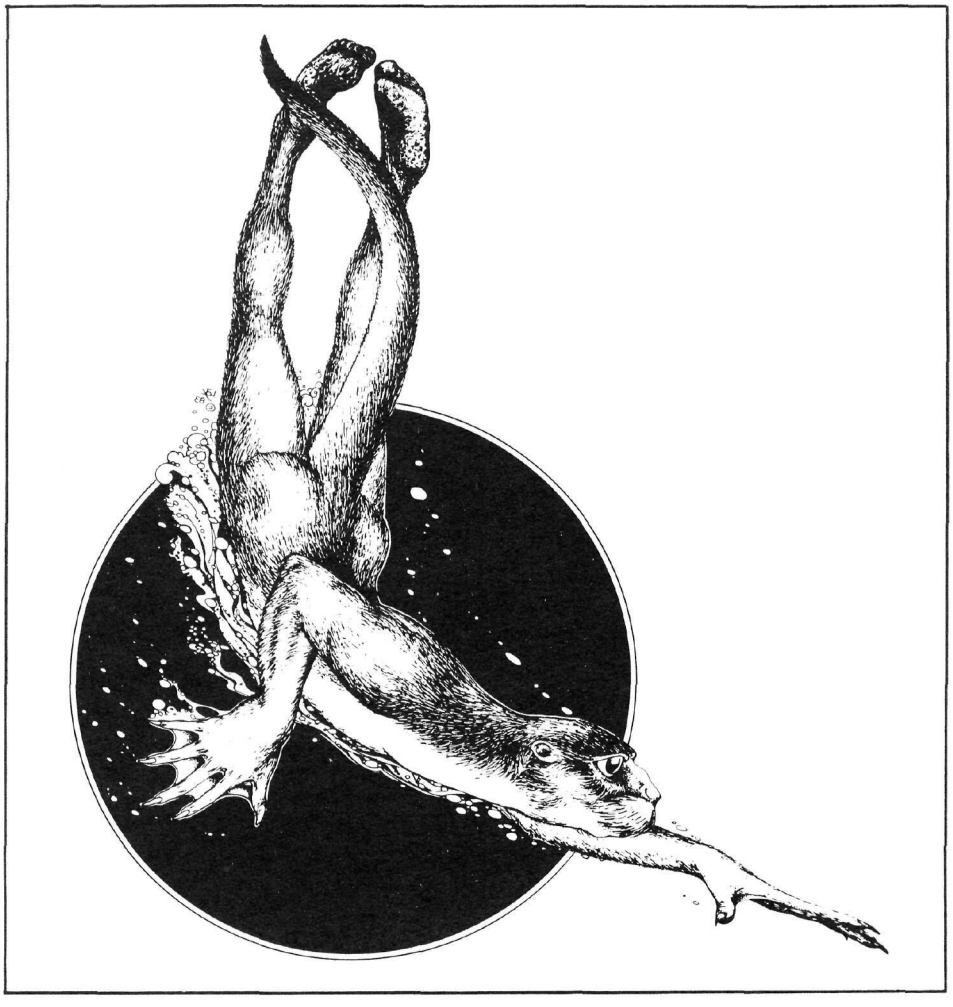
Though they must have evolved slowly, Trinocs are the most advanced (and only sentient) methane-breathing species known. Until their biology is more thoroughly understood, isolation suits are required when dealing with Trinocs, because of the potential danger for mutual genetic plague. There are also treaties restricting the contamination of Trinoc-suitable worlds.

The asexual reproductive cycle of the Trinocs is unappealing to most humans. It is neither ritualistic nor romantic, and incorporates many uncertainties. It begins with conjugation between two or more Trinocs, lasting up to several hours. Conjugation (not necessarily mutual) involves the exchange of 400-800 ml of protoplasm drawn through siphon-tendrils, normally hidden at the base of the head. Generally this results only in the metabolic revitalization of both Trinocs, and is seldom repeated with the same partner when others are available. Occasionally, however, conjugation triggers the reproductive budding cycle in one or both participants and, within days, up to three dozen bud-like polyps appear, growing on membranes protected beneath the thick yellow rolls around the Trinocs' necks. The buds enlarge gradually, and begin to detach in about six weeks. The parent places all the polyps together in a nutrient bath. There they continue to differentiate, partially recapitulating the complex molecular evolution of their primordial ancestors. The polyps developing most rapidly attack and consume their less-sophisticated crechemates, restructuring their substance. Only one or two polyps will survive. The infant Trinoc matures slowly, receiving considerable attention and occasional conjugation from its single parent.

PAK

To comprehend the dimensions of Ringworld and to know ourselves, we must understand the Pak.

The Pak are native to a world in the galactic core, that spheroidal cloud of stars some 7,000 light years in diameter, at the heart of the Milky Way. The stars are more closely packed in these central regions of the galaxy, and the radiation is far more intense than in the spiral arms, Supernovae in the core periodically trigger chain-reactions of stellar outbursts within that volume. The Pak sun is yellow-white, an early spectral-type G star, located near the galaxy's hub. The Pak home world is slightly less massive than Earth, and its oxygen atmosphere is somewhat lighter, with a 2% abundance of helium. The sunlight on Pak has a cool, greenish tinge, and the air is full of strange, rich smells. Except for the presence of the Pak species, the planet might have remained an idyllic garden.



Sea Person (description p. 33) — here a lithe, otter-like Sea Person dives for food.

The Three Stages of the Pak

The Pak are an ancient race of extremely intelligent, strong, and warlike xenophobes whose life cycle has three distinct stages: childhood, breeder, and protector. The first stage, from infancy to adolescence, is self-explanatory. Breeders, the second phase, are sub-intelligent bipeds, whose purpose is simply to create more children. Breeders resemble *Homo habilis* and certain other ancient hominids of Earth in physiognomy and limited cranial development. They are smaller and tougher than human beings. Their minds are not keen; their use of tools and technology is minimal. Their memories retain only blurred, indistinct images of direct, elemental experiences: pain; fighting; bright endless days discovering new foods, experiences in sex and affection, fear and hate. They remember climbing trees, and watching curiously as female breeders give birth to children, who, by their smell, belong to their individual bloodline.

At around the age of 42 UNS years - if the breeder survives that long — it will get the urge to eat the root of a certain bush, the scent of which had previously been repugnant. The bush is called *tree-of-life.* Suddenly the fragrance smells like delicious perfume, and the breeder feels compelled to gorge on the roots. Tree-of-life is a hardy perennial growing all over Pak, so there is scant chance that the root won't be available to any breeder desiring it. When a breeder eats the root, dramatic physiological and emotional changes are initiated, which result in metamorphosis to the third stage of the life-cycle: the protector. A symbiotic virus living in the root of tree-of-life triggers this transformation.

The skull of a breeder who has fed on tree-of-life begins to soften and grow; the brain enlarges until it is bigger and more complex than that of a human. A bony crest rises from the swelling skull before it again hardens. The head slopes backward, as if streamlined; there is no forehead and no chin. Human-looking eyes are set deep in wrinkled pits beneath a jutting ledge of brow. Remaining teeth fall out. Gums and lips grow together, fusing hard to form a flat, black "beak." All hair drops off. Gonads and all other obvious sexual characteristics vanish. The joints of the limbs, the shoulders, and the hips swell enormously, offering much greater leverage to the muscles by means of an increased moment-arm. The wrinkled skin thickens and hardens to form a tough, leathery armor. Fingernails become retractile claws, but the swollen fingertips are actually more sensitive than before — protectors are far better tool makers than breeders. A simple two-chambered heart develops in the groin, at the junction of the two great veins from the legs. The back petrifies into a menacing arch.

A new-born protector awakens staring, unblinking. The memories and experiences of the Pak breeder coalesce and crystallize in a vast new intellect of extreme clarity and sense of purpose. The Pak protector emerges from the metamorphosis sharply sentient, with keen senses, and great agility. It is strong enough to lift ten times its body mass despite what appears to be a hideously-crippling case

of advanced arthritis. With the aid of teachers to inculcate the habit of questioning and to culturally orient it, the Pak protector matures into a being of immensely powerful intelligence and formidable physical prowess, an ideally-designed fighting machine. Tree-of-life root remains the perfect and preferred food for adult protectors.

The incredible advantages possessed by Pak protectors are counterbalanced and almost outweighed by their strong inherited instincts. The conflict between their intelligence and their genetic imperatives dooms adult Paks to eternal warfare within and among themselves. Individual protectors often behave as if they have overpowering internal tensions and conflicts, and their inner tumult impels them to ceaseless external activities in pursuit of a single manifest motivating drive. All their decisions are connected to the compelling urge to protect their own bloodlines. They evidence no interest in art, in luxury, or in science for its own sake.

They recognize members of their family clans not only by sight but by the correct smell. A mutant among the breeder population has little chance, for if it smells wrong, it is immediately destroyed by a family protector forefather or foremother. Radiation is heavy in the galactic core, so this behavior provides effective check on unacceptable mutations there. But it also relegates the Pak to a condition of continuous internal combat and strategic undertakings, since only one's own bloodline smells right. Every protector acts solely to defend, to protect, and to expand the breeder population of its own bloodline at the expense of all other lines.

The Pak world has not been free from war since the species first appeared. The race cannot cooperate for a single minute beyond the point where one protector sees advantage in betraying the others. Therefore the Pak make little social progress: knowledge is often lost, and they cannot always maintain their technology. Atomic and biological weapons and counter-agents are sometimes developed for use in warfare, but the families keep their secrets. Frequently, secrets are obliterated when a family territory is attacked. Temporary alliances form to neutralize, restore, and reforest radioactive deserts; as soon as the land is reclaimed, the cycle of conflict for breeder-space begins anew.

Pak protectors are remarkably resistant to radiation of all types — and they are already sterile. They can travel unshielded in fusion ships or survive in cosmic environments that would rapidly destroy human beings. The Pak developed space travel well over three million years ago. They have extensively exploited their own asteroid belt and even the planetary resources of many nearby systems. But Pak colony worlds in the core are always overrun and destroyed by subsequent waves of assault ships from other Pak bloodlines. Their civilization has often fallen back to the sacred ancestral territories of the Pak home world. They have never cooperated with other alien races, nor have they tried to learn more from them than needed to duplicate their weapons. Of the thousands of sentient species in the galaxy, the Pak acknowledge and study only their own. Whenever they encounter other sentient species (perhaps while mining nearby worlds) they destroy them as efficiently and safely as possible, preserving nothing of such cultures. Aliens are dangerous, or might be, and Pak are interested only in the welfare of Pak. A protector's intelligence is certainly high; but intelligence is merely a tool to be used to reach a goal — and goals are not always chosen intelligently.

A protector is not always hyperactive and hostile. If its breeder population is known to be safe for the moment, the adult sometimes lapses into a state of dreamy lassitude. Dreaming is, in fact, the most art-like form practiced by the Pak. A childless protector, one whose descendants have been annihilated, becomes a being utterly without purpose. Its dream-state becomes permanent, and it dies of starvation. Childless protectors cease to feel hunger, and no longer eat, though their lifespans otherwise might be many millennia. Lacking a bloodline, a protector loses its will to live, and the hapless outsider must find a new purpose quickly, or perish. Most die. Occasionally a childless protector finds that it can generalize and adopt the entire Pak species as its progeny; but then it must find a useful, major way to serve that species. Sometimes, before it loses all interest in eating, a protector without descendants will journey to the ancient Pak Library, established in a desert seeded with radioactive cobalt to make it unsuitable for breeder territory. There the pilgrim may read for decades, hoping to discover some essential task to be performed, or some compelling quest to be undertaken, the accomplishment of which would be of undeniably great benefit to the future of the Pak species.

Earth Pak

For millennia, records of tens of thousands of interplanetary and interstellar flights have been filed away among the virtually indestructible books of the great Pak Library. The Library is used and staffed exclusively by and for childless protectors. Its treatises on the philosophy of space travel are never really abstract; all assume that some day the Pak must find a new home. It follows that any contribution to the techniques of spaceflight contributes to the survival and immortality of the species. Engineering texts cover all aspects of space technology. There are works on sub-nuclear physics, astronomy, gravitation, electromagnetics, and ecology. For three million years the practical Pak art of space travel has nonetheless failed to advance beyond a relatively recent design for a primitive interstellar ramjet, and a simple gravity polarizer. Hyperwave theory, the mathematical basis for faster-than-light travel, has never been hinted at in Pak treatises. The Pak do not seek knowledge for its own sake, nor do they engage in abstruse speculations about the fabric of the cosmos. They are interested in information only as it serves their needs of the moment.

One of the earliest interstellar flights was the most fantastic — and it had met a horrible fate. A group of childless protectors rode a hollowed-out asteroid-ship far into the spiral arms of the galaxy in search of yellow suns with suitable planets. They intended to map out a migration route and establish a second Pak home world. The group started with a roughly-cylindrical asteroid about 10 kilometers long and some 6.5 kilometers thick. It was composed of reasonably pure nickel-iron, with stony strata running through it. Solar mirrors carved it out. They built into it a small life-support system and control module, a larger frozen-sleep chamber, a fuel-breeding nuclear pile and generator, a dirigible ion-drive, and an enormous cesium tank. To get control of a thousand breeders, they exterminated the protectors of a large family. With two protectors as pilots (and 70 more in frozen-sleep with the breeders) they set out into a spiral arm of the galaxy. A careful selection of beneficial lifeforms from Pak was also aboard.

The expedition headed straight outward on a radial line from the galactic hub, at a maximum initial velocity of just 2% the speed of light. Their ability to change course or speed was quite limited, but they were prepared to travel a very long time to find an ideal Pak-habitable world. Journeying deep into the outer galactic arms, they searched for single yellow stars with double-planets the right distance from the sun. The Pak believed that only double planets (or those with very large moons) would be likely to develop Pak-suitable oxygen atmospheres. Yellow suns became more common as the expedition penetrated further into the arms. They passed double-star systems, lone suns with no planets, and others whose worlds were all gas giants or frozen balls of primordial ice. Yellow suns with possibly-habitable worlds went by, but all were too far off course to be reached with the sparse maneuvering reserve of cesium fuel. The sky darkened around them as the stars thinned out; their velocity dropped gradually due to interstellar dust and the galaxy's gravity. Protectors began to die of old age, rather than starvation or violence: this was so unusual that detailed medical accounts were beamed back to Pak. After 500,000 years of travel, half the protectors were dead — revived from frozen sleep to pilot the asteroid ship and dying in turn after millennia. Finally, 32,000 light years from the galactic center, the expedition entered the Solar System, found Earth, and braked their ship into orbit.

The Pak transferred their remaining plutonium reserves to the motors of four landing craft and descended. Some 30 protectors remained; nearly all the breeders successfully revived. The decision to land was not final, but it would have taken decades to prepare the ship for a resumption of the interstellar journey. Two landers set down in south and eastern Africa, a third in central Asia, and the fourth in Australia. The planet seemed ideal. The breeders were turned loose in the forests to be fruitful and multiply. The atmosphere and soil seemed good, and no indigenous life form proved too difficult to handle. Some of the dangerous threats were simply exterminated. The protectors planted crops, dug mines, and built machines to dig more mines, process metals, and to tend the crops. There was room for all, and much to do. The Pak did not fight, and none stopped eating. The black, nearly starless night sky of Earth bothered some, but they got used to it. The frequent rains annoyed others, but did not harm the breeders, so that was all right. They bred without check. Earth would certainly become the second Pak home world.

A year later, the protectors knew they had chosen the wrong planet. With spring and summer came the first crops — and disaster. Something was wrong with the Tree-of-life. The smell was wrong. It grew well, it looked and tasted like Tree-of-life, but it had no ability to transform breeders. It had no symbiotic virus to sustain the protectors. The colonists never understood what had gone wrong with the crop. They suspected that the sparsity of particular wavelengths of light (or of starlight in general) was to blame, but experiments along those lines produced no results. The Pak could not return to space. Their scant remaining store of roots represented an inflexible

number of protector work-years. In the time they had left, they might have refueled and refitted the asteroid ship, but they could never have reached another Pak-like world, where Tree-of-life might prove equally impossible to grow. Instead, the protectors spent their last years building a powerful message-laser, to beam back an account of their plight to the galactic core. They asked for help, and then they died. Starvation is a normal death for protectors, but these starved against their will, on Earth, two and a half million years ago.

Later, on Pak, it was discovered that the symbiotic virus cannot live unless there is an abundance of thallium oxide in the soil. Although this is common in the galactic core, none is present in the soil of Earth.

The Development of Man

There was endless room on the Earth, and the breeder population flourished. In the beginning, they stayed around the ships, where they had been used to helping out. Their irrepressible curiosity remained, though with the protectors gone their naive explorations were no longer guaranteed to be safe. To give the breeders a better chance for survival, the protectors used radiation from the fission-powered lander engines to stimulate mutations, and they induced biochemical modifications to make them more compatible with native ecosystems. (It is probable that life on Earth and on Pak both evolved from the same gray yeast of Slaver food-worlds, several billion years since the fall of the galaxy-wide Slaver Empire.) Through the ages, the breeders evolved utterly free of the constraints of Pak culture and the hostile environment, of the galactic core. Eventually the population developed into a quite different, sentient species — modern man. There has been no Tree-of-life root on Earth for more than 2.5 million years, so there has never been a human protector stage. But the skeletal structure of *Homo habilis,* the Pak breeder, is almost bone for bone identical to that of modern man.

In our legends, religions, and folk-tales the protectors endure as vital and powerful forces. Many mythologies are based on a race of immortal beings with supernatural abilities who constantly battle one another. Religions often view their gods as omniscient and omnipotent, ceaselessly working in mysterious, unknowable ways for the ultimate benefit and salvation of individual believers. Although guardian angels are common in superstition, so are tales of atonement. Godlike beings are not always noted for warmth, kindness, or for forgiveness, inflicting jealous punishments for slight transgressions. Many theological systems postulate an afterlife of perfect, selfless existence following death. They hearken back to an ideal state, a Garden of Eden, preceding the turmoil of normal human life. Many strong cults of ancestor worship have little rational justification. Every young human genuinely, intuitively feels that he or she will live forever, despite unanimous contrary evidence. As we mature, our brain cells begin to die and our body functions begin to deteriorate,— yet people respect us more, and (sometimes) listen to our advice.

The physiological changes experienced at middle age alter human bodies and emotional makeup. They are holdovers from the ancient Pak origins of humanity. The changes anticipate transformation to the protector stage, but we merely grow older and die without the additional genetic programming supplied by the symbiotic virus found in Tree-of-life. In females, the production of eggs ceases, and in both sexes there is a pronounced wrinkling of the skin, loss of hair and teeth, and a disabling swelling of the joints. The circulation weakens, but no auxiliary heart develops, and humans eventually face complete coronary failure. Only a restlessness and dissatisfaction remains of the hunger for Tree-of-life — the "second childhood."

Human Protectors

Human metabolisms are still vulnerable to the smell of healthy Tree-of-life. If available and accessible, adult men and women develop the ancient compulsion to gorge on its roots. The age range of susceptibility is quite a bit wider for humans than for Pak breeders. Individuals as young as 20 UNS years have been known to succumb to the scent (it takes the will-power of a reformed wirehead to resist it). To the eye, these twisted, fleshy, pale-yellow roots resemble sweet potatoes. They are squat, wide, and fibrous, pointed at one end but flattened at the other as if by a putty knife. Their leaves are a dark, glossy green. The fragrance is irresistible, like an intensely-attractive perfume. Unlike opium's golden haze or the hopelessly-happy sensation of electric current trickling through the pleasure-center of the brain, the scent of Tree-of-life root impels the perceiver to immediate action, like a jolt of some overwhelming hormone. Tree-of-life sparks a raging hunger, and the urge to eat the root overpowers all other considerations. Any person too old to undergo the conversion soon dies in convulsions. Many humans in the contractable age-range also die during the transformation, which may take as long as a week. Those who survive the change become human protectors.

Human and Pak protectors naturally share a number of essential qualities, but differ radically in many respects. Though human protectors are larger than Pak, they are not as strong or as agile. They depend less on instinct, reflex, and chemical stimuli. Because human beings are much more intelligent than Pak breeders, human protectors develop more intelligence than do Pak protectors, and they learn faster. They are more flexible and adaptable in their thinking, and correspondingly less willing to commit themselves to immediate, irrevocable decisions.

The many more subtle possibilities seen in a given situation sometimes make it more difficult for a human protector to choose as efficiently among them, for human protectors believe in probability, not luck, and experiment a great deal. The diversity of human personality reflects in a wider range of human protector types. In the human protector stage, the aesthetic senses may heighten, and the sense of humor be enhanced; human protectors often enjoy complex games, diversions, and philosophical speculations. If they have known love as a human, it affects their judgment as a protector. In general, human protectors can empathize with the feelings of sentient beings (even breeders) — utterly impossible for Pak. Human protectors are much less xenophobic on the average, and some clearly value and respect alien viewpoints. Though they might destroy entire alien species if necessary, they are far less driven to do so by instinct. Boredom and distraction can be problems for human protectors (never for Pak!), so they sometimes rig up dauntingly sophisticated contraptions just to amuse themselves. They also seem more capable of acknowledging mistakes and admitting defeat on those rare occasions when they can see no solution to a problem. Human protectors tend to take on even more grandiose projects than do the Pak, uniting much more effectively in cooperative ventures. They use technology more effectively, and are more willing to rely on computer-controlled automatic systems.

Every human protector must wake the same way — clear-headed and sentient for the first time, like the Pak. It wakes, though, with its human memories intact. It recalls everything, all at once, and it thinks with a certain embarrassment, *"I've been stupid."* All of existence seems to come into perfect focus. Its motivations shift and crystallize. It has an eidetic memory and awesome powers of concentration. It can perform complicated tasks while simultaneously following intricate chains of logic or engaging in lucid, involved conversation along totally-unrelated lines. Its thoughts seem to flow with blinding speed — most problems are not problems long enough

PAK BREEDERS

Char.	Range	Average	
STR	2D6+6	13	Average Hit Points: 26
MAS	3D6	10-11	Speed: 3m/im
CON	1D6+2	5	Action Ranking: 4
INT	1D6	3	
POW	3D6	10-11	
DEX	2D6+6	13	
APP	3D6	10-11	
EDU	none		
Age	1D4 on age table		

ARMOR: Pak breeders have no natural armor, but may occasionally wear primitive forms of artificial armor, such as skins, or leathers, or even use small shields.

Location	D20 roll	Armor/HP
Right Leg	01-03	0/8 (.30)
Left Leg	04-06	0/8 (.30)
Abdomen	07-10	0/8 (.30)
Chest	11-15	0/10 (.35)
Right Arm	16-17	0/7 (.25)
Left Arm	18-19	0/7 (.25)
Head	20	0/8 (.30)

WEAPONS: Pak breeders employ various forms of primitive weapons, and some know a form of unarmed combat.

SKILLS: Archaic Melee Weapon 50%, Archaic Ranged Weapon 50%, Athletics 70%, Fine Arts 40%, Hide 65%, Move Quietly 55%, Musicianship 70%, Observation 65%,Scent 15%, Tracking 40%, Unarmed Combat 25%.

Mud People (description p. 31) — these lovelies have not yet reached the age of Transformation. Compare and contrast them with the ugly Muck Ogre illustrated on page 26.

to be interesting. There seems to be plenty of time. In concept and in action the human protector has a sense of utmost confidence and of straight-forward direction. Consequences are grasped as a whole. Given any complex set of circumstances there seems to be only one obvious answer. Like the Pak, though, human protectors sometimes are blinded by the first brilliant flashes of their insights. Their remarkable intellects occasionally lead them to misjudge the intelligence of other sentients — often overestimating it, and sometimes disastrously underestimating it. Even protectors have their limits. They are very formidable opponents, but they are not infallible.

Childless Pak protectors generally die, but childless human protectors have no compulsion to starve themselves to death. Human protectors are generally less motivated by genetic imperatives; the absence of the starvation-drive is a flaw in the human organism which makes the survival of childless protectors more likely. Fortunately, the ability to generalize, to find a way to do something for the whole species, seems to be easier for a childless human protector than for a Pak. Human protectors are dangerous and unpredictable, though — no sane human being would want to become one. A human protector with descendants to look after will concentrate primarily on that goal, even to the point of contemplating the extermination of large portions of humanity, or of sacrificing entire colony worlds, to expand or defend its bloodline. A childless protector might be tempted to modify the composition of the human race in order to benefit the species as a whole. Luckily, human protectors instinctually recognize that the Pak themselves are potentially mankind's worst enemy.

A Pak protector is hideously repulsive to humans, but a human protector is even worse — something like a human sculpted out of coconuts. It stands fully erect. Its head looks dented in the middle because of the enlarged frontal lobes and the upward swelling of the back of the skull. Its body appears to be all knobs, and its face is impressively grotesque. Pak arms are longer than human arms, but the elbow joints of both become balls 18 centimeters across. The shoulders, knees, and hips bulge like cantaloupes. The knobbly hands are like two fistfuls of black walnuts glued together. The swollen joints appear to indicate a horrible arthritic condition. The leathery skin is everywhere thick and tough enough to turn a knife. All protectors are sexless and look it, with only folds of armor-like integument between their legs. The melon-like, flattened head of a human protector seems to rest on its shoulders, without any neck. The forehead is distended; there is barely a chin. The fused, toothless mouthparts form two flat, fibrous arcs easily hard enough to bite off chunks of Tree-of-life root. Dark but never shiny, protector 'beaks' in no way resemble the pointed, horny bills of birds. The eyes are sunken in wrinkled, leathery pits of deeply-convoluted skin beneath a projecting shelf of brow. The bony crest atop the head looks distorted, malignant, and not at all streamlined. Protectors wear only utility garments, such as long, loose-fitting vests with a multitude of pockets and loops for tools.

Pssthpok the Pak

Humans had established colonies on the worlds of several nearby stars when the first Pak was encountered. In the year 2125 A.D., an interstellar fusion-ramship decelerated into the Solar System, piloted by a childless Pak protector named Pssthpok. In the Pak Library, some 35,000 years before, Pssthpok had found an ancient account of the legendary colony of Pak breeders lost somewhere far in the galactic arms. He knew instantly that his mission would be to find that world, and to save the colony. He plunged into furious activity, uniting all the other childless protectors to assist him in his quest. Enormous quantities of south magnetic monopoles were mined, and a crude but serviceable interstellar fusion ramscoop was built. Trailing by cable some 13 km [about 8 miles] behind the massive drive section, an 18-meter-diameter life-support sphere carried air-reserve tanks and recycling machinery for a thousand-year voyage. The re-entry cargo pod trailed another 13 km further behind with precious supplies of thallium oxide and deep-frozen Tree-of-life seeds. Pssthpok had developed new methods which located the lost colony, and his research had also solved the mystery of the virus in Tree-of-life roots. He set out alone to make the 32,000 light year journey to Earth — without even an autopilot. Some 1200 years, ship time, had passed when the Pak ramscoop was detected by the Belt miner Jack Brennan.

Brennan matched velocities with the alien ship, gambling on a mutually-beneficial first contact. Belters had been looking forward to meeting "outsiders" for decades. Instead, Pssthpok immediately captured Brennan and fed him Tree-of-life root to observe the effects. Jack Brennan was lucky. He survived the difficult transition, metamorphosing into the first human protector. As soon as the change was complete, Brennan killed Pssthpok — realizing at once that the Pak would soon discover the lost population of breeders he intended to rescue had mutated to become monsters in the 2.5 million year interval: humanity had so evolved that they now bore little resemblance to the Pak. Pssthpok may have hypothesized a lower natural mutation rate, since the stranded breeders had been so far from the savage cosmic-ray intensity of the galactic core. Brennan understood that Pssthpok would have tried to exterminate the entire human species, not just as potentially-hostile aliens but as a corruption of the Pak form itself. Worse, he would have sent a message to the Pak home world.

Taking Pssthpok's ship, Brennan moved into the cometary halo of the Solar System. There he kept watch over humanity and prepared for eventual war with the Pak. Brennan built a much-improved fusion ramship along Pak lines, and developed gravity-generation techniques. He set out to fight the first scouts of the Pak fleet near the star Epsilon Indi, 11.4 light years from Earth, where the colony world of Home had been settled in 2189.

The battle with the scout ships ended in victory for the Brennan-monster (as he referred to himself). To place the defenseless Home colony on a war footing, Brennan's descendant Truesdale exposed its entire population to a variant Tree-of-life virus. The small fraction who survived this plague became human protectors. They built a war fleet and left Known Space to fight the waves of Pak ships traveling out-bound along Pssthpok's route. Their fate

is unknown, but no Pak fleet has ever found Earth. The beautiful earthlike planet of Home was uninhabitable by humans for 200 years; it was officially resettled in 2589 A.D., and for a time Louis Wu lived there as a colonist in the late 27th century — long before his Ringworld adventures.

The mummified remains of Pssthpok may be viewed in the Smithsonian Institute. Also preserved are ancient holo tapes of Jack Brennan, lecturing on the origin of humanity and the threat of the Pak. Despite this evidence, the question of the Pak and of humanity's origin was casually ignored by most of Known Space as an anomaly predating the Man-Kzin wars. Not until fresh evidence came forth in the Ringworld era was this line of reasoning adopted even by most specialists. It is now known that Brennan's interventions led to the alleviation of the terrible social problems created by organ banks. The two centuries of his influence are remembered as a golden age of relative peace and prosperity on Earth.

The Pak Engineers of Ringworld

The Ringworld is an awesome artifact whose origins are still shrouded in deepest mystery. Much of what follows is informed speculation and some is extrapolation of galactic history. Ringworld's engineers were certainly Pak protectors, but were they also the builders? We do not know. An ancient Pak fleet, tracing the path toward the lost breeder colony on Earth may well have discovered a peaceful, idyllic Ringworld and conquered it. Neither can we ignore the possibility that the Ring may not always have been at its present location. It can be moved like a gigantic fusion ramship, using the superconductor grid to generate a magnetic scoop field. It may have been built elsewhere and flown through interstellar space to its position 200 light years from Known Space. Purchasing the answers to such questions from the Outsiders would doubtlessly involve long, delicate, and costly negotiations.

A logical scenario can be drawn from the likely assumption that the Pak built Ringworld around its present sun, Puppeteer catalog star EC-1752. At least a million years after the disastrous failure of the Earth colony, a much more impressive effort was made to establish a second Pak home world far from the galactic core. There are some indications that the Ringworld Pak differed slightly from their home world cousins. They may have represented a non-conformist Pak faction. Perhaps they were visionary Pak with a dream of escaping the periodic outbursts of the galactic core suns and the futile constant warfare of their species. They may have come from a Pak colony world in the core. Faced with annihilation by waves of assault ships from Pak, they could have decided to emigrate rather than fight. The Ringworld Pak may have begun as childless protectors like Pssthpok, who lost a war but did not lose the will to survive. They may have chosen not to transmit reports of their expedition back to the core until they had established a colony so powerful as to discourage invaders, especially other Pak. Records of their expedition could have been destroyed, suppressed, misfiled, or lost.

The Ringworld Pak almost certainly knew about the first expedition to Earth, ancient even in their time. They had no doubt about the expedition's general course through the galactic arms, but had no reason to follow it precisely, even if they could. They knew that conditions on Earth, and perhaps on most non-core worlds, were unsuitable for Tree-of-life and therefore for Pak protectors. No one had pinned down the problem to the lack of thallium oxide, but it was a strong possibility, so copious supplies of the chemical were prepared, along with other soil additives. Clearly these Pak would travel as far as possible outward from the core along a relatively safe route, and (leaving nothing to chance) *manufacture* a second Pak home world from raw materials gathered at their destination. The yellow suns of the spiral arms were under no obligation to provide worlds ideal for Pak, so the Ringworld protectors set out intending to build a perfectly-engineered world of their own. It would be far safer, and much superior to any randomly-accumulated ball of gas and water and rock.

These expedition ships may have been more advanced than Pssthpok's. Interstellar-ramjet theory periodically has been rediscovered by the Pak. Drives supplied by or taken from a conquered colony world could have been used. The fleet may have been launched in a single wave; if there was time for preparations it may have left in stages. Huge cargo ships loaded with construction spacecraft, machinery, nuclear fuel, weapons, raw materials, and supplies would have departed first. Next, the main fleet (with protectors, Tree-of-life cargo, and breeds in frozen sleep) would have been launched. Finally, a small cloud of fast, expendable scout ships might have departed, overtaking and passing the previous convoys. This arrangement grants the expedition considerable flexibility, and an added degree of protection.

The fleet probably stayed close to the galactic plane for most of the journey, taking advantage of the rich concentrations of hydrogen, for fusion fuel. Fortuitous events during the flight itself may have influenced the final choice of a site well above the galactic plane — or the approximate location may have been planned, concealing their location until they were strong enough to defend themselves. The orientation of the Ring is doubly advantageous. It is not only immune to galactic core radiation, it is also very difficult to detect from the galactic plane below, where ramships normally travel. The decision to turn upward, to galactic 'north,' may have been made at the last minute, if a supernova exploded in the plane ahead of them. They may have decided to conceal their activities behind some gaseous nebula, or their big cargo ships may simply have risen off course through time. Whatever the reason, the Ringworld Pak chose to build on 'high ground' well above Known Space.

The initial construction of Ringworld must have lasted at least a thousand years of furious activity. The most suitable solar system doubtless included several worlds much bigger than Jupiter. Idyllic Pak worlds were not required, though a system with a huge planet moving in a Pak-habitable orbit would have provided a wonderful head start, especially if it had a few Earth-like moons. A Kemplerer rosette of construction stations (the largest cargo ships?) would have been set in place, and the traces of the Ring strung between them with shadow-square wire. Mass-drivers probably were installed on other planets of the system, to throw continuous streams of raw materials to the spots where rows of scrith-making machinery crawled through space, weaving together the foundations of the Ring. Perhaps some of the other worlds were moved wholesale.

However it was built, when Ringworld was finished, it worked. It might have lasted intact forever. The ecology was carefully planned and ideally suited to Pak breeders. There was ample power, evenly distributed, to run all the re-circulation equipment, from the Ring-wide flup-recycling system and dredges to the localized moisture-condensation field generators. Plenty was left over for transportation and defense, including the spacecraft-landing systems and farside laser cannon. Unimaginably vast unpopulated territory became available.

Not enough breeders had been brought from the core to satisfy the protectors. When the lost colony on Earth was finally located, and found to have survived, the Ringworld Pak sent expeditions to import millions more breeders from there. These excursions may have prompted the widespread disappearance of certain species of human hominid ancestors. Modern humans may have developed not from the direct line of Earth Pak-breeder descendants, but instead from variants clever and lucky enough to remain hidden from the Ringworld Pak half a million or so years ago, possibly accounting for some of the differences between us and the modern Pak. In any case, the Engineers certainly mapped some of the planets of Known Space onto their great structure — perhaps one world at a time — and the Maps all seem to be over 200,000 years old. The Maps were stocked like zoos with the flora and fauna of the worlds they mocked, and it is difficult to believe their purpose was merely to camouflage entrances to hidden control centers, storage volumes, living areas, and repair centers.

The Pak protectors were exterminated not long after the completion of Ringworld. A mysterious disease took them, but their extinction may not have been entirely accidental. There are species more intelligent, more devious, more cautious, more perspicacious, and more cooperative than the Pak. Pierson's Puppeteers are an example. The completion of Ringworld coincided approximately with their first great spacefaring age. There are no Puppeteers on Ringworld, and there is no Map of their home world, so far as is known. Perhaps a terrible confrontation occurred when the Ringworld Pak found the Puppeteer system. The protectors' extermination might have resulted from early business negotiations between the Puppeteers and the Outsiders, who sold them reactionless drives capable of moving worlds. This ancient conflict could also explain why the Puppeteers have shown such interest in guiding human evolution via Birthright Lotteries and (perhaps) earlier experiments.

Of course, the end of the Ringworld protectors may have had nothing to do with either Puppeteers or Outsiders. An arrangement may have been concluded with some powerful alien instrumentality when the Pak engineers found it necessary to obtain advanced drives for their fleet, or to move Jupiter-sized worlds; that hypothetical superspecies may have wiped them out for unfathomable reasons. But there is a more likely explanation: the Ringworld Pak originally may have been determined to break the endless cycle of warfare, xenophobia, and self-destruction crippling their species in the galactic core; we might infer that their effort was unsuccessful. One protector faction may have developed the genetic virus which doomed them all. You can take the Pak out of

the core, but you can't take the core out of the Pak.

Diversification of the Hominids

The habitable surface area of Ringworld is three million times that of Earth. In the beginning there were no dangerous predators, and there was no disease. Nothing like a volcano or an earthquake could occur, and there were no killer storms. The structure was safe from impacts, and the scrith floor blocked much of the cosmic rays and harmful radiation. Everywhere on Ringworld, the landscape accessible to Pak breeders was an idealized, park-like garden.

After the protectors died, this changed. The systems set to maintain Ringworld operated with a minimum of supervision, and initially the breeders changed much faster than did their gargantuan environment, for breeder mutations were no longer weeded out. Those who could survive, usually did. Limitless territory was available, and many ecological niches had been left unfilled by the engineers. The base population may already have been in the trillions, well-dispersed around the Ring. Variant breeders had it all their own way; the hominids spilled into every unfilled gap in the biological spectrum. Evolutionary speciation proceeded swiftly. The hominids flourished and progressed. On present-day Ringworld there are over a thousand distinct hominid types, and even more than that number in species. The variety of cultures, appearances, and modes of living is overwhelming.

As the park-like environment changed, new habitats were formed. New species developed: predators, scavengers, ghouls, vampires, flyers, swamp-dwellers, tree-top brachiators, and many more filled a host of specialized roles. Many kept their intelligence and thereby dominated a particular adaptive niche. Many which did not retain sentience (or which did not advance in intelligence past that of the original Pak breeder) devolved into anthropoid-like creatures and lesser primates, resembling everything from chimpanzees to lemurs and tarsiers.

The Ringworld protectors were able to set on automatic the meteor-defense laser and other systems. Perhaps they didn't realize they were doomed until too late. They seem to have been unprepared to halt the course of what they must have anticipated to be hideous changes in the breeder population. The automatic operation of the awesome gas-laser was probably meant to be temporary, its setting never intended to ensure the periodic cremation of millions of hominids. The mysterious ailment which killed the protectors was probably a genetic virus with widespread biological side-effects; among them might have been the acceleration of hominid mutation rates and the creation of disease organisms from harmless bacteria. After the protectors, painful ailments and deformed progeny became part of everyday life on Ringworld.

The descriptive summaries of representative Ringworld hominids in this game include very advanced species such as the City Builders, and nearly non-sentient ones like the Vampires. The rise and fall of technological civilizations affected many species, and some seem to have been bred for specific purposes by ruling civilizations; the Spill Mountain Folk are a good example of such an over-specialized hominid race. In the individual descriptions will be found much more such information. Those hominids presented represent, in raw number of species and in total populations, about two percent of Ringworld's total hominids. The population of Ringworld is estimated at some 30 trillion beings — hundreds of times more than all Known Space species combined. Among them are primitive Kzinti, Trinocs, Pierin, Kdatlyno, Martians, and possibly humanity's ancestors, all on the maps in the great ocean, Ringworld is vast in area and in mind.

Hominid Protectors

Surely no human being would want to be a protector? but there might be hominids who would.

—Louis Wu

Three ancient City Builder legends tell of encounters with mighty, armored magicians who were terrible fighters. Unpredictable and dangerous, these strange wizards could never be defeated in combat. They possessed unfathomable powers which they wielded at random, like whimsical gods; nature herself was usually more benign. Beyond ordinary concepts of good and evil, the magicians seemed to follow no moral code. Rarely, without warning, they bestowed the gift of immortality. They were not to be confronted, but avoided, for they also granted oblivion without warning, sometimes to whole cultures.

Many hominids have similar myths, and many a primitive species still builds armor in something like the shape of a protector, a shape meant to awe and frighten. Tales of this kind may well have originated with the Pak — but over the millennia, they have probably been nurtured and augmented by the occasional rise of hominid protectors.

From time to time, one of Ringworld's hominid denizens may stumble upon Tree-of-life, and survive the protector change. It is even possible that a massive overdose of City Builder immortality drug could trigger the transformation, or an attenuated version of it. A new protector might find a worthy challenge, and create and destroy other protectors as necessary. He may well overestimate his abilities in relation to the scale of the Ring, however and fail to survive. He may die for lack of an achievable goal, from insanity, or from unforeseen hazards, including possibly-lethal agents in the biosphere left over from the disease that killed off the Ringworld Pak. Hominids who already carry a genetic virus related to the disease are much more likely to prove immune to the change, or to die upon exposure to Tree-of-life. Biologically engineered species (such as the Spill Mountain Folk) are known to be able to survive the protector change, but species whose longevity or life-cycle genes have been tampered with are much less likely to do so.

A hominid protector will share many characteristics with a Pak or human protector: Their intelligence, strength, agility and concentration, for example will all increase to relatively the same degree. Two or more protectors will distrust one another, will have difficulty cooperating, and may even do battle among themselves. Nonetheless, the diversity of hominid types creates limitless additional possibilities. The peculiarities of each species, and in many cases of each individual, must be considered separately. In general, different hominid protectors will have different points of view, motivations, and degrees of aggressiveness or xenophobia which reflect their species of origin and its Ringworld environment. As with humans, some of the breeder traits will vanish, some will change, and some of their unique characteristics will become enhanced and accentuated. On Ringworld, the harsh xenophobic component typically may be reduced, particularly in hominids with a long history of multi-species experience. City Builders in particular have a very solid legacy of inter-hominid cooperation. Hostile, insular species would be more dangerous. In all case the specific ecological niche of a hominid protector will certainly color its outlook.

Travelers to Ringworld, especially aliens would do well to avoid hominid protectors. Advanced weaponry is no guarantee of survival against a protector; and in the ancient legends, the armored magicians sometimes mobilized whole populations at a time to achieve their ends.

The Fate of the Homeworld Pak

The Pak on their world of origin may or may not have survived the explosion of the galactic core. Though intense radiation from the cataclysm will not sweep across Known Space for another 1 5,000 to 20,000 years, the chain reaction of supernovae in the central star clouds of the Milky Way burned out nearly 9,000 years ago. The density of the nuclear regions, the rapid rotation of the core, the geometry of the stellar outburst, and the direction in which it spread could have worked together to minimize the effects on the Pak. They may well have had time to begin a massive exodus before the shock front reached their system, and even now a series of great Pak fleets may be migrating outward through the arms of the galactic disk. If they departed not long after the chain reaction began, their scouts could already be approaching regions as far from the core as Known Space.

Sensational theorists have suggested that the Pak themselves might have triggered the core explosion to cleanse the galactic arms of non-Paks; or, alternatively, that a powerful alien instrumentality might have instigated the outburst to rid the galaxy of the Pak. Astronomers have hypothecated more probable (but less popular) causes based on well Known natural Phenomena.

Ringworld's orientation to the plane of the galaxy renders it immune to the core explosion since neither radiation nor sub-atomic particle can penetrate scrith. Perhaps the ring-makers had observed similar outbursts in other galaxies, or had reason to anticipate such an occurrence in the middle of the Milky Way. Whether or not Ringworld was engineered to become a second Pak home world, it would certainly serve the species as an incredibly-roomy, ready-made refuge.

If the Ringworld was meant to be secret, the childless protectors continuing Pssthpok's research in the Great Library may nevertheless have deduced its existence and pinpointed its location. The Pak fleet that Jack Brennan detected over 500 years ago might well have been the first wave of a truly formidable force bent on reclaiming the Ringworld. Brennan led an armada of human protectors from the ruined Home colony to meet the Pak in deep space. Though confident of victory in the initial encounter and prepared to battle subsequent waves of Pak, the fate of the human protectors is uncertain. They had no reason to expect a massive migration from the galactic core, and they did not know about the Ringworld. One day soon, the threat of the Pak may again become an imminent danger to humanity.

Protectors in the Game

Protectors on Ringworld should be extremely rare, though gamemasters might hint of the existence of such superbeings with a bit more freedom. Explorers should be able to have fifty or a hundred adventures without meeting a protector of any species.

Protector skills and statistics vary greatly from individual to individual. A new protector will retain all knowledge and skills from its previous life, and its characteristics will improve significantly. It is impossible to meaningfully present protector versions for every species, but the following procedures for turning humans into human protectors can be taken as a general guide. Most importantly, when an explorer becomes a protector, it becomes a creature under the control of the gamemaster (the player must hand over his character sheet); in this guise detailed protector statistics often will not be required.

In order for a human to become a protector, he or she must be of breeding age and have finished growing. Those who have taken boosterspice are treated, for purposes of transformation, as being their physiological, not chronological, ages. Nominally, the quantity of Tree-of-life root necessary for transformation is a kilo, but gamemasters should feel free to adjust the amount to fit the situation.

Having eaten adequate Tree-of-life root, the explorer falls unconscious for 1D4+3 days. To wake as a human protector, the gamemaster must successfully make the luck roll of the ex-explorer, or the character dies. If the gamemaster finds it more realistic, he might take the nominal human age of 30 as a median transformation age: if the explorer was physiologically under 30 by given years, that number of percentiles could be added to the luck roll; if the explorer had been physiologically above 30, then that excess number of percentiles is subtracted from the character's luck.

Surviving the transformation, the character is converted from an explorer to a protector in the following fashion:

STR is doubled; then add 6 more.
CON is doubled.
Present INT plus 5D6.
POW remains unchanged.
DEX has 1/2 DEX added to it; round up any fractions.
APP is lowered to 6.
EDU is unchanged.
MAS has 6 added to it.

Once the characteristics have been changed, recalculate the skills modifiers, and appropriately increase relevant skills. Remove the human maximum for the Scent skill. Skills which the protector knew as an explorer will increase at a rate of one percentile per ten days for 500 days, and at two percentiles per 100 days thereafter, until 5000 days have passed.

Research and training take a human protector one-third the time in hours required for a human, allowing the protector to learn new skills and information.

Finally, increase the protector's natural armor by 5, and double its movement rates.

Explorers as Protectors

If, by chance, an explorer successfully makes the protector change he or she should from then on be controlled by the gamemaster. The former explorer's player should turn the explorer sheet over to the gamemaster. Players never control protectors.

Grass Giant (description p. 18) —
a war-scarred chieftain stares thoughtfully into the distance.

HOMINIDS

THE CITY BUILDERS

Their Civilization

The City Builders are the boldest, the most sophisticated, and the most technologically-daring of the Ringworld hominids. Their scientific and political achievements dwarf those of 20th century Earth. 'City Builder' conjures magnificent visions of a lost golden age on Ringworld spanning 200 centuries: millennia of courageous exploration and expanding interspecies civilization, and especially the creation of countless shimmering metropolises.

Once fabulous aerial cities, vast and resplendent, floated hundreds of meters above most of their urban centers, held aloft by giant MAGLEV field-generators drawing beamed power from the shadow-square solar energy receiver stations. City Builder sky cities were the source of social, political, economic, and military power in many regions. Beneath each was a cosmopolitan crossroads, with an extraordinary variety of ground-dwelling inhabitants, traders, and tourists. Today, relatively few of these great confluences still exist.

The masters of Ringworld were fertile. Before the Fall of Cities, a hundred thousand floating cities may have flourished, their individual populations ranging from tens of thousands well into the millions. At the height of their empire, City Builders very likely outnumbered the present human population of Known Space. Even so, the foci of their civilization were thinly spread over less than half of the Ring's surface.

Though rarely self-sufficient, each beautiful, highly-visible aerial metropolis was virtually autonomous. Neighboring cities were often as far apart as the Moon from the Earth. Each served, functionally and symbolically, as the local hub of City Builder society. The most extensive urban centers were composed of a dozen or more large, floating complexes, and hundreds of separately-airborne skyscrapers.

Giant MAGLEV aircraft plied intercity routes, linking the empire. In rimland sectors where construction had been completed, the Rim Transport System gave access to remote regions. Microwave beams and rim wall relay stations seem to have been the primary communications links, though Map Room imagery may have been essential in extremely-distant locations. Nothing like transfer-booths, hyperwave, or induced gravity were ever developed by City Builder engineers.

Little is known about the development and organization of ancient City Builder civilization. In their rise to power, they drew heavily upon the energies, ideas, and inventions of many other species. Typically their own social and technological experiments were daring, pragmatic, and often risky; sometimes they were disastrous, as the use of Ringworld attitude jets for starship ramscoops testifies.

Nearly every floating city was the focus for all the varied hominid cultures throughout a surrounding territory often several times larger than the surface of the Earth. (Each hexagonal facet of the superconductor grid is roughly eight times Earth's surface area.) Although many members of these local species worked directly with or for the City Builders, many others learned about the civilization only from folk traditions, customs, rare coins of gold and silver, or fleeting glimpses of great sky-craft following the intercity trade routes. Military conquests or industrial projects in backward areas were usually undertaken by hominid allies, not by City Builders themselves. Many members of favored species were welcome to dwell in the floating cities, but general access was and is quite limited. Most

SKILLS BASE CHANCES FOR HOMINIDS AND ALIENS

SKILLS	City Builder	Ghoul	Grass Giant	Hairy One	Hanging Person	Healer	Herder	Machine Person	Muck Ogre	Sea Person	Valley Person	Vampire	Human	Bandersnatch	Dolphin	Grog	Kdatlyno	Kzin (Known Space)	Kzin (Ringworld)	Outsider	Puppeteer
Anthropology	05	05	–	0	–	05	0	03	–	0	0	–	0	0	0	0	0	0	0	0	0
Aquatic Vehicle	0	0	–	–	–	0	–	0	–	0	–	–	0	–	03	–	0	0	01	–	0
Archaic Melee Weapons	10	10	15	10	10	10	10	10	10	10	10	05	05	–	0	–	10	05	05	–	–
Archaic Ranged Weapons	05	10	05	05	05	10	10	10	05	05	05	–	03	–	–	–	10	05	05	–	–
Astronomy	05	05	03	0	0	20	05	04	04	0	0	–	0	0	05	0	0	0	0	20	0
Athletics	02	05	07	05	10	05	03	02	02	05	02	05	15	–	15	–	15	15	16	–	05
Atmospheric Craft	10	–	–	–	–	0	–	0	–	–	–	–	0	–	0	–	0	0	0	–	0
Bargain	10	10	05	05	10	15	05	05	10	15	05		10	10	10	15	03	10	05	50	25
Biology	0	0	–	–	–	0	05	0	–	0	05	–	0	0	0	0	0	0	0	0	0
Botany	0	–	0		0	0	02	0		0	05	–	0	0	0	0	0	0	0	0	0
Chemistry	0		–	–	–	0	–	0	–	–	–		0	0	0	0	0	0	0	0	0
Computers	0	–	–	–	–	0	–	–	–	–	–	–	0	0	0	0	0	0	0	0	0
Debate	05	10	05	08	05	05	05	05	15	06	05	–	05	25	10	25	05	05	03	30	25
Emergency Treatment	10	10	10	10	10	25	10	10	10	15	10		01	–	–	–	01	01	01	15	15
Engineering	05	0	0	0	05	10	–	03	–	03	05		0	–	0	–	0	0	0	05	10
Farming	0	–	0	03	0	10	05	03	–	0	25	–	0	–	0	0	0	0	0	–	0
Fast Talk	0	10	07	03	10	10	05	05	10	10	05		10	05	20	25	03	05	02	20	23
Fine Arts	05	02	03	02	05	10	04	03	–	03	05		05	01	05	–	15	03	05	05	05
Ground Vehicle	05	–	0	–	0	0		02	–	–	–	–	0	–	0	–	0	0	0	–	0
Handgun (energy)	05	05	–	05	05	05	–	05					05		–		15	07	0		05
Handgun (projectile)	03	03	–	03	03	03	–	07	–		–		03	–	–	–	15	05	05	–	03
Heavy Weapon (energy)	05	05	–	05	05	05	–	05	–	–	–	–	05	–	–	–	15	07	0	–	05
Heavy Weapon (projectile)	03	03	–	03	03	03	–	07	–	03	–	–	03		–		15	05	0		03
Hide	0	10	03	05	20	10	05	05	15	15	10	10	10		10		03	07	10	–	20
History	15	10	0	01	0	20	0	0	0	0	0	–	0	15	0	–	0	0	0	10	05
Hyperdrive	–	–	–	–	–	–	–	–	–	–	–		0	–	0		0	0	–	0	–
Law	01	0	0	0	0	05	0	0	0	0	0		0	–	0	–	0	0	0	10	05
Listen	05	15	05	05	10	05	05	05	10	10	40	20	05	–	15	–	20	10	10	–	08
Mathematics	01	0	–	–	0	01	–	–	0	–	–	–	0	0	0	0	0	0	0	0	0
Musicianship	08	05	05	05	05	05	05	05	–	05	05	–	05	05	05	–	10	05	05	–	10
Observe	05	15	05	02	15	15	10	10	10	10	10	15	05	–	05	–	25	10	12	25	15
Orate	03	10	10	10	05	10	05	05	20	05	05	–	05	–	05	–	10	05	03	–	10
Own Language	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/2	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5
Perform	05	03	07	05	08	10	0	01	–	05	02	–	05	–	05	–	02	04	01	–	05
Personal Flyer	15	–	–	–	0	25	–	–		–	–		0	0	0	0	0	0	0	0	0
Physics	0	–	–	–	0	0	–	0	–	–	–	–	0	0	0	0	0	0	0	0	0
Planetology	0	–	–	–	–	0	–	–	–	–	–	–	0	–	0	10	0	0	0	0	0
Psychology	07	05	0	0	0	10	0	0	05	0	0		0		0	–	0	0	–	–	0
Reaction Drive	0	–	–	–	0	0	–	–	–	–	–		0		0	–	0	0	–	–	0
Reactionless Drive	–	–	–	–	–	–	–	–	–	–	–	–	0	–	0	–	0	0	–	0	0
Repair	05	0	0	0	01	10	–	05	–	07	05		0	–	0	–	0	0	0	0	0
Ringworld	15	05	0	0	05	20	0	05	01	02	0	–	0	0	0	0	0	0	0	0	0
Scent	05	05	05	05	06	05	05	05	10	05	05	30	0	–	0	–	0	05	06	–	05
Search	05	08	05	05	07	05	05	05	08	05	06	10	05	05	15		15	05	07	15	10
Second Language	0	0	0	0	0	0	0	0	0	0	0	–	0	–	0	–	0	0	0	–	10
Sneak	03	15	01	05	15	10	05	03	05	20	10	20	05	–	05	–	06	07	08	–	15
Strategy	10	07	06	05	05	10	05	06	05	0	03	–	0	10	0	05	02	0	0	20	15
Theology	01	0	0	0	0	05	0	02	–	0	0	–	0	10	0	05	0	0	0	0	0
Track	–	10	05	05	10	03	20	03	01	05	10	20	05	05	05	–	06	05	07	–	0
Unarmed Combat	0	0	05	0	0	0	0	01	–	0	–	–	0	–	03		03	05	08		–
Var. Sword/Flashlight-Laser	–	–	–	–	–	–	–	–	–	–	–	–	15	–	15	–	15	15	–		20
Weapons System	0	–		–	0	0	–	0	–	–	–	–	0	–	0	–	0	0	0	0	0
Zoology	0	01	–	0	0	0	0	0	0	0	0		0	0	0	05	0	0	0	0	0

The accompanying table lists base chance skill percentages for the hominids and aliens included in the Ringworld game. Ringworld hominids may become important as explorers in some campaigns; the table data along with the species essays and statistics give enough information to create native explorers.

Table values are starting values. You will have to choose learning rates and pursuits which seem to match the societies from which these sentients come.

In general, follow the age/occupation scheme in the rules for human explorer generation; an individual might earn more (or less) than 20 occupation points per UNS year, but the game is calibrated for about that yield.

Human base chances are identical to those shown on the explorer sheet. To use that sheet for another species, those base chances must be systematically replaced by the appropriate base chances.

Zero as a base chance means just what it means for humans — that the skill is specialized, but exists within most or within representative cultures of the species.

The dash (—) indicates that the particular skill either is very unusual for the species, or that it is ordinarily impossible for the species to achieve — either physiologically or (in the case of Puppeteers) psychologically.

Creatures with natural weapons have base chances with those weapons equal to the chance given in the appropriate creature description.

NOTES - The Dolphin VS/FL skill is usable only for variable sword; the Puppeteer VS/FL probably is usable only for flashlight-laser. To a Grog, language skills are unnecessary, since she always uses the ability of the being with whom she is in touch; Grogs communicate among themselves by pure thought — a concept which this table is unable to take up in detail.

of the menial tasks, services, and repairs were performed by families of privileged hominids devoted to their City Builder masters. Unparalleled connoisseurs of the erotic arts, the City Builders sometimes paid their servants in periodic rishathra. They also used rishathra to conclude political pacts with visiting dignitaries from distant hominid kingdoms. In the later days of the empire, City Builders occasionally bestowed small quantities of a powerful longevity drug, possibly synthesized from Tree-of-life. (This "immortality drug" is a very rare and valuable commodity during the Ringworld era.)

Ultimately, Ringworld's scale must have severely tested the resolve of even the most single-minded central authority. Interstellar adventures doubtless put extra strain on far-flung City Builder provinces.

In late millennia, each isolated floating city clearly constituted a unique regional seat of government, a city-state orchestrating the affairs of a dozen local hominid nations. Many cities evidently held the equivalent of a regional emperor or of an entrenched dynasty of powerful ruling families, their allies, and numerous loyal servants. Occasionally there were intercity wars. In most areas, though, the empire was not one of terror and overt coercion. City Builders generally ruled wisely enough to maintain ascendancy, satisfying material and social needs through astute economic manipulation, skillful rishathra, and sophisticated information- and religion-management technique. They may have themselves, for instance, promoted worship of the Arch among primitives. Most City Builders lived well with relatively little effort, occupying the top floor of a multi-species social pyramid of their own creation.

City Builder rule on Ringworld ended abruptly nearly 1200 years before the Ringworld era of Known Space began, with the catastrophic events called the Fall of Cities. But City Builder influence nonetheless remains enormous. In widely-separated areas, isolated enclaves of City Builders have begun to revitalize pockets of their once-mighty empire. Impressive remnants of their engineering works and irresistible multi-species political organization endure in many regions of Ringworld. Struggling, intermediate-level industrial cultures avidly seek out technological artifacts buried in long-forgotten City Builder ruins. Some less-progressive hominids revere the City Builders as a race of vanished gods, who once called forth terrible powers to raise the Arch over the world and then suspend the very sun from its apex. More sophisticated hominids yet think of those former rulers with apprehension and awe.

Hominid species lacking definite historical contact with the City Builders yet may have City-Builder-derived knowledge, artifacts, customs, beliefs, language, or music. Even the worlds of Known Space may bear as-yet recognized imprints of Ringworld's highest civilization: of all the Ringworld hominid species, only the City Builders achieved interstellar space travel, in kilometers-long fusion ramships capable of relativistic flight.

Appearance and Personality

City Builders are not physically formidable. They are usually of medium stature, with an adequately-muscled but slender build. Though taller on the average than the typical flatlander, they seldom top two meters in height. They often have pale, ghost-white skin, unlike that of any Known Space human race. Both sexes lack body or facial hair. Their lips are barely everted; their mouths are thin, virtually-lipless slits. Dentition is that of an omnivorous, long-civilized humanoid. Their noses are usually very small and narrow, and sometimes oddly flattened. City Builders lack eyebrows.

At first glance, a City Builder looks completely bald. The human eye registers only a finely, delicately shaped bare skull. Closer inspection reveals a 2-3 cm fringe of hair-bearing scalp, beginning just behind the ears and widening to cover the back of the neck. Both males and females frequently wear the hair from this patch in a long, flowing style, though many other styles may be seen. In a classic traditional fashion, City Builder women draw their hair smoothly to one side, to fall forward over one breast.

To many unsophisticated Ringworld hominids, the appearance of a City Builder is like an incarnate holy image, a reminder of the ancient age of wonder when sky-castles floated in the air and miracles occurred daily. Among primitives, the wholly-depilated fashion of some flatlanders occasionally might allow them to pass for or to be mistaken for City Builders, for a time. Real City Builders, however, usually have a natural grace, a serene dignity, and a confident air of high intelligence often lacking in other hominid species.

City Builder eyes are often hypnotic and penetrating — they seem to spear the viewer with an uncomfortably direct gaze. Inexperienced humans rarely can read the expression of these complex, extraordinarily accomplished hominids. Unsmiling, they convey a natural impression of blank austerity, even severity. On other occasions, their small features may seem to show a happy curiosity totally inappropriate to the immediate situation.

Appropriately for a species which had conquered much of Ringworld and settled neighboring solar systems, City Builders are more likely than most hominids to possess technical knowledge and equipment of great elegance and power.

A few City Builders do not live in fixed locations, but settle for successively short periods of time with other hominids. (They are usually treated as gods wherever they go.) When encountered, these representatives of the species can be very dangerous. They are confident of their skills and power. They might be friendly but they will be quick to deal with anyone they perceive as a threat. Such City Builders have survived for a thousand years by controlling events and people; they will not be dominated easily by technology or by force.

The Floating Cities

These great structures were the bastions of the City Builders' administrative, cultural, and technological elite, purposefully separated from the legions of lesser ground-dwelling hominids. Here were the centers of City Builder science and engineering, government, social planning, and legal justice. The highest courts were here, and top-security prisons with state execution chambers beneath them. (In these, a crude armless chair ran down a track to propell the hapless criminal into the windy void.) Police and military installations often contained armories filled with advanced electromagnetic, projectile, and laser-beam weapons, bulky by modern human standards, but quite effective. This sophisticated firepower was rarely lent to even the most-loyal armies of the City Builders' allies.

Herein were the great libraries, with their histories of exploration and interspecies civilization, their tales of myth and epic adventure, their records of incredible ramship voyages, their book-tape archives, the banks of public reading-machines, and the floors of locked, gold-coded doorways leading to sealed-off classified research areas. At the top of the library was the public Map Room, where a holographic projection of the Ring, hundreds of meters in diameter, could be leisurely examined. Use of library facilities usually took place under the watchful eyes of imperious librarians, identified by their identical blue robes with jaggedly-cut collars.

In each city were fabulous markets, shopping districts, restaurants, recreation decks, and entertainment parlors. Specialty shops of every description offered fine bedding, gourmet delicacies, clothing toys, sport and hobby items, rishathra perfumes, bizarre hominid religious paraphernalia, and exotic pets from alien worlds. There were fully-equipped spas; there were control, communication, technical, and maintenance centers; there were auditoriums for tourist attractions, banquets, conventions, and special events. Luxury residential buildings had lavish quarters for prosperous, well-born City Builders and their retinues. The sky-castle of the local emperor or magistrate governor also generally was in the floating city, though it sometimes had independent power and could be detached.

Visually stunning, the floating cities displayed a refined, soaring elegance rivaled only by a handful of human-built structures. Like the pyramids of Egypt, the Acropolis, the Taj Mahal, or the Paris Arcology, Ringworld's floating cities possessed a balanced, integrated conceptual splendor, seeming both to deny and to reaffirm their own almost impossibly-massive construction, which made extensive use of white poured-stone and glass over steel. As the abodes of a race of living gods, the great sky-castles never were haphazard collections of clumsy architectures; designed neither to fly nor to land, they never could be mistaken for hovering aircraft nor for space vehicles.

Though sharing stylistic traits, each large floating city had its own unique aesthetic theme. Their major external elements were rarely dissonant or jarringly asymmetrical. Their building shapes they preferred as graceful solids: tall, slender cylinders; tapered hourglass hyperboloids; double or inverted cones; narrow, needle-like spires; tetrahedrons or crystal-shaped octahedral towers; layered cubes with circular central air wells; polyhedral glass slabs; domed step-pyramids or trapezohedrons; geodesies; buildings fluted like segments of abstracted Greek columns. Slightly less common were disks, pie-shapes, spheroids, minarets, and occasional organic forms. Their building exteriors seldom were elaborately ornate. The function of some structures might be coded by shape.

In some regions, local hominid cultures influenced the design of a floating city. In the rimlands, especially near spaceports, the distinct flavors of other worlds would catch the fancy of city architects.

Narrow skyways, broad ramps, and sweeping bridges (some retractable) connected the buildings of a typical floating city. There were also numerous landing ledges and carports, with docking bays for larger flying trucks and passenger craft at the base of the city or the lower tips of individual buildings.

CITY BUILDERS

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6	10-11	R Leg	0/7
CON	3D6	10-11	L Leg	0/7
MAS	2D6+3	10	Abdomen	0/7
INT	2D6+9	16	Chest	0/8
POW	4D6	14	R Arm	0/6
DEX	3D6+9	19-20	L Arm	0/6
APP	2D6+6	13	Head	0/7
EDU	as for humans but add 10 additional EDU points			

Age: 1 D10 on age table
Average HP: 21
Speed: 3m/im
Action Ranking: 3

ARMOR: No natural armor; City Builders seldom wear armor of any kind, but if one does, generally it will be of a light, flexible material which often is powered, or else will be a defense against a specific type of energy weapon. Use the standard hominid hit location chart.

WEAPONS: City Builders rarely use weapons; they prefer to negotiate or have a subject race fight for them. Nevertheless, they had an advanced weapons technology at least equal to that of Known Space. Some of those weapons are still in working order, and may have found their way into the hands of other hominids species. Automatic weapon systems are still operational in some former floating cities. City Builders seldom use any archaic weapon.

SKILLS: The City Builders have access to all skills included in this game, with the exception of Hyperdrive Pilot. They generally have high percentages in Knowledge and Communication skills. Some City Builders are old, sometimes thousands of years old: the skills of such ancient beings should be impressive.

Air-roads, elevator towers, and open spiral escalators often joined single floating structures to the ground-cities below, but access to the great floating cities evidently was far less casual.

Within a floating city lay a world of light, color, and beauty. The massive grandeur of a floating city was often more than matched by the fabulous decoration of its interior. There were great halls with elaborately-carved wooden doorways; sweeping circular balconies of glass and steel, with long, curved glass tables; beautifully-designed self-powered spiral staircases of polished metal; extraordinary iron-work; fragile railings wrought in elegant geometric forms in organic patterns sometimes resembling elbow-root; hand-webbed hardwood furniture; finely-tooled leather upholstery; lovely crystal goblets; tableware of swirled silver and gold (sometimes electronic control-knobs as well) in the dwellings of the high-born; exotic fur carpets; cavernous banquet halls, audience rooms and bed-chambers with 15-meter ceilings; splendid sunken swimming pools with glass walls and bottoms; fountains suspended in midair by invisible forces; canopies and curtains of exquisitely colorful fabric; hanging roof-gardens; huge portraits sculpted in stressed-wire; hologram murals of vast Ringworld landscapes.

For convenience, there were autokitchens; for pleasure, there were complete facilities for storage and hand-preparation of fresh, perishable foods (City Builders greatly preferred to eat fresh foods — decayed human foods like cheese were considered inedible), and bars were stocked with a wide variety of potable delights. The clean, silent machinery at the core of a floating city was efficient and remarkably unobtrusive. Moisture condensers in the uppermost levels ensured a continuous supply of fresh water. Everywhere great transparent window-walls and observation ports looked out on the city-scape far below. Windows came in all shapes and sizes — rows of gleaming or dark ovals, 20-meter rectangles and octagons, fluid symmetrical designs, and bubbles, domes and thick panes in the floor. Only the bases of the low buildings directly above a floating city's permanent shadow usually lacked windows.

Serene and majestic, the floating cities utterly dominated the nearby landscape. At a distance, they became dream-like, fairy-tale visions, the sources of strange myths and wondrous tales of adventure. In darkness, their lights could be seen for hundreds of miles, tight, sparkling star-clusters which must have seemed more permanent than the stars themselves.

The Cities Below

Beneath most floating cities, often for hundreds or thousands of square kilometers, was more city, built conventionally on the ground. Single such cities along shorelines sometimes completely surrounded seas the size of the Mediterranean. Though planned and built differently, in different styles, many of the ground cities were once terrible in their beauty, the rivals of any in Known Space.

The prominent central buildings were tall, slender towers, artfully spaced, rising above an almost-continuous mass of lesser structures, densely-packed but arrayed in orderly patterns. A handful, tall enough to dwarf the rest, reached as high as the base of the floating city. Skyscrapers usually had restrained geometric forms, though in some provinces they were sculpted, artistically-twisted pillars with rows of black oval windows and jutting cornices decorated with surrealistic gargoyle-like figurines. Some ground-city buildings floated independently, joined by winding groundcar ramps and elevator tubes to street level and to other towers. At night, skyscrapers and floaters blazed from crown to base with tiers of brilliantly-lighted windows, fitting beacons to those who seemed all-powerful.

Ground cities were densely populated, except for permanently-shadowed areas beneath floaters or floating cities (since the sun does not move, but is merely eclipsed on Ringworld, these shadow areas could be defined exactly and without variance). Fungus farms or factories would be sited in permanently-shadowed areas.

With all the room on Ringworld, city-dwellers cared little for big urban parks or wide-open, lazy boulevards — Machine People or even lesser vassals could create such places. City Builders loved immense public squares and amphitheaters where vast throngs might assemble, or tiled malls surrounded by shops; public baths and roof-gardens met any psychological need for breathing space. There were large, flat, multi-level glass towers that might have been department stores on a human world — sometimes illuminated at night by beams from the bottom of the floating city.

Urban bustle gave way eventually to wide patches of suburbia surrounding the cities, usually dominated by curved rows of one- and two-story houses. These bungalows often appeared oddly like beehives, with oval doorways and rounded windows, separated by graceful, meandering sidewalks almost too narrow to be called streets. In a few abandoned cities, oval doorways still glow bright-orange or softly yellow — some big, durable emergency power sources, though dimmed and cooled by time, still faithfully provide street-lighting.

Particular districts frequently were mostly composed of dwellings tailored to accomodate particular hominid species. Ground cities, especially at their edges, have sometimes been partially re-civilized.

Remnants of the City Builders

For the most part, only ruins and wreckage of the great City Builder metropolises remain today. The Ring-wide power failure and its accompanying disasters left no region untouched. In the cities, the floating buildings smashed down into the lesser structures below, demolishing both. Others became rolling cylinders of death, cutting swaths of destruction across the city-scape. Skyscrapers toppled upon rows of shops and dwellings, flattening them beneath thousands of tons of machinery, and flying vehicles rained down everywhere. Fires and explosions followed, amid the broken buildings, bodies, and rubble-filled streets. All was shattered brick and glass and poured-stone, collapsed skyways and sheared beams; torn steel skeletons and twisted towers tottered in the sky at threatening angles.

A tiny fraction of the floating buildings survived, perhaps landing undamaged on reserve power, or remaining aloft using independent power sources. A few of these latter buildings were modified for travel, and were used as refugee ships.

Over the centuries few attempts were ever made to restore the cities, though civilized enclaves drew on them for resources. Once broken, the coherence of the City Builder empire could not be restored. Generations of looting, scavenging, and vandalism gave way to rain and wind born detritus, to rust and rot, to all the decays and corrosions possible on Ringworld.

In some places, sandstorms the size of continents buried entire cities when nearby seas dried up. Urban centers elsewhere were half-drowned by silt-blocked rivers, or engulfed by jungle and swamplands. Vines and trees struggled to bring down the remains of old buildings and completely overgrew abandoned cities in many regions. Tremendous fungi from ancient shadow-farms dominate some of the ruins, while others have been claimed by bizarre animals, savages, bandits, and even Vampires.

The ground height of some partly re-civilized cities has risen 3-4 meters: layers of com-

pacted refuse, bones, broken implements, and rubble have created what archaeologists would recognize as vast 'village mounds.' The inhabitants of such places frequently are the descendants of City Builders who chose to live on among the ruins after the Fall of Cities. They find the relatively-few still-standing structures to be easy to defend, easy to warm, hard to burn down, and better shelter than they could hope to build for themselves.

Ringworld explorers should be wary in the vicinity of any City Builder center, whether inhabited or long-abandoned, for every site holds secrets: the City Builders were most adept at harnessing electromagnetic forces, and the superconductor plague did not destroy all their old machines. Some devices shut down automatically; others still operate flawlessly because there has been nothing to strain their powers in so long a time. Trespassers may run afoul of automatically-training weapons unaware that they have nothing left to defend. Unwary explorers might release an emergency energy beam left set on slow-charge. The field of an uncalibrated or damaged *cziltang brone* is more lethal than a ramscoop at close range.

Some police trap-fields still operate unattended, capable of automatically seizing control of vehicles from drivers in violation of traffic laws. These systems can burn out circuits or motors as necessary, and can even draw offending vehicles long distances into floating prisons to await adjudication. Many electromagnetic bands were reserved exclusively for military, security, transport, maintenance, or broadcast communications. Unauthorized transmission on such restricted wavelengths may result in the sudden destruction or confiscation of some vital piece of equipment, such as a translator or comdisc.

In a Map Room, attempts to view images on the Ring whose nature was secret may trigger alarms, restraint fields, or other devices.

Cutting existing power accidentally may prove as calamitous in many cases as restarting it. Deactivating a still-working cold-room might be a serious example, for instance, if it contains a frozen supply of vampire-perfume!

With luck and intelligent caution, nonetheless, explorers may also find treasures among the ruins of Ringworld cities — valuable artifacts of vanished technology, lost knowledge, and strange cultures. Many flying vehicles may still function, their sealed motors merely turned off. In some situations the successful repair of old machinery (such as water condensers) may prove to be helpful to local hominids and to Ringworld explorers alike.

The City Builders never completed their conquest of Ringworld or of the stars. Much of their high civilization is wholly lost. Many of their great ramships never returned from their interstellar flights, and their destinations probably have been forgotten. Some City Builders now believe their own once-pragmatic mythologies: that they themselves long ago built the Ring. How will modern City Builders welcome "lesser" hominids from the stars, possibly the vassals or allies of the monstrous aliens who so maliciously destroyed their ancient empire?

GHOULS (Night People)

The Ghouls (or Night People) are widespread on Ringworld. Their place in the ecology is everywhere secure. These sentient, nocturnal

Ghouls (description p. 22) — this pair briefly scans the horizon before indulging in a midnight meal. Despite this gruesome habit, ghouls are an invaluable source of information and gossip concerning local Ringworld affairs.

hominids are scavengers and morticians, carrion-eaters and bearers of information. They have mastered the domain of night — and few species care to compete for their dark realm.

From a distance the Ghouls seem horrid, supernatural blendings of human and jackal. In small, quiet packs they approach native camps on all fours to claim the day's refuse and garbage. Hunched and half-erect, they move away at fair speeds, often carrying substantial burdens. In more civilized environments they walk about perfectly upright, on wide, flat feet, without fear, to bear away the bodies of the dead. Whenever, in rare instances, hominid cultures do begin burying or cremating their dead, hordes of Ghouls attack the living to convince them of the error of their ways. Despite occasional tension, though, peace, toleration, and a certain mutual respect usually prevail. The Night People are generally diffident and unassuming in their relations with other species; they normally show no hunger for dominance and they seldom intrude. Indeed, they are scrupulous and thorough in their understanding of and compliance with the customs and religious practices of thousands of local cultures. Ghouls seem to have a fatalistic acceptance of their place in the scheme of things, feeling that "the activities of other species rarely interfere with our own lives, and in the end they all belong to us!" Funeral traditions of the Night People themselves are not known.

Ghouls are least frequently encountered in aquatic environments, wastelands, or in other regions far from concentrations of land-dwelling hominids. They detest the habitats of Vampires.

The Night People are small, seldom even approaching the 2-meter mark. They usually have permanent mates, and frequently travel in pairs or in family groups. Their bodies are almost entirely covered with thick iron-gray or black hair. Their skin is a cooked-liver blend of dark-purple and charcoal. They smell very bad, and the foul stench of corruption gives them the breath of a basilisk. The nails of their tapered fingers and gnarled toes are as sharp and as tough as claws.

Ghouls have wide mouths displaying a daunting expanse of sharp, wedge-shaped teeth designed for ripping. Their big, pointed goblin-ears come erect and alert as they listen intently or show apprehension. Ghoul hearing is quite sensitive; they gather information more by eavesdropping than by asking questions. Their night vision is excellent. Their eyes, not overly large, appear quite human and have chocolate-brown pupils. A single thick eyebrow traces an "M" across the brow. The nose is flattened, knobbly, and not exceptionally broad. The Night People have straight, shiny, dark hair on their heads which most keep trimmed and combed.

Male and female Ghouls alike usually wear a big purse or pouch on a shoulder-strap, and (except in cold climates) nothing else. Their repulsive look and odor offends the sensibilities of most Ringworld natives. Though Ghouls do rishathra, few hominids ever suggest it. Low-born City Builders are an exception: in some areas traditions demand their society's debt to the Ghouls be paid in periodic rishathra.

Second Role of the Ghouls

The Night People are intelligent, clever, and curious. As a species, they have accumulated a great deal of information. They, in fact, deal in information, though they find myths, opinions and detailed observations frequently as useful as substantiated truth. So long as the dead are ultimately left unburied, they do not antagonize other species, and they do not use their pool of knowledge to manipulate or to exploit them. They respect the technologies and life-styles of all, and rarely attempt to intervene in the affairs of other species. They watch and listen. Their gift for oral history is superlative, and only the most advanced civilizations realize the true extent of Ghoul knowledge and interest. From time to time the Night People do not understand the implications of the incidents they witness. Nevertheless, the visual impressions, legends, undocumented rumors, and superstitions they report often prove to be as valuable as actual political events or scientific facts. It is hardly surprising that City Builders, Machine People, and other progressive societies have a degree of acceptance and respect for the Ghouls going far beyond uneasy tolerance. They work together, and Night People are sometimes permitted access to their libraries. Their value in "helping to hold together what is left of civilization" is recognized and appreciated.

The Ghouls have shown little overt interest in changing their traditional mode of existence, perhaps acquiring advanced-engineering skills, or procuring sophisticated technology. There is some evidence, though, that they do collect and accumulate curious objects, tools, valuable items, historical relics, books, and intriguing weapons in hidden caches. If they have a language of their own, no one knows it (except perhaps the Healers). They commonly use the City Builder tongue, or the local dialect in dealing with other species.

News usually travels slowly on Ringworld between widely-separated locations. The Ghouls, however, have developed a system of signalling over very large distances using flashes of light reflected into darkened lands from remote mirrors. They occasionally transmit information to the people of the Spill Mountains, and receive replies — but for the most part their network of communication remains a great mystery. The central bases and native lands (if any) of the Night People may be very far apart on the Ring, and outsiders are rarely permitted even to learn of their existence.

Though they make no claim to rule, the Ghouls are in a sense the invisible masters of Ringworld. More than most sentient hominids, they have gained a hard-won, humbling awareness of the Ring's true dimensions and of the self-centered provincialism of most of its inhabitants. There may in fact be many species of Ghouls, but there must be many more species who lack any contact with Night People. Ghouls, comfortably well-adapted to their present nocturnal way of life, are on the whole wise enough to appreciate its limitations. Probably there are no Ghouls in deserts, swamps, on mountain ranges, in barren icy realms, or on the Island Maps in the Great Oceans.

One of the Protectors who assisted Teela Brown in repairing the attitude jets was a female of the Night People. Alone among them, she survived to supervise the defense or the evacuation of breeders in lands imperiled by radiation. The Night People Protector may yet remain a force to be reckoned with on Ringworld.

GRASS GIANTS

Grass Giants are a race of large, ferocious herbivores who live on the veldt. Through-

GHOULS (Night People)

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6	10-11	R Leg	0/7
MAS	2D6+3	10	L Leg	0/7
CON	3D6	10-11	Abdomen	0/7
INT	2D6+6	13	Chest	0/8
POW	3D6	10-11	R Arm	0/6
DEX	3D6	10-11	L Arm	0/6
APP	1D6+2	5-6	Head	0/7
EDU	1D10+4			

Age: 1D4 on age table
Average HP: 21
Speed: 4m/im
Action Ranking: 5

ARMOR: No natural armor. A Ghoul might wear some sort of armor (City Builder or otherwise), with a specific need. Make Ghoul hit location rolls using the standard hominid hit Use the standard hominid hit location chart for Ghoul hit location rolls.

WEAPONS: Though they are likely to be unarmed when casually encountered, Ghouls can be found carrying the most advanced types of weaponry available to them. Night People have sharp teeth and claws, useful in hand-to-hand combat. They have a base percentage to hit with both claws and bite of 40%.

Weapon	*Attack*	*Damage*
Claw	60%	1D8
Bite	60%	1D10

NOTES: A Ghoul can, if not carrying anything, use both claws at a single action rank rating on the same target. Once a Ghoul hits with his claws, he can opt to hang onto his opponent. The victim's player, if his character is to perform no other action, rolls his character's STR against the Ghoul's STR on the resistance table for each of his character's AR ratings which come up while the character is still held by the claws. If successful, the victim escapes, taking additional damage of 1D8 per claw. When holding an opponent, the Ghoul will do no claw damage to his opponent, but renders immobile the hit location held; he may not bite an active opponent unless holding him with both claws.

COMMON SKILLS: Anthropology 20%, Astronomy 20%, Athletics/Acrobatics 40%, Bargain 40%, Biology 20%, Chemistry 20%, Engineering 20%, Handgun (projectile) 20%, Heavy Weapon (projectile) 20%, History 60%, Observe 40%, Orate 20%, Repair 20%, Scent 60%, Second Language 40%, Sneak 40%, Strategy 20%, Track 60%.

out vast primitive grassland regions their tribes have become undisputed masters. Their war parties march through the Ringworld night as if they owned it.

Grass Giants are as big as Kzinti and as brave. The males range from 2.2m to 2.7m tall, but the kings may reach 3m [nearly 10 feet] . They are massive, powerfully-built, and confident. Their skin and eyes are brown; they have lots of coarse yellow hair. The males appear not so much bearded as maned. Sometimes only their eyes and wide nose show through the mass of hair covering their faces and cascading over their shoulders. Grass Giant jaws are huge and muscular; their mouths are full of large, flat-topped molars, all well-worn down. Their arms are the size of a flatlander's leg; they have big, broad-fingered hands.

The males often bear numerous scars, and some are remarkably disfigured. They wear only plates of thick leather armor to protect arms and torsos in case of combat. Their characteristic weapon is a heavy sword with a long, curved blade which also can function as a scythe. They use a variety of bows, knives, lances, daggers, sabers, halberds, and clubs. They do not favor shields or defensive weapons.

The females are imposing and dignified. Usually they also are naked. Their pigmentation is identical to the males; their golden hair falls down their backs to their thighs in a mass of tangles. Females stand 3-8cm shorter than the males. Their legs are thick, their feet large and hard. They have big, heavy breasts. They rarely wear jewelry, symbols, or other decorations. Some females show the characteristic wrinkles and white hair of old age, but the males seldom live long enough to do so. The ratio of females to males in a tribe may be as high five or ten to one.

Grass Giants have a herd-like social structure, and will not appreciate Known Space tolerance, relativism, or sexual equality. The female Grass Giants are all wives of a single dominant male. No other male in the tribe gets to mate, except when the king giant declares a holiday and leaves, so he won't have to watch. The fun is over when he returns, and officially nothing has happened. He then spends most of the night getting re-acquainted with a dozen or so of his favorites. Grass Giant females have their own social order, and they enjoy frequent sexual attentions partly for the status conveyed. They willingly and eagerly accept novelty and rishathra, but are very docile and seem unable to participate fully. Unlike humans, they seem to have no biological response analogous to orgasm. The females efficiently organize and establish routines, though otherwise they tend to be placid and unimaginative. They do not fight.

The king giant maintains his authority and other social advantages only while he stays at the top of the dominance hierarchy. There are frequent challenges. Grass Giant tribes, like many hominids, believe that bargains and covenants, even between men and gods, must be sealed by rishathra. The male giants are incredibly well-endowed — females of other species stand in awe of them. They practice rishathra whenever they can, and at peace conferences boast that they enjoy the fruits of peace no less than war. The king giant always can be counted on to assist enthusiastically in socially-ordained rishathra along with his wives.

These veldt tribes consume enormous quantities of forage each day. They seldom remain long in one location, and almost never develop cities or industrial technology. For major harvests and transportation, they use heavy wagons which they pull along by hand (the wagon belonging to the king sometimes has an auxiliary motor or propulsion unit, a relic perhaps obtained by conquest or occasional trade). Grass Giant settlements are low, temporary constructions of mud and grass, reinforced with vertical members. The main building is a dirt-floored longhouse of respectable area, four meters high, used for communal shelter, ritual, sleep, and weapons storage.

Grass Giants prefer to sleep sprawled upon one another in naked piles. The king giant sleeps in the center, with a heap of women around him. The rest of the tribe, ranging 50-500 in number, beds down about the perimeter, the least dominant males at the edges of the circle. Outside, there are always guards. The giants take turns at sentry-duty and night patrols, sleeping inside after dawn. During daylight hours, additional security is sometimes provided by "fire plants" (Slaver sunflowers) growing on the sod roof of the longhouse. It takes cunning to sneak up on a sunflower.

Awesome war parties occasionally march from the longhouse into the night. Grass Giants are relatively friendly as long as the tribe's food supply is not threatened. They will fight any other herbivores, carnivorous species herding grazing meat-animals, or wild grass-eaters which might compete for forage areas. Challenges to individual honor or precedence are also certain to be met with ferocity. Grass Giants get particularly annoyed with arrogant chauvinists who assume that Grass Giants must be docile since they eat plants. (Once a certain tribal king challenged a Kzin to fight him hand-to-claw, naked and weaponless — boasting he could use a fine orange rug for the longhouse.) During the daily harvest work, patrols carrying sickle-swords protect the cutters and guard the perimeter.

Major war parties are organized by the king. They march forth rapidly in a wedge formation. These battle groups contain 40 or more warriors, heavily armed and armored. On the forward sides of the triangle are bowmen, with swordsmen and lancers inside the phalanx. At the point of the wedge is the king giant, wearing a suit of perhaps full metal armor: a gleaming shell with bulges at the elbows, shoulders, hips, knuckles, and knees. The forward-jutting mask is usually left open. (In one region, in exchange for building a road, the Machine People manufactured one such suit of armor per Grass Giant tribe, the prized property of the king.) The shape of the armor, much like that of a Pak protector, is intended to awe and frighten. On Ringworld, many of the primitive war-like hominids use armor fabricated along similar lines, but they do not understand the origin of the shape, or the underlying reason for its psychological effectiveness.

Grass Giants are brave but not foolhardy. A reasonable offer backed up by a show of superior strength is often sufficient to gain their respect and cooperation. They treat generously those who assist them, or who defeat their enemies.

Sometimes entire Grass Giant tribes may be encountered on the march, fleeing infertile, burned, hostile, or ravaged lands. In some regions, big patches of Slaver sunflowers are a particular problem. Rarely, a king giant may possess a high-technology artifact or weapon, perhaps taken in some fortuitous raid. In unexplored regions of Ringworld, there may well be Grass Giants with quite different habits and social forms.

HAIRY ONES

'Hairy Ones' is a general term describing certain races often found living in and about

GRASS GIANTS

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	5D6	17	R Leg	4/12
MAS	4D6+12	25-26	L Leg	4/12
CON	3D6	10-11	Abdomen	4/12
INT	2D6+5	12	Chest	4/13
POW	3D6	10-11	R Arm	4/10
DEX	2D6+3	10	L Arm	4/10
APP	3D6	10-11	Head	4/12
EDU	negligible			

Age: 1 D4 on age table
Average HP: 37
Speed 6m/im
Action Ranking: 5

ARMOR: Grass Giants have thick skin worth 2 points of armor. The males wear 2-point hardened-leather armor, and the kings wear metal plate worth 6 points. Female Grass Giants rarely wear armor. The hit location table below assumes 2 points of leather plating is being worn by the individual. Determine Grass Giant hit locations on the standard hominid hit location chart.

WEAPONS: Grass Giants use sickle-swords, great swords, and other two-handed weapons, but rarely employ shields or other manual defensive devices. They have no claws, but can punch and kick with great effect. Their fist attack has a base chance of 40% and their kick has a base attack of 20%.

Weapon	*Attack*	*Damage*	*Parry*
Fist	60%	1D3+2D6	
Kick	40%	1D6+2D6	—
Scythe-sword	60%	2D8+2D6	60%

COMMON SKILLS: Archaic Melee Weapons 60%, Archaic Ranged Weapons 40%, Athletics/Climb 20%, Bargain 20%, Debate 20%, Emergency Treatment 40% (females 60%), Fine Arts 20%, History (tribal) 60%, Musicianship 40%, Observe 60%, Psychology 20%, Second Language 20%, Strategy 80%.

Muck Ogre (description p. 31) — this creature toys with an unfortunate victim. Compare this brute with the demure Mud People illustrated on page 15, who may suffer Transformation into vile beasts like this.

the ruins of ancient towns and urban centers. A heterogeneous amalgam of several species including regressive City Builder lines, before the Fall of Cities the original Hairy Ones were lower castes closely allied with and related to the technologically-advanced City Builders. Serving as vassals, menials, and mechanics, they became thoroughly integrated into that civilization. As farmers and laborers, they supplied the City Builders with food and services in exchange for defense, education, technology, and periodic rishathra. They and the people of the Spill Mountains may have had a remote common ancestor. Like them, the Hairy Ones have fallen on dark times since the abrupt decline of the City Builder empire. Most no longer even remember that the world is ring-shaped.

Hairy Ones are hairy mainly in contrast to their former City Builder masters. They have pale ghost-white skin, almost everywhere covered by thick, tightly-curled ash-blonde hair. The males wear their hair combed but uncut. Below the soft brown eyes, beards cover their faces. To depilated flatlanders, their hirsute appearance may be unsettling. Their features mark them as hominids, but they are clearly unrelated to any known race of humanity. They tend to short torsos and long legs, their height averages between 1.5 and 1.9 meters [5-6 feet] . Their extraordinarily long, tapering fingers might have made them born surgeons in the days when surgery was still performed. Although their religious leaders usually wear plain brown robes, most Hairy Ones attire themselves in parti-colored garments, cut blankets, and coarse tunics of dyed vegetable fiber.

On present-day Ringworld, Hairy Ones are omnivore farmers. They domesticate animals and tend large rectangles of patchwork plots beside their broken cities. They seldom use remnants of archaic machinery and almost never develop technological cultures on their own. They rarely even build their own dwellings, preferring to retreat each evening to the crumbled, decaying towers at their cities' edges. Though ruined and smashed, many of the ancient structures provide far better shelter and defense than any the Hairy Ones could fabricate for themselves. The population of a single site may be as high as 10,000, on the outskirts of a city which might once have held millions. A stratum of skulls can still be found in the compacted mounds of refuse and debris.

Thinking of themselves as a civilized, settled, and not at all blood-thirsty people, the Hairy Ones long for a return to the days of their former glory and status, but do little to rebuild civilization. They believe that the City Builders surely will return to repair the urban centers, refloat the buildings, restore the power, and guide them in the clean-up operations; and they are willing to wait. In fact, many societies have made a fervent religion of this attitude, allowing priesthoods to wield ultimate control.

Hairy Ones believe that long ago the City Builders constructed the world, raising the Great Arch as a sign of Holy Covenant between the two species. Often their altars depict a detailed, chiseled, flatlandscape, the features of which diminish and blur around the edges. Above it rises a parabolic arch of silver or gold-plate, attached to opposite sides of the landscape like a handle; suspended by fine wire from the apex of the arch is a highly-polished golden ball, representing the sun. The name of the thread translates to Interworld as "sunwire." It is traditional for the high priests to make inquiries about the eventual renewal of civilization, and to request miraculous demonstrations of great power from advanced travelers — perhaps as much to enhance their own religious credibility as to provide fascinating tales for the culture's descendants. Only the holy ones speak the pure tongue of the City Builder "Engineers."

Hairy Ones often prove difficult to deal with: their religions are complex, with many strange taboos. Some groups, for example, believe that it is sacrilegious to "fight with light" — that is, to carry lasers as weapons. (Their own weapons are often no more than primitive swords, clubs and spears; but in the ruined cities, they have access to sophisti-

HAIRY ONES

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	2D6+2	9	R Leg	0/6
MAS	2D6+2	9	L Leg	0/6
CON	3D6	10-11	Abdomen	0/6
INT	2D6+4	11	Chest	0/7
POW	3D6	10-11	R Arm	0/5
DEX	3D6+3	13-14	L Arm	0/5
APP	3D6	10-11	Head	0/6
EDU	negligible			

Age: 1 D4 on age table
Average HP: 20
Speed: 3m/im
Action Ranking: 4

ARMOR: No natural armor. They may wear scavenged armor from some City Builder ruin, but the vast majority of Hairy One cultures do not make their own armor. Hit locations for Hairy Ones are determined from the standard hominid hit location chart.

WEAPONS: They normally have available a large selection of archaic weapons; some may have modern weapons salvaged from the ruins. In some Hairy One cultures, such City Builder weapons are taboo. It is impossible to make generalizations about Hairy One armament. A sample culture's weaponry is given below.

Weapon	*Attack*	*Damage*
Crossbow	40%	2D6+2
Bolas*	40%	3D10
Sledge	40%	3D6

* this thrown weapon consists of two spheres tied together with a length of City Builder monofilament wire. The bolas is thrown so that the spheres wrap around the target and the wire cuts deeply. There would be few of these weapons available.

COMMON SKILLS: Archaic Melee Weapons 40%, Archaic Ranged Weapons 40%, Athletics/Climb 40%, Bargain 40%, Debate 20%, Emergency Treatment 40%, Fast Talk 20%, Hide 20%, Orate 60%, Second Language 40%, Theology 80%.

HANGING PEOPLE

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	2D6	7	R Leg	0/5
MAS	2D6	7	L Leg	0/5
CON	2D6+2	9	Abdomen	0/5
INT	2D6+6	13	Chest	0/6
POW	3D6	10-11	R Arm	0/4
DEX	3D6+12	22-23	L Arm	0/4
APP	3D6	7	Head	0/5
EDU	1D10			

Age: 1 D4 on age table
Average HP: 16
Speed: 4m/im in trees; 2m/im on ground
Action Ranking: 2

ARMOR: No natural armor. Hanging People depend on stealth, quickness, and camouflage, not armor. Determine hit locations on the standard hominid hit location chart.

WEAPONS: Primitive Hanging People usually use poison-tipped darts, and snares of many types. Advanced Hanging People prefer light, compact energy weapons, if they carry weapons.

Weapon	*Attack*	*Damage*
Dart	40%	1D6 + poison

COMMON SKILLS: Athletics/Acrobatics 100%, Athletics/Climb 100%, Archaic Melee Weapons 40%, Archaic Ranged Weapons 40%, Bargain 20%, Debate 20%, Emergency Treatment 20%, Engineering 20%, Fast Talk 20%, Hide 60%, Law 20%, Repair 20%, Scent 20%, Second Language 40%, Track 20%, Unarmed Combat 20%.

cated artifacts from the past.) Sometimes their ancient teachings do not discourage the use of "old machinery," where it is found still in working order. The degree of tolerance or hostility evidenced by Hairy Ones' cultures depends markedly on their past experiences with strangers and with other local hominids. In some areas, visitors from the sky displaying high technology will be accepted as gods, Engineers, or their representatives. Elsewhere, aliens and strangers have earned bad reputations and must prove their good intentions to avoid being killed or driven away. In either case, visitors should scrupulously observe the local customs and taboos. Hairy Ones are notoriously unpleasant when they discover a "god" or prophet to be an impostor, and their priests are always suspicious of outsiders who might have come to steal their congregations.

Holy Hairy Ones jealously protect their social power, like religious rulers anywhere. Daily ritual observances and periodic mass convocations help them to maintain political control. Before sounding the call to worship, a high priest ritually shaves his head to imitate the City Builders' baldness. He dons an ancient brown robe, still decorated with an elaborate ceremonial design in faded pink. He ascends the hallowed ruined of some archaic tower, and looks down on a sea of faces resembling a field of golden dandelions. Invoking the powers of a mystical bird tattooed on the back of his hands, he raises his arms solemnly, majestically, to the heavens. He leads his people in earnest chants, hymns, and prayers for the return of the legendary "days of wonder." His sermons encourage his people's longing for easy salvation in the divinely-ordained material rebirth of the great cities.

HANGING PEOPLE

In the upper branches of jungle trees and dense, tall forests live heterogeneous small sentient hominids collectively known as the Hanging People. There are many closely-related subspecies. They interbreed gregariously among their own races, so one can never be sure from appearance alone the origin of an individual. All are covered with fine silky hair, ranging in color from deep forest-green through yellow-green and soft shades of orange and brown, with occasional markings. Certain exotic blues and bright yellows are most often native to tropical or oceanic regions. Hanging People are arboreal vegetable-eaters, but their diet includes a variety of fruits, nuts, seeds, and insects. In the mountainous timber-lands, they also eat leaves, berries, soft bark, snails, and birds' eggs. They are not usually carnivorous.

Hanging People seldom reach the height of a human's shoulder — they average only 1.15 meters [3.5 feet] tall. Their elongated human-sized heads seem too big for their bodies. Their ears are large, pale, and prominent; the hair on their cranium is so thin as to (from a distance) make them appear bald. Their skin pigmentation varies from pink to light green. They have shining, expressive eyes of a rainbow of colors, with gray and black the least common. Their noses are narrow and delicately austere. Their jaws also look delicate, but are strong enough to break open the hardest nutshells with ease. The diminutive dentition resembles that of a human child, but the teeth are sharper and much stronger.

Lightly built, the Hanging People have long, slender arms, legs, fingers, and toes. With opposable first toes as well as thumbs, they are quite dextrous and very agile. The third and fourth fingers are nearly the same length, but the fourth is longer. In an erect stance, their arms reach below the knees, the fingertips nearly touching the floor. When walking, though, they are completely bipedal, displaying no tendency to lean upon the knuckles of their hands. The nails of their digits are occasionally lengthened, hardened, and carved for use as special tools. Most Hanging People have lean, prehensile tails nearly a meter long, which they use for brachiation, manipulation, and for silent communication. Their sense of touch in fingers, toes, and tail is particularly sensitive.

Primitive Hanging People rarely leave their forests, and are quite protective of the fauna and flora within their territories. Although usually peaceful, they will fight with fury any intruder who seems to threaten their habitat. Poison-tipped blow darts and snares are favorite weapons. Many races of Hanging People are quick, curious, and clever enough to have made their presence felt in the more advanced civilizations of Ringworld, both as tourists and as skilled technicians. They commonly contract themselves to the City Builders as mechanics, acoustics technicians, and precision electronics experts. They have even been observed (by Louis Wu) touring a great City Builder library. Their services are not inexpensive, and they can often afford to purchase the goods and services of others. They enjoy travel, mostly in groups of their own kind. Under normal circumstances, Hanging People do not like to be touched by other hominids. Some of the more sophisticated groups do practice rishathra, though - 'carefully,' according to one City Builder. It is rumored that, because of their exquisite sense of touch, rishathra with them is unbelievably satisfying.

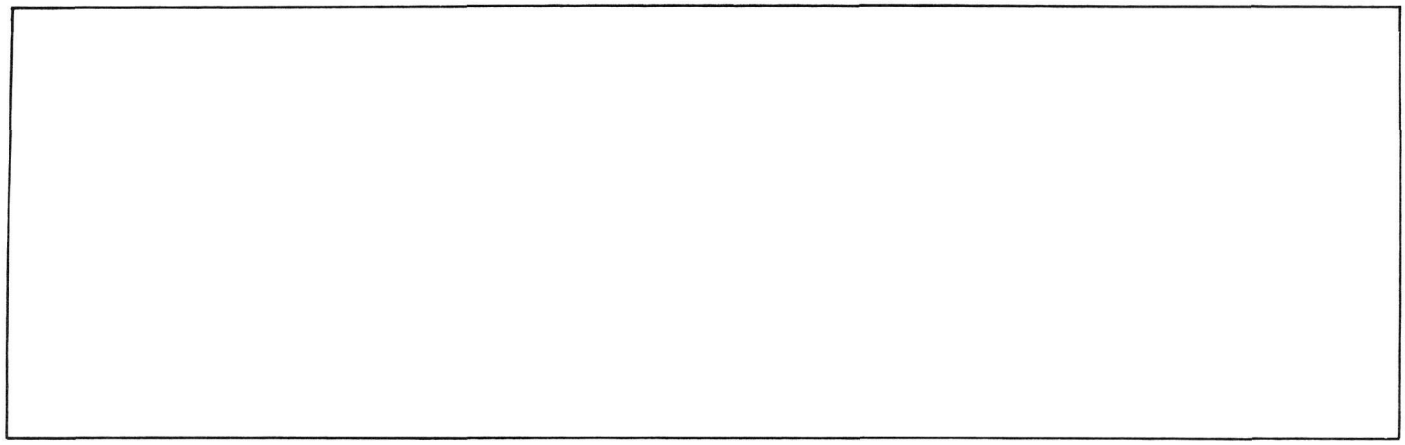
In mixed company, Hanging People often wear light, brightly-colored armless gowns. The technicians wear drab, but similar, blouses or vests with pockets for a multitude of delicate, specialized tools. They are excellent acoustic diagnosticians, with a wide range of acute hearing. Although often reserved, reticent, and temperamental with strangers or employers, they are by nature non-aggressive and sociable. They are adept at languages, but prefer to whistle, chatter, and whoop among themselves — occasionally to the great annoyance of everyone else within earshot.

Hanging People are for the most part honest, trustworthy, and proud. Very rarely there are exceptions. To carry out particularly challenging thefts or technological crimes, the services of a Hanging Person may sometimes be required. They make excellent, though infrequent, burglars, commanding top fees in such modes of employment. Seldom is their motivation for undertaking these jobs mere financial gain, though: they are more often seduced by the difficulty and intrigue of a tough caper.

HEALERS

Dozens of advanced civilizations rose and fell in antiquity, long millennia before the City Builders became the powerful masters of Ringworld. Little trace of any of them remains, even in legends. Most simply decayed and disintegrated, or were overrun by barbaric species. Others annihilated themselves in conventional chemical or nuclear wars. A handful were erased by meteor punctures, and a few more were cremated by the automatic meteor-defense beams as soon as the average speed of their air- or space-vehicles exceeded 7.25 km [4.5 miles] per second. Any species evolving sophisticated technology on Ringworld needs intelligence, patience, care, determination, and a great deal of luck to endure.

One advanced race thought to have survived for at least 200,000 falans on Ringworld is the Healers. Though rarely encountered, their influence has been felt for ages, and their culture is the source of many mysteries. For a time, they partly filled the ecological niche vacated by the Protectors, but they were ultimately unable to shoulder such a burden. They fell victim to all the temptations of human progress. Their own civilization is said to have been nearly obliterated at least three times. Presently, they travel alone, far from their hidden centers of education and culture. They are feared and despised by the City



Builders (who suspect them of having spread the superconductor plague), but they are sought out by many others for their medical knowledge, immortality drugs, or simply because of their reputation as magicians.

Eons ago, the people now known as Healers evolved a scientifically-progressive, increasingly mechanistic culture on Ringworld. They were among the earliest to do so. Originally, their advanced knowledge of biochemistry and their skills in medicine brought them growing power and domination throughout their expanding realms. There had been no disease and no mutations on Ringworld while the Pak protectors lived. But the genetic-virus disease that killed off the Pak accelerated the mutation-rate among the hominids as well as the lesser life forms. Random mutations in nature are not generally beneficial, and often are fatal. They induce painful biochemical dysfunctions and hideous deformities; and they generate killer bacteria. The Healer tradition of scientific medicine initially arose in response to the presence of disease, suffering, and mutation among their own people. Eventually, Healers found ways to ease the pain of other hominids, developed techniques to interfere with the spread of epidemics, eradicated many of the new diseases, and greatly reduced the rate of debilitating mutations. They released agents into the environment to counteract genetic viruses that were still generating waves of chaos among the hominid populations. One by-product of their research was an immortality drug ten times more powerful than that later used by the City Builders. A side effect was decreased fertility; as the Healers spread out over the Ring, their population tended to stabilize rather than to explode. For millennia, the Healers were looked upon as gods, though at present only ancient myths preserved in hidden Healer centers of science and culture speak of these times.

The Healers' civilization became increasingly mechanistic and technologically-oriented: they began to build an empire. They discovered they already possessed the basic scientific knowledge and industrial techniques to progress rapidly, and many other species already treated them with gratitude and respect. It was easy to get power, both politically and literally, by tapping into the beamed energy from the shadow-squares where it converged on the collectors. They began to build cities on a grand scale, and they built sky-car networks between them, riding on beamed-energy drives. They developed radio communication fairly early, transmitting medical discoveries and therapeutic techniques great distances by bouncing the signals around the Ring from the E-layer of the atmosphere. Now they used radio transmissions to coordinate the expansion of their empire so that remote regions would never lag far behind.

Day of Disaster

The Healers were too sure of themselves and they had not yet learned caution. There came a day when the Healers' biggest, newest sky-cars were fitted with advanced repulsers and fusion-beam drives. These were straightforward upgrades of proven designs, so they were not extensively tested. They were manufactured in every transportation capital, and service was ceremoniously inaugurated throughout the empire on the same day. On that day, the Healers' rise to glory ended. The new craft would easily travel 19 km [about 12 miles] per second, exceeding everyone's expectations. But their speed attracted the attention of the meteor-defense laser system, which had been left set on automatic by the Pak. As the day swept past, every major center of Healer population and technology was burned into nothingness. Healers fleeing as fast as possible in other craft drew destruction to outlying areas. Billions died, including the entirety of several hominid species.

The Healers Reformed

Thousands of falans passed before the remaining Healers knew why their civilization had been destroyed. Meanwhile, their culture changed and reintegrated. They had survived a costly, traumatic experience. Carefully, cautiously, they began to study the Ring as an artifact, and without disturbing its systems. They returned to their ancient traditions of healing as a primary cultural imperative. They felt remorse as a species for the holocaust they had inadvertantly brought down from the sky upon so many innocent beings, and they resolved to direct most of their energies henceforth toward the alleviation of suffering and the restoration of health in every part of the world.

Science began again, but with strict controls, guidelines, and built-in safeguards. Ethical and social knowledge became as important as biochemistry and applied technology: research proceeded slowly, with thoroughness and responsibility. The compulsion to create an empire of comfort and domination was gone — or at least the urge was indefinitely deferred until they had accumulated enough information to do the job without sacrificing populations wholesale. The Healers also resolved to guide others away from their own ancient path of error, and they set up something like a technological police force to watch over the progress of other species. They began to interfere with the civilizations of other hominids (as subtly as the situations permitted) to prevent them from reaching the same level of arrogant mechanization that the Healers themselves had once boasted long ago, just before catastrophe struck.

New centers of culture, education, and science were established, linked only by radio. Telescopes were built to study the Arch and the stars. The solar power collectors were no longer tampered with, and the Healers learned how to receive and display images of the Ring beamed in from the shadow squares. They built the first Map Room. Healers began to travel systematically about the surface of Ringworld, mapping, learning the ways of other cultures, and applying their medical techniques. They used magnetic compasses to follow the grid of superconductor cables buried in the Ring floor. In every area where Healers wandered, they studied the local inhabitants' physiology, native medicines, and philosophy; the ecology of the region; and the science and technology of progressing civilizations. Periodic radio reports kept their home centers up to date on their explorations.

Missions of Healers were, and still are, long — often over a thousand falans (nearly 250 UNS years) for a single one. The powerful longevity drug manufactured in Healer centers needs to be administered infrequently, every few hundred years or so. It is almost never carried on a mission. One side-effect of this drug — decreased fertility — is not considered undesirable by the Healers. Their numbers have gradually stabilized and become dispersed over the entire surface of Ringworld. Their concentration is thin, though, perhaps one or two every 400,000 square kilometers. Many ancient legends of powerful 'magicians-without-armor' can be traced to Healer encounters with primitive hominid cultures.

The influx of radio reports from distant travelers grew steadily in the new Healer centers. Accumulating knowledge was categorized, systematized, and synthesized over the ages into an encyclopaedia of 3600 volumes. The much-larger files of complete reports referred to in the summaries were maintained separately and updated continuously. A new edition of the Healer Encyclopaedia was published approximately every thousand UNS years on Ringworld. It was never widely distributed nor translated. Few species ever knew of its existence, since direct access by outsiders was rarely allowed. Indirect access to the information was always available to other hominids, however, through radio requests from missions in the field (of such traffic, 95% ordinarily concerned applications of scientific medicine). Many editions of the Healer Encyclopaedia had existed when the City Builders first obtained a copy of it, far around the Ring.

Healers and City Builders

Healers do not look like City Builders. They are taller in stature, often above two meters. Their large frames are well-developed, lean but not delicate (though in the wilderness they may appear deceptively frail). They have long legs and arms. Their hands have coarse, triangular palms with long, bony fingers. Their skin is the color of reddish straw, darkening to rust brown with prolonged exposure to sunlight. Their hair usually is a rich, deep auburn, smooth and wavy or lank and straight. It grows luxuriantly over the top and sides of the head, and down the neck to its base. Both sexes are beardless, but have prominent eyebrows of fine, dark-red hair. Healers are relatively long-headed (dolichocephalic), with long ears and fairly high, rather narrow cheekbones and foreheads. Their brooding, upturned faces have smooth, regular features which are often striking. The noses are naturally long, well-shaped, and arched. The lips are of medium thickness, sometimes appearing pursed above only slightly-projecting jaws. The eyes are invariably deep-set and occasionally oblique, ranging from black to hazel to blue. In hostile territories, or if native customs demand it, Healers sometimes alter their coloration with chromatabs and dyes. Their clothing is generally simple, without elaborate decoration.

Long before they came into direct confrontation with the Healers, the City Builders had developed a substantial technological and political dominion. At first there was a degree of cooperation between the two species. The Healers believed that, since the City Builders themselves had lost several urban centers to the meteor-defense laser, ignoring prior warnings and pleas, they would moderate the rate of their progress and cease tampering with dangerous systems. But the City Builders rushed ahead blindly, by trial and error, by brilliant seat-of-the-pants engineering, by clever rishathra, and by any other means necessary, whatever the cost. The contributions and labor of other species pushed them rapidly into widespread dominance in many regions. Then a Healer center was inadvertently depopulated by a City Builder nuclear accident. A number of volumes of the Healer Encyclopaedia fell into their hands, and they found a working Map Room. Electronic theory and several other physical sciences were elucidated in these books, and the City Builders were quick to make engineering applications.

The City Builders were the first to ascend the rim walls of Ringworld and spill down to the spaceports. There they discovered cziltang brones, laser cannon, small spacecraft — and several primitive but serviceable fusion ramships. The Healers had already begun a campaign of persuasion, resistance, and sabotage, but they were not prepared to counteract such a leap in brute-force technology. The locations of all the Healer centers were known from the Map Room. Using laser cannon hauled through the rim walls, then mounted on repulser ships, the City Builders destroyed most of the centers, effectively ending, once again, the advanced civilization of the Healers. Later, the City Builders began dismantling Ringworld's attitude-jet toroids for use in their ramships, eventually imperiling the entire structure.

Over the millennia while the City Builders ruled on Ringworld, the Healers slowly and secretly reassembled pieces of their culture. They avoided City Builder metropolises, sending in only occasional spies to report on developments, adeptly manipulating and avoiding police beams, radar, and other electromagnetic security traps. The maximum resolution of detail for City Builder Map Rooms is just sufficient to make out grid patterns of city streets; the new, hidden centers of Healer culture were designed to make detection difficult, even if a thorough search were undertaken. The missions of healing began again and work started, almost from scratch, on a new edition of the Encyclopaedia. The risks were much greater, though, since in many regions there were now species allied with the City Builders who had been taught that Healers were evil. When the superconductor plague precipitated the downfall of the City Builder empire, the Healers also suffered, but not as catastrophically. Their culture had once again retreated to its origins, and their dependence on City Builder superconductor technology and the beamed power receivers was limited. Many surviving City Builders became convinced that the Healers had spread the plague which caused the Fall of Cities.

Healers in the Ringworld Era

On present-day Ringworld, the Healers endure. Their dispersed numbers were not severely affected by the City Builder conflict. The secret centers of Healer education and culture are also sanctuaries. Healers travel alone, and it is almost impossible to force or to convince a Healer in the field to reveal the whereabouts of a single center. The potency of the longevity drug has been increased to a thousand years, and is never carried along on a mission. Radios are carried, and Healers are as well as accomplished as ever at manipulating old City Builder beams, field-generators, and police frequencies. Most carry a packet of small quantities of thousands of anti-viral, anti-bacterial, and chemosynthetic catalysts which can produce healing serums and pain-killing agents in the bodies of animals and hominids. They make extensive use of native plants, and often carry a vampire-immunity agent. In primitive areas, spiders and snakes occasionally are used in place of hypodermics or other equipment to inoculate victims of disease or accident. Because disease is not widespread on Ringworld, resistance to it is sometimes very low, and the work of the Healers is still very welcome.

Often, Healers travel the old routes above the superconductor grid cables. For long distances they use skysleds and repulser cars, but usually they are on foot in their designated hexagon of the superconductor grid. They travel alone, so they cannot be taken hostage effectively. Their cultural imperative requires that they must sacrifice their own lives if other lives (even City Builders) will be saved. There are now several new editions of the Encyclopaedia in existence, carefully concealed and well-protected. A number of entries are little more than lists of topics once known, or reports once received but no longer on file. Nevertheless, there are hundreds of Ring years of recent entries, including interesting new topics such as communication attempts with Bandersnatchi, summaries of certain interstellar expeditions by the City Builders, and Ghouls' tales concerning visits by aliens from beyond Ringworld in modern times. These reports intrigue the Healers, but a majority of them reject the idea of revealing themselves to powerful, potentially-dangerous species from the unknown depths of space.

HERDERS

The small red carnivorous hominids who live on the grassy veldt of Ringworld represent a typical Herder species. They eat "meat without fire" — freshly killed and dressed, uncooked. Extensive grazing herds of various herbivorous animals ensure their tribes a continuous supply of fresh, raw meat. The race has many dozens of tribes, who refer to themselves collectively as "the People" (Interworld translation). Herders run like demons, swarming and bounding through the tall grass. Even carrying nets and spears, they easily overtake any hapless animals. Though faster on foot than most hominids, they probably could not outrun a Kzin.

Often a particular tribe specializes in a single species of semi-domesticated grass-eater. The small, red carnivores favor a type of green dwarf elephant with a short flattened trunk and a voracious appetite, known as *zanjii.* This prey is placid enough but may stampede if startled. Other tribes of the People tend herds of lopers, jumpers, dak-daks, and yellow-striped snorters.

HERDERS

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	2D6+1	8	R Leg	3/6
MAS	2D6	7	L Leg	3/6
CON	3D6	10-11	Abdomen	3/6
INT	2D6+6	13	Chest	3/7
POW	3D6	10-11	R Arm	3/5
DEX	3D6+8	18-19	L Arm	3/5
APP	2D6	7	Head	3/6
EDU	negligible			

Age: 1 D4 on age table
Average HP: 18
Speed: 6m/im
Action Ranking: 3

ARMOR : No natural armor. Herders often wear treated animal skins (3-point armor), but usually nothing more advanced than that. Determine hit locations on the standard hominid hit location chart.

WEAPONS: Herders prefer missile weapons, light melee weapons, traps, and nets. It is unusual to find a Herder with advanced weapons.

Weapon	*Attack*	*Damage*	*Parry*
Spear	60%	1D6+1	60%
Light Bow	60%	1D6+1	

COMMON SKILLS: Athletics/Acrobatics 40%, Archaic Melee Weapons 40%, Archaic Ranged Weapons 40%, Bargain 60%, Emergency Treatment 40%, Hide 40%, Musicianship 60%, Observe 60%, Second Language 40%, Strategy 60%, Track 40%.

The People are lean and short, seldom reaching 1.4 meters [4.5 feet] , but in general appearance they are rather human-like. Their skin is a uniformly rich, bright red. Except for tight, rusty curls hugging their elongated scalps, they are nearly hairless. They have excellent sight and hearing. The pupils of their eyes are shiny black, set in deep pink. Large, rounded ears stand well out from the head. Their full lips are like big cherries: glossy, and redder than the skin. Their teeth grow disconcertingly sharp, as if filed — even the children's teeth. They have thin muscular arms, and legs long in proportion to their torsos. Male and female voices alike are high-pitched, piping falsettos. Their language sounds like a rapid-fire series of shrill squeaks. The elders wear kilts of cured hide marked with decorative lacing; and most tribes trade high-quality tooled-leather goods with other species in the region, sometimes for metal implements.

Herders are usually without any forms of advanced technology. The herds crop vast areas of grassland almost to bare dirt, so tribes must relocate frequently. Their settlements are temporary: clusters of low huts grouped close together and joined by fences. The huts often are arranged in a circle, enclosing an inner compound of bare earth, with a central fire-pit. The entrances to the huts all face inward. Only a single guard-hut, twice the height of the rest, has a balcony for sentries and windows facing out onto the veldt.

The tribes of the People like variety and visitors. As long as there is no threat to their grasslands or herds, they are very sociable. One of the highlights of their existence on the veldt is the "trading feast." Infrequently but periodically, two or more Herder tribes rendezvous to feast, swap crafted goods, and amuse one another with stories and legends. Their philosophy is summed up in a phrase, "Life is more than not being hungry." At the festivals, there is always a wide choice of fresh meats laid out on clean leather. The red people eat like Kzinti, tearing into their meal, covering lips and chins with blood. The tribes perform complicated "circle dances" for each others' entertainment, to the accompaniment of loperhorn pipes, shrill chanting, and the clacking of snorterhoof castanets. Rituals of herding, killing, and dressing meat are celebrated in these energetic dances; they also encapsulate tribal history and dramatize accounts of particular myths and encounters of interest to other tribes. At the feasts, entire herds are sometimes exchanged, for variety. The tribes adjust their habits and skills accordingly — spending up to a half-falan in mutual instruction (with much joking and prank-playing) before parting.

Strangers are usually welcome in villages of the People. They love to meet beings who are different, and the gift of a sumptuous dinner is often sufficient to gain their hospitality. No known Herder tribe practices rishathra, though all know of it. They have no overt taboos against it, merely disinterest. Vampire scent overwhelms them; their usual amiable apathy may be due simply to strongly divergent cultural or biological instincts. Despite their inability to do rishathra, the small, red carnivores are ordinarily on good terms with neighboring cultures, trading in handicrafts, carved flutes, and fabulously-detailed leather goods. The tribes of the People are dangerous only if their grasslands are devastated or taken from them. Species such as the Grass Giants — fierce herbivores — present the toughest competition for the tribes of the People.

It should be clearly understood that many species of Herders live on the veldt. Most are not red; a fair percentage certainly are not small. According to the People, there also exist 'brainless meat-eaters' superficially resembling dwarf black hominids. These fiendish creatures attack in the dead of night and are dreaded by most plains-dwelling tribes.

MACHINE PEOPLE

You know that the world is a ring, and that is secret!

The Machine People rule an empire many hundreds of thousands of square kilometers in area, centered upon an isolated floating city. These hominids have advanced technologically nearly as far as mid-20th-century Earth, but are limited by scarce natural resources and the plurality of their domain. Metals are rare, strip-mining operations essential, and major reclamation projects common. They use alcohol and methane as fuels, and must devote considerable effort to bio-mass agriculture, bulk transportation, and chemical processing. They are gradually, arduously progressing toward a high culture, even while they support the material requirements of the remnant City Builder society hundreds of meters above their heads. The Machine People believe they are building a special destiny of their own. They feel that they trade by logical choice with the City Builders for information, entertainment, and services, and that they supply and maintain the floating city mostly out of tradition and old loyalties. The true power and sophistication of the City Builders' techniques, both political and technological, is largely unsuspected by the Machine People. If real hostilities ever broke out between them, mutual destruction of both cultures would likely be assured. In regions where ad-hoc floating cities have been pieced together from disparate buildings with independently-operating power sources, respectable industrial civilizations have often developed. The Machine Empire is but a single example of this phenomenon.

Traditionally, an empire is a cluster of nearly-independent kingdoms. The various kingdoms must pay taxes; and they follow the emperor's commands regarding warfare, inter-kingdom disputes, bandit-control, and maintenance of communication. Occasionally there may be an official religion, but other-

City Builder (description p. 30) — inset against a view of a floating city hovering above a broad plain is an illustration of a City Builder. The distinctive hair growth is evident on both males and females of this hominid species.

MACHINE PEOPLE

Char.	Range.	Averages	Hit Locations	Armor/Av. HP
STR	2D6+6	13	R Leg	0/8
MAS	2D6+6	13	L Leg	0/8
CON	3D6	10-11	Abdomen	0/8
INT	2D6+6	13	Chest	0/9
POW	3D6	10-11	R Arm	0/6
DEX	3D6	10-11	L Arm	0/6
APP	3D6	10-11	Head	0/8
EDU	as for humans			

Age: 1 D4 on age table
Average HP: 24
Speed: 3m/im
Action Ranking: 5

ARMOR: No natural armor. Occasionally Machine People may wear a bulletproof vest, protecting the chest and abdomen for 6 points. Determine their hit locations on the standard hominid hit location chart.

WEAPONS: In common use are projectile arms resembling those of 20th century Earth. Rifles are more common than handguns, though both are frequently found.

Weapon	*Attack*	*Damage*
Rifles	40%	2D6+3
Pistol	40%	1D6+2

COMMON SKILLS: Astronomy 40%, Bargain 60%, Chemistry 60%, Emergency Treatment 40%, Engineering 80%, Fast Talk 40%, Fine Arts 20%, Ground Vehicle 60%, Handgun (projectile) 40%, Heavy Weapon (projectile) 40%, History 60%, Musicianship 20%, Repair 80%, Second Language 60%, Strategy 30%.

wise the kingdoms follow their own customs. The problem is compounded within the Machine Empire where, for instance, the way of life of herd-keeping carnivores is in competition with harvesting hominids such as the Grass Giants, is useful to the traders who buy the carnivores' tooled-leather goods, and is irrelevant to the Ghouls. In some territories, many species work in cooperation; all allow free passage to the Night People. The various subject races follow their own customs as much from evolutionary necessity as from imperial benevolence in the empires of Ringworld.

The Machine People look upon their domain as an empire of trade, taxing only their own merchants. The Ghouls provide an information service, act as guides and emissaries to distant realms, as well as morticians and garbage collectors. They are never taxed, but many other species do in effect pay tribute. The kingdoms must maintain the roads that link the empire, if their people are capable of it - which, for example, the tree-living Hanging People generally are not. Major roadways mark the borders between territories held by different species of hominid. Wars of conquest across the roads are forbidden; so the roads keep the peace (sometimes!) merely by existing. The empire has the power to draft armies to battle bandits, thieves, and threats from outside. The large patches of land it appropriates as trading posts tend to enlarge to full colonies of the empire. Because highways and alcohol-powered vehicles unite the kingdoms, the empire requires its subjects to maintain chemical distilleries and to hold fuel available at specified locations. There are schools and regulations for traders; a code of justice requires even Machine People convicted of minor infractions to do supervised labor in the stinking Shadow Farm beneath the floating city, where huge fungi are grown in the darkness using City Builder manure. Still, the rule of the Machine Empire is relatively benign.

Personal Aspects

Machine People look rather human-like, but somewhat widened. They are stocky and muscular, with broad torsos. Their skin is a dark olive hue; they seldom reach 1.8 meters [a bit more than 6 feet] in height. Their faces are remarkably square, with plain, well-shaped features. Their night vision is surprisingly good, and their eyes come in shades of blue, green, brown, and dark orange. They have fine black hair, which the women sometimes wear long and braided. Both sexes have a light fringe of soft, black beard along the lower jaw, which they do not shave. A strip of similar hair runs along the spine, all the way down the back. They enjoy having their backs scratched affectionately, as do many humans.

The Machine People generally eat simple, spiceless meals. They are omnivorous, but dislike fish. They use no salt in their cooking and, as with most species far from the Great Oceans, seem not to require it in significant quantities. Usually they eat one meal at day's end, and then sleep: perhaps their digestive process induces drowsiness. In ancient times, nonetheless, Machine People cooks traditionally served the City Builders, and they are still employed in that capacity in the floating city hovering above their empire. Machine People dress typically is as straight-forward as their diet: plain and practical. Except for the Elders, simple shirts, pants, blouses, and occasional shorts are considered adequate clothing. They often wear chronometers, backpacks, and sometimes a little jewelry or other personal adornment. The Machine People customarily practice rishathra to seal bargains and truces, for contraception, and for trading. It goes with the territory — and they may be offended if one does not suggest or agree to it under certain circumstances: both parties must disrobe slowly in adequate light, a ritual intended to assure the honorable setting-aside of all weaponry. They give up rishathra, unlike the City Builders, when they settle down.

Despite an imperious attitude toward strangers and aliens, Machine People should not be thought of as humorless, arrogant boors. Among themselves, they are friendly, convivial, and affectionate; they enjoy literature, philosophy, games, and music, and in idle moments can even be heard to whistle the tunes of other species. Nonetheless they are confident and assured in their privileged role as trustees of hidden knowledge passed down from the Engineers. They keep many secrets from their subject races, applying them in practical ways to maintain their power and to expand their commonwealth. Ultimately, Machine People are secure in their belief that they are a pinnacle of progress, the rightful inheritors of the crown of creation in their realms. It should never be forgotten, though, that the great Machine Empire is but *a* tiny speck on the vast habitable surface of Ringworld.

Sample Machine People Technology

A variety of tough, all-terrain vehicles are built and operated by the Machine People. These cars, trucks, and buses are square and boxy in design, and very sturdy. To pampered flatlanders they are uncomfortable and unwieldy, though generally roomy. Although usually driven on roads of white poured-stone or hard-packed dirt, the vehicles often must travel much rougher landscape. In the realms of the empire, there are swamps and deserts, whose muck or dunes may drift across even well-maintained roadways. In very remote areas, Machine People almost always travel in heavy, reinforced vans, well-provisioned and well-armed with their characteristic chemical-projectile weapons. They sometimes journey tremendous distances to search for artifacts in ancient abandoned cities, even ones in the middle of inhospitable deserts. The vast swamplands are the least accessible and most primitive domains in the Machine Empire, and they are largely ignored, even though some are inhabited by the giant Bandersnatchi. How and why the City Builders transported Bandersnatchi from the Map of Jinx in the Great Ocean, 35 degrees away on the Ring, is a deep mystery.

The architecture of the Machine People is squat, massive, and sprawling. The poured-stone buildings tend to compete for ground, but never for height. Their cities seldom contain houses or public buildings as tall as five stories. The streets are often narrow and crowded, the use having rapidly outstripped the design. The chemical plants and distilleries, which look like big low slabs of concrete, produce plastics, artificial fibers, and other substances besides pure 200-proof alcohol. There is an alcohol-abuse problem in the Machine Empire, but little concern is given to it. Every power source has its drawbacks and sociological side-effects. Those species with the least ability to control their alcohol intake are simply kept away from the distilleries and fuel depots. And the characteristic beverage of the Machine People is, after all, worth it: a powerful sweet nectar with the flavor of elbow-root blossoms, called *makai.*

MUCK OGRES (Mud People)

These corpulent, bloated, hideously-repulsive hominids lurk in the muddy ooze and slime of Ringworld's primitive swamps, silted bogs, and river deltas. They are ill-tempered as well as ugly, and they are frequently hungry. Their ponderous bulk prevents them from standing erect on land; lacking tails for counterweights or cushions, they cannot even sit comfortably out of the water. Their level of intelligence is surprisingly high, but most have become resigned to a life of immersion,

like marsh-beasts, in aquatic backwaters with sluggish currents. Over short distances, Muck-ogres are powerful swimmers. The effort exhausts them rapidly, though, so such sprints are reserved only for catching large mobile chunks of fresh meat, or for emergency escapes. If they remain immobile, Muck-ogres can stay submerged for upwards of half an hour. When hunting or hiding, they use breathing-tubes for much longer intervals. They do not enjoy the stagnant swamps and brackish mudholes where they are most often encountered, but these surroundings afford them the best hiding places. Muck-ogres are also widely known as Mud-Devils.

The term "Muck-ogre" refers to the late-adult form of an isolated hominid species called Mud People. The latter name is merely derogatory: Mud People have no interest in mud or in swamps. They are subsistence hunters, gatherers, herders, and occasional farmers who sometimes live far from aquatic environments. They are tall, sleek, and (to flatlanders) generally quite attractive. Their hair and skin are nearly the same lustrous bronze; but in the sunlight the skin becomes a darker copper and the hair lightens to gold. There is little body pelage, and all are beardless. The arms and legs are slender and well-proportioned, the torsos trim and nicely-shaped, with excellent muscle-tone. Their facial features are delicate, even vulnerable; the young women are sometimes awesomely beautiful. Although their intelligence level is unimpressive, they seem self-satisfied, good-natured, and sociably curious. Their associations are quite insular, however, and they tend to make fun of outsiders without making an effort to understand them. Other hominids shun the Mud People.

The Transformation

Not one of the younger Mud People ever really believes that the ancient affliction of their race will strike him or her. A third or so of the Mud People never do change to Muck-ogres, but for many, the transformation commences just after the Age of Breeding has passed. It is triggered by a genetic virus that has little respect for family bloodlines — nearly all Mud People are carriers. The curse of the Muck-ogres, transmitted down through the ages, might be a relic of the strange disease which killed off the Protectors. Indeed, individuals of other hominid species who come in close contact with the younger Mud People sometimes undergo monstrous mutations in later life. The low-technology encampments and close-knit villages of Mud People are often located on islands, on isolated stretches of shorelines and beaches, or on inland tracts cut off by natural barriers. Mud People are traditionally avoided, like lepers; but rarely are they attacked by other races.

The transformation to Muck-ogre is slow but inevitable. Once it begins, it never really ceases; so far as anyone knows, it cannot be arrested or reversed. Initially, the level of intelligence rises, so that first-stage Muck-ogres often become aware of their fate long before their families even begin to suspect. They must conceal their heightened sentience. They become angry at the stupidity which surrounds them, and the unfairness of their own inexorable doom. Some become desperate enough to commit suicide; but most resign themselves to voluntary exile before becoming an intolerable burden to an insensitive community. If they wait too long, they become huge, helpless, vulnerable monsters. If they do not leave, they may be penned up in pits, objects of scorn and ridicule; or they may be towed away and cast adrift in a river. Occasionally, they are killed or left out to dry by their own offspring, who feel betrayed and repelled by such a reminder of what they might one day become. Muck-ogres soon cease to feel much attachment to their young. They lose interest in protecting their own kind, and begin to focus exclusively on concerns of their own survival.

The change to Muck-ogre may take several years. As the drastic physiological transformation progresses, Muck-ogres have less and less choice where they can live, or how long they can remain out of the water. There comes a day when each must permanently settle in some carefully-chosen out-of-the-way backwater. Their attitudes decay, from bad to unsavory, and their tempers shorten. Their body-mass increases by 600% to 1000%; more than half is fat. Their skin becomes a murky dark greenish-brown hide, like discolored copper, and nearly three centimeters thick: rough, knobbly, and impervious. Fat, short, raspy bristles of dark hair sprout all over the body. The skull softens, enlarges, slumps, and finally coalesces into a large, flattened, hemispherical ovoid with bulging eye sockets and powerful jaws. The legs thicken substantially and the feet become webbed; but the upper limbs remain relatively muscular and mobile. The fingers become only partially-webbed, the nails hardening into sharp claws. The mouth widens initially to about 30 centimeters, and gradually further widens over the years. The teeth are small and variegated, with many narrow, pointed pyramid-shaped canines in front, and broader, rather cow-like molars everywhere else. The snout is big, flat, and upturned — half-frog, half-pig in appearance. Life-expectancy more than doubles. After many ring-years of isolation, Muck-ogres often become lonely and bitter, tiring of the only-occasional companionship of other mud-dwellers.

Muck-ogres are omnivorous, necessarily subsisting on water-plants, insects, algae, snakes, crustaceans, and fish. Many of them grow to detest fish. They begin to have complex fantasies about their former existence, and particularly about the taste of red meat from the land. If they do not exert themselves, Muck-ogres can go for quite a while between major meals; but even if they are not hungry, they will catch any particularly-tasty morsel and hold it in their grasp, sometimes for days, until they are ready to eat again. They seem to relish the anticipation almost as much as

MUD PEOPLE

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6	10-11	R Leg	0/8
MAS	2D6+6	13	L Leg	0/8
CON	3D6	10-11	Abdomen	0/8
INT	3D6	10-11	Chest	0/9
POW	3D6	10-11	R Arm	0/6
DEX	3D6	10-11	L Arm	0/6
APP	2D6+7	14	Head	0/8
EDU	negligible			

Age: 1 D4 on age table
Average HP: 24
Speed: 5m/im
Action Ranking: 5

ARMOR: The Mud People have no natural armor, but occasionally wear 2-pt leather armor. Determine hit locations on the standard hominid hit location chart.

WEAPONS: They use a variety of primitive weapons, but seldom have any advanced weapons; since they may turn into Muck Ogres, no species will trust them.

Weapon	Attack	Damage	Parry
Sword	20%	1D8+1	20%
Axe	20%	1D8+2	20%

COMMON SKILLS: Archaic Melee Weapons 20%, Archaic Ranged Weapons 20%, Athletics/Swim 60%, Debate 20%, Emergency Treatment 20%, Hide 20%, Observe 20%, Sneak 20%, Track 20%.

MUCK OGRES

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6 x2	20-22	R Leg	6/20
MAS	2D6+6 x 3	39	L Leg	6/20
CON	3D6 x 2	20-22	Abdomen	6/20
INT	3D6x 1.5	16	Chest	6/23
POW	3D6	10-11	R Arm	6/17
DEX	3D6 x .5	5-6	L Arm	6/17
APP	2D6+7 x .25	3-4	Head	6/20
EDU	negligible			

Age: 1 D6 on age table + 40 years
Average HP: 60
Speed: 1 m/im on ground; 4m/im in water
Action Ranking: 6

ARMOR: After the muck ogre transformation, heavy skin and thick fat give the being 6 points of armor protection. Determine Muck Ogre hit locations on the specific Muck Ogre chart.

WEAPONS: Muck Ogres usually use no weapons other than their own claws and teeth. However, they are capable of using any type of weaponry, and may steal such weapons as will remain intact and operational under the muddy conditions of the ogre's life. The base chance to hit with claws or bite for a muck ogre is 50%. Each round, the ogre can bite and claw twice.

Weapon	*Attack*	*Damage*
Bite	90%	1D10
Claw	90%	1D6+2D6

COMMON SKILLS: Muck ogres retain all knowledge skills at full percent ability as well as Athletics/Swim. All other skills are halved at transformation.

the consumption of their delightful repasts. Frequently, Muck-ogres use swamp-snake or plant venoms to paralyze prey — but in many cases they simply immobilize the animal in an iron grip, heedless of its struggles. Hominids caught in this way have about as much chance to escape as would a varmot.

Since Muck-ogres are intelligent, and often starved for companionship and conversation, an unarmed humanoid has one course of action available: he must retain enough self-possession to persuade the creature to release him. Occasionally, this is accomplished through abstruse philosophical dialogue, sufficiently-amusing clever stories, puzzles, convincing threats, or inspired bargaining. Kindly offers to study the mechanism of the Mud People's genetic transformation do not usually prove to be useful. And as the time passes, both hunger and boredom increase in the Muck-ogre. Rarely, something better to eat swims by at the last moment.

Many Ringworld locations have Muck-ogres. In their fully-changed state they cannot reproduce, and they are no longer genetically-contagious. In general, the older they are, the bigger they get, and the worse their disposition becomes. On land they die quickly, for their skin dries out hard in less than a day. In open water, they are vulnerable monsters, and they are at the mercy of swift currents. Many cultures have captured them, or persuaded them, to serve as guards, bouncers, and sentinels in exchange for education and a proper diet. They may thus unexpectedly be encountered in moats, ditches, canals, lakes, pools, indoor baths, and even isolated mud-holes far from the swamps. Breeding-stocks of Mud People have been maintained by diverse cultures, including the City Builders, to ensure a continuing supply of domesticated Muck-ogres. Societies failing to live up to their bargains with Muck-ogres, or which mistreat them, sometimes deeply regret it. It is a mistake to think Muck-ogres are stupid, just because they are ugly.

distances faster than a man, despite their short legs. They dive expertly, and may swim as much as a kilometer without surfacing for air.

The gently-flowing streams, freshwater lakes, and shallow seas of the Ringworld lowlands and forests are their favorite habitats. Sea People cannot survive in deserts, high plateaus, dry mountainous areas, or stagnating backwaters. They detest bogs and marshes, and persistently engage in desilting operations. Occasionally, teams of them undertake to cut channels through swamps with working dredges or more primitive substitutes. Sea People are seldom technologically advanced, and have difficulty adapting the machinery of other species to their aquatic environment. Although somewhat isolated, they are generally friendly and adept at languages. They have two distinct dialects, one for use in air and the other for communication underwater. They trade services and seafood to other hominids in exchange for metal tools and artificial materials, and sometimes are employed in building and servicing boats.

Sea People have the same general proportions as otters — a lithe, slender body; long, thick neck; drastically-sloping shoulders; small ears; and short legs. The hands are only partly webbed, the fingers tapering to small, narrow claws. The head is flattened, with a wide, low brow. Large brown human eyes, heavily lidded, are set well apart in bony sockets. The broadened nose looks pressed and bent over a slightly-projecting muzzle. The mouth is wide and underslung, showing almost no chin. Sea People have mediocre hearing, good vision, and keen senses of taste and smell. They range from 1.5 to 1.9 meters in height. Many (but not all) varieties have strong, tapering tails just slightly longer than their legs, with broad bases where they join the body. Their pelage is a fine oiled underfur of dark grey-brown, overlain with straight, glistening guard-hairs of dark brown or jet black. The upper chest and throat have lighter shades of brown and grey; and small aquatic animals — including fish, which they often herd efficiently or even farm. They also prey along shorelines, building slippery, carefully-oiled slides of mud (snow, in some regions) which dump unwary animals into the water. These slides are used for playful sport as well, and occasionally are concealed for defense.

Sea People cultures are organized around large, extended families. Following a complex traditional pattern, any particular individual usually takes several permanent mates. They build sprawling, submerged lodges, often in and about islands. All the adults share in caring for the infants, feeding and playing with them in the lodges. Dredges are often inhabited, too — especially by families cut off in seas with silt-blocked inlets. Repairing dredges, or constructing substitutes, is one of the few technological enterprises engaged in by the Sea People, but it can become an obsession. Such efforts may require decades to complete, and sometimes may fail disastrously. In isolated bodies of water such as Tuppugop's Sea, Stellar's Bay, and the Lake of Lutra major repair activities are progressing well.

The Sea People prefer unspoiled natural habitats. They have relatively little contact with other species of hominids, although they do periodically come into conflict with Vampires and Muck-ogres. They are not generally subject to close scrutiny by land-dwellers, and are under no obligation to surrender their dead to the Ghouls. Most Sea People follow an ancient tradition of ancestor worship, entombing family members on sacred funeral isles in the least accessible parts of their aquatic domains. This unique practice is largely ignored by the Night People, who do not care much for watery realms, and who welcome any fellow-antagonism to Vampires. Sea People prefer not to do rishathra. They will accept at the insistence of others, though, so long as it can be performed underwater. The Boat People sometimes employ them as sea farmers, fish herders, or in ship service capaci-

SEA PEOPLE

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6	10-11	R Leg	0/7
MAS	2D6+4	11	L Leg	0/7
CON	3D6	10-11	Tail	0/6
INT	2D6+6	13	Abdomen	0/7
POW	3D6	10-11	Chest	0/9
DEX	2D6+6	13	R Arm	0/6
APP	2D6	11	L Arm	0/6
EDU	1D4	2-3	Head	0/7

Age: 1 D4 on age scale
Average HP: 22
Speed: 3m/im on ground; 4m/im in water
Action Ranking: 4

ARMOR: No natural armor — rarely wear artificial armor. Determine hit locations on the Sea People hit location chart.

WEAPONS: Sea People use weapons valuable both below and above the surface, such as harpoon launchers and spears. They rarely can obtain advanced weaponry functional underwater.

WEAPON	*ATTACK*	*DAMAGE*
Speargun	20%	1D10
Spear	20%	1D8+1

COMMON SKILLS: Archaic Melee Weapons 20%, Archaic Ranged Weapons 20%, Athletics/Climb 20% or root skill, Atheltics/Swim 100%, Bargain 20%, Engineering 40%, Emergency Treatment 20%, Fast Talk 20%, Hide 40%, Musicianship 20%, Repair 20%, Scent 20%, Second Language 20%, Sneak 60%, Track 20%.

SEA PEOPLE

Sea People are among the most aquatic of the Ringworld hominids. They are warm-blooded, but often are referred to as amphibians. They mate underwater, and their infants must remain at least partially submerged for their first year of life. Sea People are widespread on Ringworld, and they travel extensively. They swim easily with tough, hairless webbed feet, and live most of their time in and under the water. Though awkward and vulnerable on dry ground, they can run short

and the region of the nose and eyes is nearly bare. Below the nose there is a thick mustache, and whiskers. Marine species, confined to the vicinity of the Great Oceans, are roughly similar in appearance, but diverge immensely in many respects. At least one, thought to grow far larger than its aquatic cousins, may have evolved into a race of fearless predators.

A number of admirable qualities characterize the Sea People. They are good-natured, intelligent, inquisitive, confident, and patient. They value wisdom, and generally are fearless without being fierce. Sometimes they are impulsive and even impudent. Their food consists of all manner of water-plants, crustaceans

ties. In some remote regions the two species may have to compete for the same limited resources. Many land-dwelling cultures value the aquatic hominids for their services as scouts, guides, and emissaries — they are sometimes willing to pay the Sea People handsome fees for underwater reconnaissance and for the recovery of sunken artifacts.

VALLEY PEOPLE

These agricultural herbivores subsist solely on the crops they grow in extensive, well-tended fields. They are most likely to be found in

rich, unspoiled river valleys, or in isolated lowlands between mountain ranges or other natural barriers. Valley People cultures are self-sufficient, stable, and non-aggressive. In regions where hominids must fight or trade to survive, Valley People are not commonly encountered. They are generally neutral to strangers, unless their fields and crops are threatened. They show little interest in trading with other species, even to obtain advanced technology for their farms. They develop and use few artifacts themselves, and are unimpressed by the vehicles, widgets, and weaponry of others.

Valley People are a little less than two meters tall on the average. Their build is moderate and spare, almost entirely without fat. They are nearly hairless except for a scraggly black tuft atop the head. Where it has been exposed to the sun, their skin is brown with a tinge of green; elsewhere it is greenish-pink. Sloping brows and prominent, thin, bony noses accentuate lean facial features. Their eye colors are very deep shades of blue, green, or red. Their many small modified molar teeth grow slowly and continuously. They have powerful hands with long, very tough fingernails.

Over the ages, the Valley People made several evolutionary adaptations to their agricultural their existence. Their long fingernails fit together, interlocking to turn their hands into specialized farming implements: tools for digging, sowing, harvesting, hulling, threshing, sifting, cutting, and pruning. They have symbiotic relationships with their crops and with several micro-organisms necessary for proper growth of the crops. These microbes live and reproduce in the intestinal tracts of the Valley People. With each bowel movement, some are secreted, and the waste becomes fertilizer specifically tailored to the tillage. This biological adaptation has so progressed that the colonic bacteria only can reproduce inside Valley People — and the crops cannot adequately live and grow without such bacteria. They are inter-dependent.

There are no seasons on Ringworld, so there is always plenty to do in the fields. As some plots are harvested, others are plowed and planted, and fallow tracts are re-fertilized. From a distance, the farms are beautiful multicolored patchwork quilts of blossoms, vines, tall stalks, bushes, rows of low plants, and bare soil. The diversity of smells is overpowering, an unforgettable olfactory maze of sublime fragrances and foul, fetid, suffocating fogs. Of note, the Valley People have a traditional process for generating methane from compost and fertilizer. Hollow vines conduct the natural gas into their dwellings. where it is used for occasional cooking, vegetable processing, and lighting.

Though vegetarians, the Valley People do keep several species of domesticated animals whose life-cycles are nearly as intertwined with the crops as their own. There is always a herd of yellow-striped havligs — prized for their tasty meat in many cultures, but used among the Valley People for their milk, weaving-hair, mineral-rich excrement, and post-harvest land clearing. Killing these symbiotic animals for any reason is unthinkable. Nearby groups of carnivorous hominids often consider the Valley People as insane, or as walking vegetables, and there are occasional conflicts. In defending its farmlands, this peaceful culture can prove furious and irresistible, especially when symbiotic animals are cleverly used in defense.

All Valley People till and tend the crops, regardless of sex or age. Their uniform, unchanging culture develops no formal political organization. There are no dominant or elected leaders. Periodically, the elders convene to discuss what problems arise, and to make decisions. During these sessions, much attention focuses upon the most minute variations in the crop cycles, the weather, and other agricultural factors.

The durable, traditional society of the Valley People is remarkable for its great variety of distinct language forms. The male children and female children have entirely different social language structures and vocabularies. They are mutually unintelligible, and by tradition the girls and boys make no attempt to learn one another's speech modes. The next level is the adult-parent language, which incorporates elements of both and is used when adults speak to children about non-farming subjects. Learning the combined tongue is one of the joys of child-bearing couples. There are two main complex languages: adult-farming and adult-social, These in turn have four subordinate but independent dialects: male-farming, female-farming, male-social, and female-social. Basic-farming, a tenth language, is understood by all; it has only 200 words. This general tongue is closest to the City Builder language in less remote areas. The Valley People regard with amusement, and sometimes contempt, outsiders who use only one language or who address them in a tongue improper to the circumstances.

VAMPIRES

Vampires are one of the most beautiful hominid species on Ringworld, and one of the most dangerous. They are slender and slightly taller than some of the races they attack, averaging 178 centimeters in height. The males and females are of equal stature, and they are equally pretty. Vampires have flawless pale white skin, like soft ivory. Their hair is silvery and full, framing exquisitely lovely faces. Fine red lips are set amid their sensitively-chiseled features. No Vampire has facial hair. Their bodies are nicely proportioned, trim, and lithe. They travel at night, naked and without weapons, hunting in pairs and in larger packs. Vampires do not look formidable — in fact they are compellingly attractive. They reach gently for you as they attack, without insistence and without fear.

These nocturnal carnivores prey almost exclusively upon other hominids. Their level of intelligence is very low: they are considered non-sentient by most other species. But more precisely, they rarely need to use the minimal intelligence they do possess. Close examination reveals that their elegant silver-white hair is a bit too thick on their heads, concealing a braincase markedly smaller than human. Their weapon is invisible, a biochemical. From exocrine glands in the throat and upper respiratory tract, they breathe out clouds of powerful pheromones, the super-stimulus chemical markers of human sexual readiness. These pheromones also emerge from sebaceous pores, and will pass directly (via the moisture of the prey's skin) into the bloodstream of the target. Even a person wearing a breathing-mask may be defenseless.

A single, gentle touch from a Vampire is enough to send most hominids into a frenzy of sexual abandon. The urge to mate with the beautiful, pale creature becomes irresistible, overwhelming all other desires, loyalties, and rational considerations. The need is immediate, frantic, and urgent. Most hominids would jump from a ten-story ledge, tearing away their clothing as they fell, if there were no other way to reach the Vampire. Pheromones are worse than a tasp — but a Vampire is worse than pheromones. Once in its ultimate sexual embrace, in a state of oblivious distraction, the Vampire pierces the prey's jugular vein with its sharp teeth and gorges on the fresh, warm, nutritious blood. Afterward, unless completely satiated, the Vampire will carefully slit open sections of the torso, neck and head, consuming certain organs, glands, and fluids. This ghastly ritual helps the Vampire to rapidly recharge its pheromone sacs.

Vampires are uncommon on Ringworld. In some regions they are nearly extinct. Every organized hominid culture loathes and fears them, especially those that consider rishathra abnormal. Despite all the campaigns of extermination waged against Vampires, no temperate region is entirely free of them. They pre-

VALLEY PEOPLE

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6	10-11	R Leg	0/7
MAS	2D6+3	10	L Leg	0/7
CON	3D6	10	Abdomen	0/7
INT	2D6+6	13	Chest	0/8
POW	3D6	10-11	R Arm	0/6
DEX	3D6	10-11	L Arm	0/6
APP	2D6+3	10	Head	0/7
EDU	negligible			

Age: 1 D4 on age table
Average HP: 21
Speed: 3m/im
Action Ranking: 5

ARMOR: Valley People rarely have nor use armor. Determine hit locations on the standard hominid hit location chart.

WEAPONS: If these pacifists are forced to fight, they may grab up farm implements or use their powerful claws, which they have a base chance to hit with of 20%.

Weapon	*Attack*	*Damage*
Claw	40%	1D6
Scythe	40%	1D8+3

COMMON SKILLS: Athletics/Climb 40%, Emergency Treatment 60%, Farming 100%, Fast Talk 20%, Hide 20%, Musicianship 40%, Observe 60%, Orate 20%, Scent 60%, Sneak 20%, Valley People Languages 60%.

VAMPIRES

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	2D6+6	13	R Leg	0/8
MAS	3D6	10-11	L Leg	0/8
CON	1D6+12	15-16	Abdomen	0/8
INT	1D6+2	5-6	Chest	0/10
POW	3D6	10-11	R Arm	0/7
DEX	3D6	10-11	L Arm	0/7
APP	2D6+12	19	Head	0/8
EDU	none			

Age: 1 D3 on age table
Average HP: 26
Speed: 4m/im
Action Ranking: 5

ARMOR: Vampires neither have nor use armor. Determine vampire hit locations on the standard hominid hit location chart.

WEAPONS: A vampire's most potent weapon is the ability to emit powerful sex pheromones, an attack rated as the vampire's CONx2 matched vs. the victim's CON on the resistance table. A successful attack causes the victim to go completely out of conscious control. The vampire prefers to bite and drink leisurely, taking several minutes to complete a repast. If the vampire's pheromone attack fails, it will release more and attack again on its next action rank. A vampire's bite does 1 D3 points of damage per impulse until the victim dies or the vampire is forcibly pulled away. This bite automatically works, and, since the victim is cheerfully pulling off any armor he possesses and exposing vital spots, the vampire automatically penetrates any armor, including natural armor. Vampires are capable of some limited actual combat, usually naturally only performed vs. non-hominid predators.

COMMON SKILLS: Archaic Weaponry 1 40%, Climb 60%, Hide 80%, Move Quietly 80%, Observation 80%, Scent 80%, Swim 40%, Tracking 40%

COMMUNICATION: Vampire intelligence is degenerate, and even those individuals with a capacity for thought almost never utilize it. There is no vampire writing or speech, though many believe that vampires communicate a range of emotions among themselves by means of pheromones. Some concepts are certainly expressed by posture, expression, and vocalization.

fer to stay close to clear, fresh running water; but lakes or even artificial pools are nearly as attractive to them. They are least likely to be found in deserts, plateaus, or smelly bogs far from City Builder centers. They bathe, if possible, before beginning the evening's hunt, since there are species whose extremely keen sense of smell can perceive a Vampire's approach. They bathe again before retiring at dawn, to clean themselves, and to remove traces of scent that might reveal their hiding places. In open territory, they may dig burrows in the topsoil or cover themselves in tall grass. Sparsely-wooded regions may provide them with hollow logs, shallow caves, or rocky overhangs. Ruined, abandoned cities are a favorite habitat for Vampires, particularly if there is water. Other ready-made refuges might be deserted boats or broken dredges near the shores of lakes or shallow seas. There are rumors of a salt-water Vampire species, as yet unsubstantiated.

The City Builders are much to blame for the widespread distribution of Vampires on Ringworld, for they manufactured a Vampire-scent perfume for use in rishathra — both to enhance the pleasure and to conclude favorable bargains with unsuspecting representatives of other species. Vampire-scent is still a favorite tool and indulgence of City Builders where their culture survives. They occasionally maintain toothless Vampire pairs as breeding stock to ensure a supply of pheromone aphrodisiac. Rarely and secretly, defanged Vampires themselves are used in rishathra by elderly, rich, perverted decadents. To many hominid species, this is repellent and disgusting; but the practice is by no means limited to City Builders. Periodically, captive breeding pairs escape, re-populating the surrounding territory. Vampires breed prodigiously. They usually have permanent mates, making them even more of an abomination to those hominids with traditions of marital fidelity. The epithet "Vampire-lover" is one of the most vicious and slanderous insults used on Ringworld, even by City Builders.

Never underestimate the power of Vampire pheromones. City Builders are as skilled at the use of the scent to condition the behavior of outsiders as Puppeteers are at manipulating tasps. Even corpses left by Vampires are dangerous: for several hours there may be enough residual chemical vapor to overcome the most cautious of passers-by. Ghouls detest Vampires, for reasons not detailable here.

It must be stressed that Ringworld Vampires are nocturnal hunters. A species of hominid distantly related to humanity through the Pak breeder, they are not supernatural beings, and no flatlander should be so foolish as to expect garlic cloves or quaint religious paraphernalia to afford any protection against them. Similarly, a stake driven through a Vampire's heart certainly need not be made of ashwood. Although Vampires sleep during the day, sunlight will prove no barrier if they are disturbed. Their habit of hunting at night is a protective adaptation, not the result of a Satanic curse.

A Vampire becomes sentient after undergoing the Protector-change brought about by Tree-of-life root. Perhaps the legend of an immortal Vampire who haunted the Grass Giants for a thousand falans is based on such a transformed creature.

Other brainless meat-eaters hunt at night on Ringworld, preying on unwary hominids — but these should not be confused with Vampires. Small and often pitch-black, such creatures kill with tooth and claw alone: they do not possess the incredible biochemical powers of the Vampires.

Vampires (description p. 34) — this pair looks innocent enough, even beautiful, but beware their infamous vampire-scent that drives other hominids mad.

ANIMALS

BOGWORM

Bogworm Description

Bogworms are either fully aquatic, found in lakes, streams, and oceans; or partially aquatic, found in swamps and marshes. They are awkward on land, though they can slither rapidly along in swamps or soft mud, and are excellent swimmers.

Bogworms range in length from half a meter to 1 5 or more meters in length. A typical specimen is about 4m long. They are covered with hard yellowish plates. Their apical maws bristle with sharp spiny teeth. Their mouths and bodies are flexible enough to swallow objects wider than their normal body width.

If a bogworm's bitten victim is smaller than half the bogworm's MAS, it will hang on and attempt to swallow him. This process takes one of the bogworm's action rankings per 6 points of the victim's MAS. While being swallowed, the victim's actions are constrained, and all his skills are at half normal chances for success. Once swallowed, the victim can take no actions, and receives 1 D6 points of damage per impulse to general hit points from

Immature Bogworm **(1m long)**

Char.	Range	Average	
STR	1D8	4-5	Average Hit Points: 11
CON	2D6	7	Speed: 1 (land)/3 (water)
MAS	1D6	3-4	Action Ranking: 4
POW	1D6	3-4	
DEX	2D6 + 6	13	

ARMOR AND HIT LOCATIONS: 3 point hide, plus resistance to sonics

Location	D20	Armor/Average HP
Hind Body	01-06	3/4 (.30)
Mid Body	07-14	3/4 (.35)
Fore Body	15-20	3/4 (.30)

Weapon	Attack%	Damage
Bite	30%	1D6

SKILLS:Swim 200%

Adult Bogworm (4m long)

Char.	Range	Average	
STR	4D6+12	26	Average Hit Points: 42
CON	3D6 + 9	19-20	Speed: 2 (land)/4 (water)
MAS	3D6+12	22-23	Action Ranking: 4
POW	3D6	10-11	
DEX	2D6 + 6	13	

ARMOR AND HIT LOCATIONS: 8 point hide, plus resistance to sonics

Location	D20	Armor/Average HP
Hind Body	01-06	8/13 (.30)
Mid Body	07-14	8/15 (.35)
Fore Body	15-20	8/13 (.30)

Weapon	Attack%	Damage
Bite	60%	1D6 + 2D6

SKILLS: Swim 200%

Very Large Bogworm (15m long)

Char.	Range	Average	
STR	6D6 + 42	63	Average Hit Points: 100
CON	4D6 + 30	44	Speed: 3 (land)/6 (water)
MAS	4D6 + 42	56	Action Ranking: 4
POW	4D6	14	
DEX	2D6 + 6	13	

ARMOR AND HIT LOCATIONS: 24 point hide, plus resistance to sonics

Location	D20	Armor/Average HP
Hind Body	01-06	24/30
Mid Body	07-14	24/35
Fore Body	15-20	24/30

Weapon	Attack%	Damage
Bite	90%	1D6 + 6D6

SKILLS: Swim 200%

TABLE OF CREATURE HABITATS

deserts	*forests*	*hills*	*marsh*	*mountains*	*plains*	*ruins*	*water*	*domesticated*
	dendrobrach	dar'los	bogworm		breakneck	razor-wasps	bogworm	breakneck
	doublescream	razor-wasp	doublescream		dak-dak		flob	dar'los
	hueti		flob		dar'los		wrillabee	havlig
	zongo				razor-wasp			hueti
					sarkbeste			sarkbeste
					zanjii			

Rumored, Unidentified Creatures

deserts	*forests*	*hills*	*marsh*	*mountains*	*plains*	*ruins*	*water*	*domesticated*
chiller	anxaoma	chiller	anxaoma	chiller	bloath	chiller	stigfish	bloath
jibber	bloath	dusk devil	chiller	greldik	dire	dusk devil		daukoon
	bushcanker	loper	dusk devil	loper	dusk devil	goron		haemont
	daukoon	munil	pilk	onik	haemont	varmont		loper
	dire	snorter	varmot	rimspinner	loper			pilk
	dusk devil	varmot			munil			rimspinner
	loper				pilk			snorter
	trembler				snorter			varmot
	varmot							vindwight

MOUNTAINS: means above tree line — otherwise see Hills

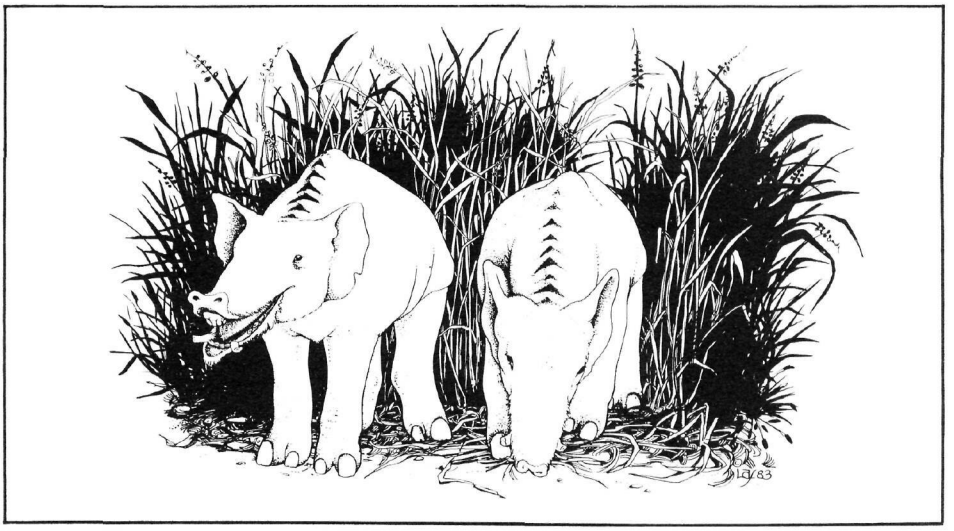
FOREST: includes jungle

RUINS: creatures may be found on abandoned floating cities or buildings as well as surface ruins.

DOMESTICATED creatures that do not appear on any other chart are only found where there are domesticators — nowhere else.

suffocation, digestive acid, throat teeth, and general inanition.

Bogworms are remarkably resistant to sonic attacks. For purposes of sonic attacks only, treat their MAS as if it were four times greater than it is. A bogworm with a MAS of 10 behaves as if it had a MAS of 40 versus a sonic stunner or similar weapon.



Zanji (description p. 42) — pictured to right two zanji dig for tasty roots and tubers.

BREAKNECK

Char.	Range	Average	
STR	3D6+12	22-23	Average Hit Points: 43
CON	3D6 + 6	16-17	Speed: 13m/im
MAS	4D6+12	26	Action Ranking: 3
POW	2D6	7	
DEX	3D6 + 6	16-17	

ARMOR AND HIT LOCATIONS: 3 point skin on legs, 5 point quills elsewhere

Location	D20	Armor/Average HP
Right Leg	01-03	3/11 (.25)
Left Leg	04-06	3/11 (.25)
Body	07-12	5/18 (.40)
Right Arm	13-15	5/13 (.30)
Left Arm	16-18	5/13 (.30)
Head	19-20	5/11 (.25)

Weapon	Attack%	Damage
Plume Wrap	60%	entangle (see below)
Kick	50%	1D10 + 2D6 (see below)

NOTES: A victim struck by the Plume Wrap must succeed in a dodge roll, or he is caught until he can overcome a STR of 1 5 with his own STR on the resistance table. He may try once per action ranking.

The breakneck's Kick attack automatically hits anything caught in the plumes. The breakneck gets one attack per action ranking. The usual tactic is to grab with its Plume Wrap until it strikes, then kick. Prey too strong to overcome with the Plume Wrap will just be kicked.

SKILL: Athletics/Run 250%, Observation 60%

DAK-DAK

Char.	Range	Average	
STR	3D6+30	40-41	Average Hit Points: 61
CON	3D6+10	20-21	Speed: 9m/im
MAS	3D6 + 30	40-41	Action Ranking: 5
POW	2D6	7	
DEX	3D6	10-11	

ARMOR AND HIT LOCATIONS: 6 point hide

Location	**D20**	**Armor/Average HP**
Right Hind Leg	01-02	6/16 (.25)
Left Hind Leg	03-04	6/16 (.25)
Hindquarters	05-09	6/22 (.35)
Forequarters	10-14	6/22 (.35)
Right Fore Leg	15-16	6/16 (.25)
Left Fore Leg	17-18	6/16 (.25)
Head	19-20	6/19 (.30)

Weapon	**Attack%**	**Damage**
Kick	**60%**	**2D6 + 6D6**

SKILLS: Listen 80%, Swim 60%

Description

Dak-daks are lean herbivores found in grasslands and river valleys, as well as in rugged brushy lands with good water supplies. They have clawed and splayed feet, and the forelegs are noticeably longer than the hind limbs. Dak-daks at rest maintain a pigeon-toed

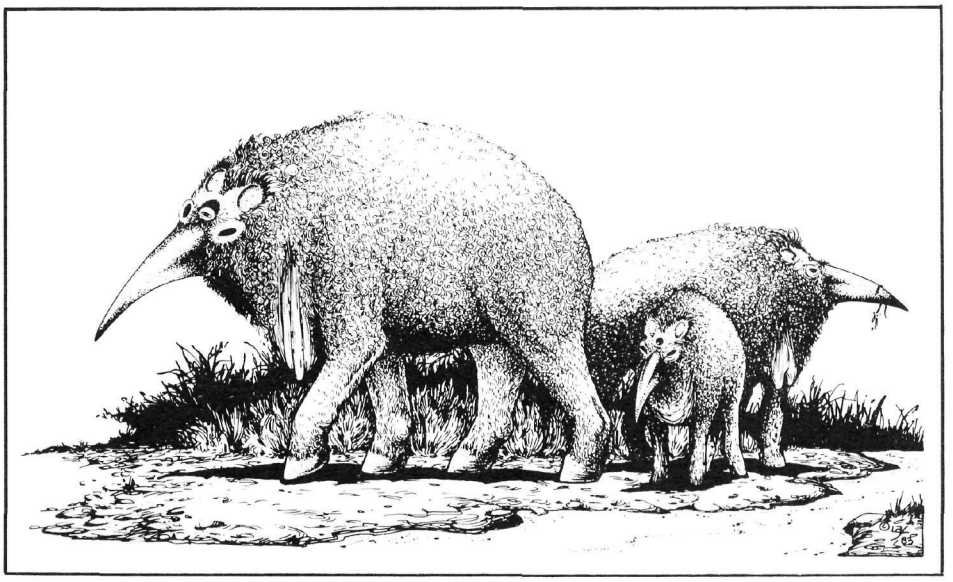
Breakneck Description

Breaknecks are bipedal plains-dwellers. They stand up to 3 meters tall and are covered with thin greenish-yellow spines or quills. Their legs are long, slender, and tough-skinned, terminating in sharp, hoof-like claws. Breaknecks have short necks with tiny heads almost entirely devoted to a wide, toothy mouth. A pair of winglike appendages fringed with tough, meter long, feather-like scales extend from the sides of their bodies.

Breaknecks seem to have only two movement rates: dead stopped, and racing full speed ahead. They never move slowly.

Breaknecks are carnivorous. Small animals such as hueti and occasional larger prey such as doublescreams are normal food. When hunting, the breakneck tries to fold the victim in its long, plumed arms to tangle it and prevent escape. The breakneck then kicks the trapped prey until it is stunned or slain, then rips it apart and devours it.

Breaknecks are often found in small family bands. They can be domesticated, and sometimes are trained as watchdogs or fighting beasts.



Sarkebestes (description p. 41) — shown here in a family grouping. Sarkebestes have only one eye, situated in the midst of their 'forehead' and flanked by their two nostrils.

crouch. The feet have long sharp dewclaws used to dig, in defense, and in mating fights. A dak-dak is 2-3 meters high at the shoulder, though it is less than a meter thick through the widest part of the body. Dak-daks have bluish-gray bare skin, except for a bristly mane down the dorsum of the neck and withers and a fringe atop the tail. A streamlined skull with a bony half-beak surmounts an underslung lower jaw. The creatures have a characteristic bark which is recognized as a warning signal by many other animals.

Normally, dak-daks are found in small family groups. During the breeding season, these groups accumulate into large herds which remain near reliable water supplies for a prolonged time. Expectant females enter the water to bear a large translucent pod which must remain immersed for two to three days. The mother guards it diligently. After the immersion period, the infant dak-dak bites its way free, but continues to need large supplies of water, and must stay near it at all times. They become capable of living in the open plains in about 9 falans, at which time the herds break up and roam the savanna again. New spawnings occur every 20 falans, though the exact season varies from herd to herd. Immature dak-daks are energetic and frisky, spending considerable time splashing through the water and flinging strands of water-plants about in play. They will always plunge into the water to escape predators, barking and squealing fright to bring adults to the rescue.

The young often wander out of the adults' sight, but not earshot. An unwary explorer could be badly surprised if he were to frighten or capture a young dak-dak in the belief that it were an adult, only to have its gigantic parents galumph into sight to rescue their youngling.

DAR'LOS

Char.	Range	Average
STR	1D2	1-2
CON	2D6	7
MAS	1	1
POW	2D3	4
DEX	3D6 + 12	22-23

Average Hit Points: 8
Speed: 5m/im
Action Ranking: 2

ARMOR AND HIT LOCATIONS: no armor

Location	D20	Armor/Average HP
Body	**01-20**	**0/8 (1.00)**

Weapon	Attack%	Damage
Bite	25%	1D3
Claws	35%	1D2

NOTE: only one attack per action ranking

SKILLS: Listen 150%, Observe 150%, Scent 150%

Dar'los Description

The dar'los is a small ubiquitous animal found across the plains of Ringworld. They are quite small, weighing no more than 5 kg at the heaviest. They have vaguely rodent-like faces, with six limbs, and are quite fast for their size. The hind legs are three-toed, and the front and central pairs of legs are four-toed. All legs have curved claws. The bodies are covered with short fur, and there are three main color variations of these animals.

They have extremely keen senses of smell, hearing, and sight. Their tastes are catholic, feeding on fruits, nuts, large insects, and succulent plants. Dar'los live in groups of about 50 in the wild, and weave communal homes out of grass and mud. When the cool or dry season comes, they dig holes deep into the ground, build nests, and keep warm. They mate only once every 1 5 falans, during the cool season. Females, recognizable by their single horn (males have two), usually give birth to twins. A dar'los lives for about ten UNS years.

Dar'los are easily trainable, and make excellent pets. A dar'los will keep one's house or tent free of all sorts of insects and pests, requiring little upkeep. Some hominids consider it bad luck to harm a dar'los, while others regularly feed upon them.

In the wild, dar'los prefer well-drained, grassy slopes on which to build their homes and in which to dig their nests. At any one time, several males stand watch over the communal residence. When danger seems to threaten, they emit a shrill, partially supersonic whine as a signal. Large predators who trespass or who attempt to break into a nest or burrow may be attacked and mauled by the entire family, who creep out of the many side entrances and assemble in the tall grass, then spring as one.

DENDROBRACH

Adult Dendrobrach

Char.	Range	Average
STR	3D6+12	22-23
CON	3D6	10-11
MAS	3D6+12	22-23
POW	2D6	7
DEX	3D6 + 6	16-17

Average Hit Points: 33
Speed: 2 (ground)/4 (trees)
Action Ranking: 3

ARMOR AND HIT LOCATIONS: 2 point fur

Location	D20	Armor/Average HP
Tail	01-02	2/9 (.25)
Right Lower Brach	03-04	2/9 (.25)
Left Lower Brach	05-06	2/9 (.25)
Lower Body	07-10	2/12 (.35)
Upper Body	11-14	2/12 (.35)
Right Upper Brach	15-16	2/9 (.25)
Left Upper Brach	17-18	2/9 (.25)
Head	19-20	2/10 (.30)

Weapon	Attack%	Damage
Bite	60%	2D6 + 2D6
Claw	90%	1D6 + 2D6

NOTES: at the end of each action ranking, a dendrobrach can attack with up to three claws simultaneously, and then bite one impulse later. All attacks must be against a single target. Any special successes permit the dendrobrach to double the damage it does (not counting its damage modifier).

SKILLS: Climb 100%, Hide 95%, Sense Movement 100%, Sneak 80%

Larval Dendrobrach

Char.	Range	Average
STR	1D10	5-6
CON	2D6 + 6	13
MAS	twice STR	10-12
POW	2D6	7
DEX	3	3

Average Hit Points: 24
Speed: 1m/im
Action Ranking: 7

ARMOR AND HIT LOCATIONS: 4 point head plates, none elsewhere

Location	D20	Armor/Average HP
Rear Body	01-05	0/6 (.25)
Mid Body	06-12	0/8 (.30)
Fore Body	13-17	0/8 (.35)
Head	18-20	4/10 (.40)

Weapon	Attack%	Damage
Bite	50%	1D8

SKILLS: Hide 25%, Sense Movement 70%, Sneak 25%

Dendrobrach Description

An adult dendrobrach weighs 1 50 to 200 kg, and can reach a height of 2.5 meters. The dendrobrach has a thick, rectangular body. At one end are two brachs (arms) and between them an eyeless 'head.' At the other end are three brachs, one of which is clawless and

called the 'tail.' All limbs are heavily muscled and jointed to move freely in all directions. Each brach terminates in a long, prehensile toeless paw, with a long band of toughened integument beneath for gripping. On the dorsal side of each brach, at the base of the sock-like 'hand,' is a pair of long serrated barbs or claws used for spearing and ripping prey. A dendrobrach's head is narrow and bare of all features besides the terminal mouth, edged with razor-like dental plates.

The body is covered with fine green hair, kept clean and loose through constant grooming with the claws. Male dendrobrachs are some 50 kg smaller than the females (and roll only 2D6 + 12 for STR and MAS) and have a bluish swelling at the base of the throat.

The fur-like filaments covering the body of the dendrobrach are highly sensitive to air currents, and serve as the animal's major sensory system. A dendrobrach can sense nearby motion, comprehending the direction, distance, speed, and approximate size of the moving creature. Dendrobrachs are also highly sensitive to sound, receiving audible vibrations through certain long bristles anchored into their skulls and protruding from their heads. Dendrobrachs cannot easily pinpoint a sound's source, but are attracted to noises, and once close will use their air-current sense to detect movement. The air-current sense is quite short-range, and cannot detect normal movement at a greater distance than 10-20 meters. If the wind is blowing from a dendrobrach toward potential prey, the animal cannot sense the prey at a distance over 5 meters. Dendrobrachs have excellent hearing.

Females possess a long horny ovipositor, normally withdrawn into the body, but capable of being extruded from the animal's mouth. During mating, the creatures lock mouths, and the female extends her ovipositor into the male's throat, puncturing his spermathecum (the swelling at the base of his throat), and siphoning up gene material. Then the female kills and devours the male. Several falans later, the female begins to drill holes in suitable trees with her ovipositor, laying a fist-sized egg in each hole. After laying 20 to 100 eggs, the female dies.

Each egg hatches into a thick-bodied wormlike animal with a horny plated head and chisel-like tooth-plates. The larva will burrow within the trunk of its tree until it is completely hollowed out, then migrate to another tree. Only one dendrobrach larva is ever found in a single tree, since both females and larvae chemically mark their trees, thereby alerting other ovipositing females and wandering larvae. Larvae are sometimes seen crawling across the forest floor on a pilgrimage to a new tree. They will stoutly defend themselves if attacked, slashing and biting with their tooth-plates.

If a hollow tree containing a large dendrobrach larva is rapped or leaned against involuntarily, the larvae within may react violently, suddenly bursting through the thin bark and snapping at whatever has disturbed it. Hence it is dangerous to sleep near a tree in dendrobrach forests. The safest procedure is to rap any tree near the campsite. If a tree is hollow, quickly move away and find another campsite before the larva can react, or else kill all larvae near the campsite.

In their lifetime, a dendrobrach larva will hollow out (and kill) 3-4 trees; one in their first 70 90 falans of life; the second in the next 20-40 falans; and the third (and possibly a fourth) in the last 10-20 falans, as the creature nears its full growth.

On reaching full size, the larva will become quiet within its tree, and metamorphose over a period of 3-4 falans into an adult. The adult, if a female, must then feed upon as much protein as possible to prepare for egg-laying. The amount of protein she has stored directly determines the number of eggs laid.

Adult dendrobrachs are arboreal predators. They make their living by ambushing and killing ground-dwelling animals. When hunting, the animal lurks on a tree limb over a trail, using its naturally tree-like color and texture as camouflage. When prey of suitable sizes comes by, the dendrobrach senses it and drops from above. It will hang onto its branch with one or two limbs, spearing and clutching its prey with the rest. If the prey resists vigorously, the dendrobrach will also rip it with bites. It then will lift the still-struggling prey animal into its tree and finish killing and devouring it in the tree top, safe from retribution. Dendrobrachs come to the ground only when they must eat a prey animal too large to lift into the tree. They are nervous at surface level.

Adults are fierce, often attacking prey larger than themselves, though only rarely will they attack large groups of prey animals. They are known to assault and kill hominids. For game purposes, roll 1 D6 whenever a party of humans passes a lurking dendrobrach. If the die roll equals or exceeds the number of humans, the dendrobrach will attack, and it will attack on a roll of 6 in any case.

Dendrobrachs sometimes hunt small arboreal animals such as arch-squirrels or clawbirds (statistics not provided), but generally lack the agility to catch lesser animals. Dendrobrachs are leisurely in their progression through the trees, and only move quickly when striking at prey or protecting themselves.

These predators live but a single Ringworld year as an adult (approximately 30-50 falans or 400-650 UNS weeks), breeding once and then dying. The females are much more aggressive than the males. Males are only found in the rainy seasons, and are either killed by females or die in the dry season.

Dendrobrachs live only in dense jungles where the temperature is warm and the humidity high. Their planet of origin is unknown. Dendrobrachs live in at least one huge rain forest on Ringworld, which is some five million square kilometers in extent, and blends into surrounding more lightly forested areas. No large tribes of hominids are able to dwell in the same habitat as the ferocious dendrobrachs.

Because of the larval burrowing, a bad dendrobrach outbreak can denude thousands of square kilometers of forest, killing millions of trees. Such outbreaks occur every 30-40 UNS years in dendrobrach habitats. After these outbreaks, their numbers fall back to their normal level.

Adult dendrobrachs have no enemies except for a few hominids. Larvae are preyed upon by a number of wood-boring animals; when crawling across the forest floor, they are quite vulnerable. Larval dendrobrachs are edible, and some hominids prize them as food — possibly only because they are so difficult to harvest.

DOUBLESCREAM

Char.	Range	Average	
STR	2D6+10	17	Average Hit Points: 39
CON	3D6 + 6	16-17	Speed: 2m/im
MAS	3D6 + 12	22-23	Action Ranking: 6
POW	2D6	7	
DEX	2D6	7	

ARMOR AND HIT LOCATIONS: 4 point hide

Location	D20	Armor/AverageHP
Tail	01-02	4/12 (.30)
Right Hind Leg	03-04	4/12 (.30)
Left Hind Leg	05-06	4/12 (.30)
Hindquarters	07-10	4/14 (.35)
Forequarters	11-14	4/14 (.35)
Right Fore Leg	15-16	4/12 (.30)
Left Fore Leg	17-18	4/12 (.30)
Head	19-20	4/12 (.30)

Weapon	Attack%	Damage
Scream	Auto.	1D3 at point-blank range, 1 point within 10 meters
Claw	40%	1D6 + 1D6

NOTES: can scream on every impulse, and claw once per action ranking simultaneously

SKILLS: Climb 70%, Observation 50%, Swim 40%

Doublescream Description

Doublescreams live in forests and woody swamps. They are lizard-like, with bloated round stomachs and hard, shark-like brown skin. Weirdly-distorted funnels and convoluted flanges cover their short-snouted heads. Their mouths have blunt, harmless teeth and a prehensile tongue. They have sharp long claws and a prehensile tail. Despite their rather fearsome appearance, they are herbivores, feeding on fungi, low fleshy growths, and roots.

Multiple vocal cords and their array of sound-modifying funnels and air passages allow them to produce a wide variety of chord-like sounds which often sound like several different animals calling at once, in harmony. Doublescreams call to express frustration, attract mates, announce rich food sources, threaten rivals, and warn intruders. When cornered by an enemy, they will use an extremely powerful screech which will mask all

other nearby sounds and hurts the ears. Within a radius of 10 meters, this amplified sonic shout will inflict a point of damage each impulse (including vs. other double-screams). If directed at a single foe within 3 meters, that foe will receive 1 D3 points of general hit point damage each impulse (this is in addition to the regular radius effect).

The shrieks of the doublescream are curiously unlocalized, and they cannot be easily tracked by sound unless an electronic sound-pinpointer of some type is used, or a special success in a Listen roll is received.

FLOB

Char.	Range	Average	
STR	N/A	—	Average Hit Points: 5
CON	1	1	Speed: windspeed
MAS	1D6	3-4	Action Ranking: N/A
POW	1D3	2	
DEX	N/A	—	

ARMOR AND HIT LOCATIONS: no armor

Location	D20	Armor/Average	HP
Balloon	01-18	0/2	(.25)
Body	19-20	0/5	(1.00)

NOTES: flobs have no effective attacks, but will burst into flame if exposed to high temperatures.

Flob Description

Flobs are living gas balloons. Different species come in different colors, including pale green, beige, light gray, white, light blue, and bright red. Most are light blue or white. They range in size from tiny organisms only a few cm across to monstrous swollen bulbs over 3 meters across. A swelling at the bottom of the float holds the body, vital organs, a single black eye, and a long, coiled tentacle. A flob's tentacle is generally at least 20 times longer than its gasbag's diameter, so a 1-meter-diameter flob has a tentacle 20 meters long. This tentacle is supported with its own sleeve of hydrogen gas and requires minimal musculature to move.

Flobs have no directional control over their movements, though they can rise or fall slowly at will. They are normally found near lakes, oceans, and other watery spots, but can drift hundreds of kilometers away from their normal habitats.

A flob begins life as a tiny aquatic eft. The young efts are gaudy and resemble flattened colorful slugs. The eft normally hangs from a mass of secreted bubbles at the water surface, feeding on organisms caught by long sticky threads of protoplasm. Most of the life cycle is spent in this stage, either free-swimming or clinging to its bubble-mass. After a variable length of time it reaches adulthood, ceases to feed, and begins to inflate its gasbag with impure hydrogen synthesized from the water. When enough hydrogen has been accumulated, the flob drifts into the air. Its long hollow tentacle sucks up more water for metabolic processes and synthesizing more hydrogen.

The first flob to emerge in an area emits a signalling pheromone which triggers all nearby adolescent flobs to mature and emerge within a few days. Flobs mate while airborne by extruding tentacles and exchanging genetic material with their kin. After drifting for several days, a mated flob will begin to lose hydrogen and sink. It can no longer rise, but can increase its rate of fall. When over a large body of water, a ripe flob will release all its hydrogen at once, fall into the water, and release hundreds of spores from an internal node. These start the life cycle all over again while the parent flob dies.

The length of the life cycle varies with the size of the adult, ranging from up to 6 falans for the largest species down to 10-20 days for the smallest.

If a flob is exposed to flame or high heat, it will explode in a bright blue flash doing 1 D6 damage for each point of MAS it has to all within 3 meters, and one third that to all within 10 meters.

HAVLIG

Char.	Range	Average	
STR	3D8	13-14	Average Hit Points: 21
CON	3D6	10-11	Speed: 5 (hop)/10 (leap)
MAS	3D6	10-11	Action Ranking: 3
POW	2D6	7	
DEX	2D6+12	19	

ARMOR AND HIT LOCATIONS: 1 point hide

Location	D20	Armor/Average	HP
Tail	01-02	1/6	(.25)
Right Leg	03-05	1/8	(.35)
Left Leg	06-08	1/8	(.35)
Abdomen	09-12	1/8	(.35)
Chest	13-16	1/7	(.30)
Right Arm	17	1/5	(.20)
Left Arm	18	1/5	(.20)
Head	19-20	1/7	(.30)

Weapon	Attack%	Damage
Kick	25%	2D8+1D3

SKILLS: Jump 200%, Observe 40%, Scent 40%

Havlig Description

Havligs, or jumpers, are placid, fecund animals frightened only by loud noises. Some species are found solely in the wild, while others are herd animals belonging to various tribes. Havligs are strictly herbivorous, feeding on giant grass, bushes, and sometimes tough cactus.

Adult havligs are between 1 and 2 meters tall, and are rodentlike in form, but with oversized hind legs. All havligs are hairless, with grotesquely wrinkled hide. They normally move by hopping, and can leap over 10m at a bound, and maintain such a pace for a kilometer or more.

Identical triplets are born to each female every six falans or so. The infants are fed on regurgitated tablets of matted vegetable matter. The infants cling to their mothers back for one or two falans, until they reach at least 10 kg in size, then drop off and become independent. In seventeen falans, they attain maturity.

HUETI

Char.	Range	Average	
STR	1D3	2	Average Hit Points: 8
CON	1D10	5-6	Speed: 1m/im
MAS	1D3	2	Action Ranking: 7
POW	2D3	4	
DEX	1D6	3-4	

ARMOR AND HIT LOCATIONS: no armor

Location	D20	Armor/Average	HP
Body	01-20	0/8	(1.00)

Weapon	Attack%	Damage
Bite	20%	1D3

Hueti Description

Hueti are small animals with long slender heads and necks and no visible ears. Their four legs are stubby, muscular, and scaled, and each is tipped with seven fossorial claws. The thick, oval body ends in a thick, spike-like tail, used as a brace or prop while digging. Their skin is soft and thin, except on the digging surfaces.

Hueti are native to woods and cool rainforests. They subsist on succulent plant roots, smaller animals, and windfall fruit. Their bare skin has no set color, but is always the same hue as whatever color is directly under the base of their neck, where a tone-sensing organ is located. The hueti range covers brown, green, dull red, gray, black, off-white, and slate-blue, as well as mixes of the above. A hueti can reproduce simple regular patterns, such as spots, stripes, or even a checkerboard pattern. It takes only a few seconds for a hueti to complete a change.

Hueti live in small woodland colonies of from a single individual up to three dozen. Every few falans, for unknown reasons, a

colony will migrate to another site, often up to 50 km away.

Hueti can be easily tamed, but do not breed well in captivity. They are popular pets, and hominids often fit transparent colored tape over the creature's tone-sensing organ, affixing the color pattern to that of the tape until it is removed.

RAZOR-WASP

Char.	Range	Average	
STR	1	1	Average Hit Points: 3
CON	1D3	2	Speed: 1 (crawl)/9 (flight)
MAS	1	1	Action Ranking: 2
POW	1D3	2	
DEX	1D3 + 20	22	

ARMOR AND HIT LOCATIONS: 1 point shell

Location	D20	Armor/Average HP
Body	01-20	1/3 (1.00)

Weapon	Attack%	Damage
Slash	40%	1D6

NOTE: A special success on the slash permits it to do 2D6 damage to the target instead of 1D6. In a typical assault, 20 or more wasps will attack simultaneously, then zoom away to return in another action ranking with another attack. This process continues until the foe retreats or is slain.

SKILLS: Dodge 90%, Fly 400%, Observation 90%

Razor-Wasp Description

Razor-wasps are insectoid, twelve-limbed animals which range from 5 to 15 cm in length. They are found in fields or plains in temperate or tropical climates. The different species of razor-wasps are associated with specific flora.

A razor-wasp's streamlined body glistens black or blue-green, and is usually marked with a bright metallic pattern, varying from species to species. Three pairs of wings of differing lengths permit precision flying, including the ability to hover, rise vertically, and fly backward. They have triangular heads with a single horseshoe-shaped eye arched over the top. The front two pairs of the legs are used solely to groom the animal.

Their name derives from a sharp blade-like appendage which can be extended from a groove in the abdomen. This blade is used both for defense and to slit open plant stems. At irregular intervals, wasps will inject microscopic first-stage larvae into specific host-plants. The larvae reach maturity in the plant's roots and emerge. They then emit a chemical attractant which beckons the adult wasps to carry the grub to the nest.

The nests are built in caves, hollow trees, and ruined dwellings. They are huge mounds of vegetation riddled with tunnels, openings, tubes, and funnels. Hundreds of maturing second-stage larvae creep about inside. Adults crawl through the mound to make new passages, carry off decaying plant matter and larval excreta, and bring in fresh leaves and stalks. The second-stage larvae drip a sour exuviate which is the adults' sole food. The vegetation used for nest mounds and feeding the second-stage larvae is never the same species as that parasitized by the first-stagers.

A wide variety of predators feed on razor-wasps. Some detect the emergence pheromone of the first-stage larvae and race to reach and devour the tiny grub before the parent arrives. Others emit their own pseudo-attractant and feed on the adult wasps to it. Some heavily-armored carnivores plunge into the wasps nest, root through the mounds of vegetation, and devour dozens of grubs and adults. Some herbivores enter razor-wasp nests to feed happily on the piles of vegetation there.

Nevertheless, razor-wasps have a feared defense. When aroused, the wasps zoom toward an opponent, extrude their scalpel-sharp blades, and slash the foe as they past. Since dozens of wasps attack simultaneously, only the hardiest or subtlest predators or herbivores will persist in the face of this onslaught. A hominid caught in a razor-wasp attack would die swiftly and horribly.

Sarkbestes are not extremely aggressive, but will defend themselves from predators, and are quite protective of their young. Sarkbestes use their long (over half a meter) rostrums to spear enemies. In addition, the rostrum is used in mating rites and to plow up soil to get at roots or water. It can be a deadly weapon.

In the presence of minute quantities of carbon monoxide (a by-product of combustion), sarkbestes go berserk. They will then insensately charge anything they see moving, except other sarkbestes. When so enraged, an entire herd of these animals will often stampede, oblivious to what lies before them. If the carbon monoxide concentration is large, they may remain enraged for as long as a day after leaving the area of the gas, but normally they calm down within an hour after the gas dissipates.

When blinded by such a frenzy, the beasts will travel for many kilometers until the entire herd is exhausted. Under natural conditions, the only source of carbon monoxide on the savanna is prairie fires. The large amount of carbon monoxide produced by such a conflagration suffices to send entire herds rampaging for extended periods. An ordinary cooking fire would only bring a few nearby beasts into a fury. However, even a single enraged sarkbeste could prove disastrous to a small encampment.

Sarkbeste herds are arranged with the immature and pregnant animals in the center. On the outskirts of their large herds are found groups of other grazing animals and predators.

Sarkbestes have but a single sex. They will breed only after a prolonged carbon monoxide enragement — evidently to allow the vulnerable young to be spawned some time after the prairie fire season. In mating, a sarkbeste will gash the flanks of its chosen mate with its rostrum, then implant spores into the wounded flesh with a tentacle-like organ extruded from its left nostril. Its mate then performs the same operation on it. The wounds quickly seal, and the spores germinate, swelling enormously, and creating great unsightly tumors on the sides of the pregnant animals. Approximately 5 falans after mating, the tumors burst open, and infant sarkbestes drop out, one from each tumor. In only a few hours, the calves are able to stand and graze with the rest. A newborn

SARKBESTE

Char.	Range	Average	
STR	3D6 + 18	28-29	Average Hit Points: 52
CON	2D6 + 10	17	Speed: 6m/im
MAS	3D6+24	34-35	Action Ranking: 6
POW	2D6	7	
DEX	2D6	7	

ARMOR AND HIT LOCATIONS: 5 point tough hide

Location	D20	Armor/Average HP
Right Hind Leg	01-02	5/16 (.30)
Left Hind Leg	03-04	5/16 (.30)
Hindquarters	07-12	5/21 (.40)
Right Fore Leg	13-14	5/16 (.30)
Left Fore Leg	15-16	5/16 (.30)
Forequarters	17-20	5/21 (.40)

Weapon	Attack%	Damage
Ram	50%	2D8 + 4D6
Trample	75%	8D6 to prone foe

NOTES: can ram once per action ranking. Alternatively, can trample once per impulse vs. downed foes .

SKILLS: Observe 75%, Scent 50%

Sarkbeste Description

As adults, these large herding animals weight approximately a metric ton each, and stand about 1.8 meters at the shoulder. They are quadrupeds, with a thickly-ovoid body with two tapering legs at either end. Sarkbestes have no obvious head. A protrusible mouth is located between the two forelegs and, above that, in line with the body's long axis, is a long, sharp rostrum. Some 25-30cm above the rostrum is a single faceted eye, flanked by two moist nostrils. Above the eye and to the sides are a pair of tympani. The sarkbeste is covered by curly yellow fur and is tailless. Its feet terminate in triangular hooves.

Sarkbestes cannot see sharply, though they can detect motion well. They can hear quite well with their frontal tympani, and they have a selectively excellent sense of smell. Their mouths are complex. Normally, all that is visible is a wrinkled sack of skin between the forelegs. When grazing, disturbed, or grooming young, a long thick tube extrudes from this area. This tube is a glistening yellow and about twice as thick at the base (between the forelegs) as at the end. It terminates in a semi-circular rasping mouth which is slowly swung back and forth over the turf in feeding.

They are always found in large herds, ranging size from 1000 to over a billion beasts. They migrate ceaselessly over enormous territories, taking UNS decades to complete their migration cycles.

calf weighs only 20-30 kg. It will grow slowly, reaching its full size in 4-6 UNS years. A young sarkbeste can run as swiftly as an adult, and has disproportionately long legs. They lack the adult's endurance, though, and cannot keep pace for long.

An adult usually holds 3-4 pregnancy tumors on its back during breeding season, which occurs about once every 8 falans. The normal life-span of a sarkbeste is around 9-10 UNS years.

On Ringworld, sarkbestes are found only on cool grassy plains. They have spread over a large area, and are common in over 400 grid hexagons, scattered much of the way around the Ring.

Sarkbestes are a decided nuisance near civilized areas, especially those relying on internal combustion engines, and are not easily domesticated by hominids who use fire. Some hominids follow the sarkbeste herds and live off them. These clans either do not use fire, or always build their camps several kilometers away from the sarkbeste herd.

ZANJII

Char.	Range	Average	
STR	4D6+18	32	Average Hit Points: 57
CON	2D6+12	19	Speed: 3m/im
MAS	4D6 + 24	38	Action Ranking: 6
POW	2D6	7	
DEX	2D6	7	

ARMOR AND HIT LOCATIONS: 5 point hide

Location	D20	Armor/Average HP
Right Hind Leg	01-02	5/18 (.30)
Left Hind Leg	03-04	5/18 (.30)
Hindquarters	05-07	5/23 (.40)
Forequarters	08-12	5/23 (.40)
Right Fore Leg	13-14	5/18 (.30)
Left Fore Leg	15-16	5/18 (.30)
Head	17-20	5/20 (.35)

Weapon	Attack%	Damage
Bite	25%	4D6
Trample	50%	8D6 to prone foe only

NOTES: attacks with one bite each action rank. Can attack prone foe once per impulse with trample.

SKILLS: Observation 40%, Scent 40%

Zanjii Description

Zanjii were among the first Ringworld animals sighted by Known Space explorers, and were dubbed 'green elephants.' They are flat-trunked pachyderm-like creatures 1.5 to 2m high at the shoulder. They root and graze with great efficiency, leaving the ground barren in their wake. They are a common domestic animal, though are still found in the wild in some areas.

In the wild they travel in small family groups. The species does well in captivity as well, and is both hardy and tractable. The flesh is edible to all carnivorous hominids.

WRILLABEE

Char.	Range	Average	
STR	2D10	11	Average Hit Points: 32
CON	3D6 + 6	16-17	Speed: 3m/im
MAS	2D6 + 8	15	Action Ranking: 6
INT	?	?	
POW	3D6	10-11	
DEX	2D4	5	

ARMOR AND HIT LOCATIONS: 4 point blubber

Location	D20	Armor/Average HP
Tail	01-08	4/10 (.30)
Body	09-12	4/13 (.40)
Right Flipper	13-14	4/8 (.25)
Left Flipper	15-16	4/8 (.25)
Head	17-20	4/10 (.30)

Weapon	Attack%	Damage
Claw	35%	1D3 + 1D6
Bite	25%	1D6+1D6

NOTE: A wrillabee may attack once per action rank, using either one claw or one bite.

SKILLS: Swim 150%, Swim Quietly 100%

Wrillabee Description

Wrillabees are largish aquatic creatures native to bays, lakes, large slow-moving rivers, lagoons, and estuaries.

Adults range from 2 to 3 meters long, and can mass over 200 kg. About 2/3 of the body length is an eel-like tail. The upper body is thick and stubby, with two broad flattened forelimbs, ending in four stubby-clawed fingerlets. There are no discernible hind

have pleasant-looking, rather delphinoid heads oriented at nearly right angles to the main axis of the body, permiting a wrillabee to 'stand' upright in the water and look about. There is no visible neck, nor can the wrillabee turn its head. In hue, wrillabees range from light blue to dull gray to glossy black, sometimes whitening to a yellowish gray on the head, ventre, and belly.

Not exceptionally fast swimmers, they feed mainly on seaweed. Wrillabees have inspired many legends and superstitions among primitive peoples dwelling along shorelines. Much about wrillabee habits remains unknown, though their odd habit of piling up cairns of stones at particular river bank locations has been documented. The City Builders do not seem to have studied wrillabees carefully.

ZONGO

Char.	Range	Average	
STR	2D6	7	Average Hit Points: 21
CON	3D6	10-11	Speed: 12m/im
MAS	3D6	10-11	Action Ranking: 3
POW	2D6	7	
DEX	3D6 + 8	18-19	

ARMOR AND HIT LOCATIONS: no armor

Location	D20	Armor/Average HP
Right Hind Leg	01-02	0/6 (.25)
Left Hind Leg	03-04	0/6 (.25)
Hindquarters	05-09	0/8 (.35)
Forequarters	10-14	0/8 (.35)
Right Fore Leg	15-16	0/6 (.25)
Left Fore Leg	17-18	0/6 (.25)
Head	19-20	0/7 (.30)

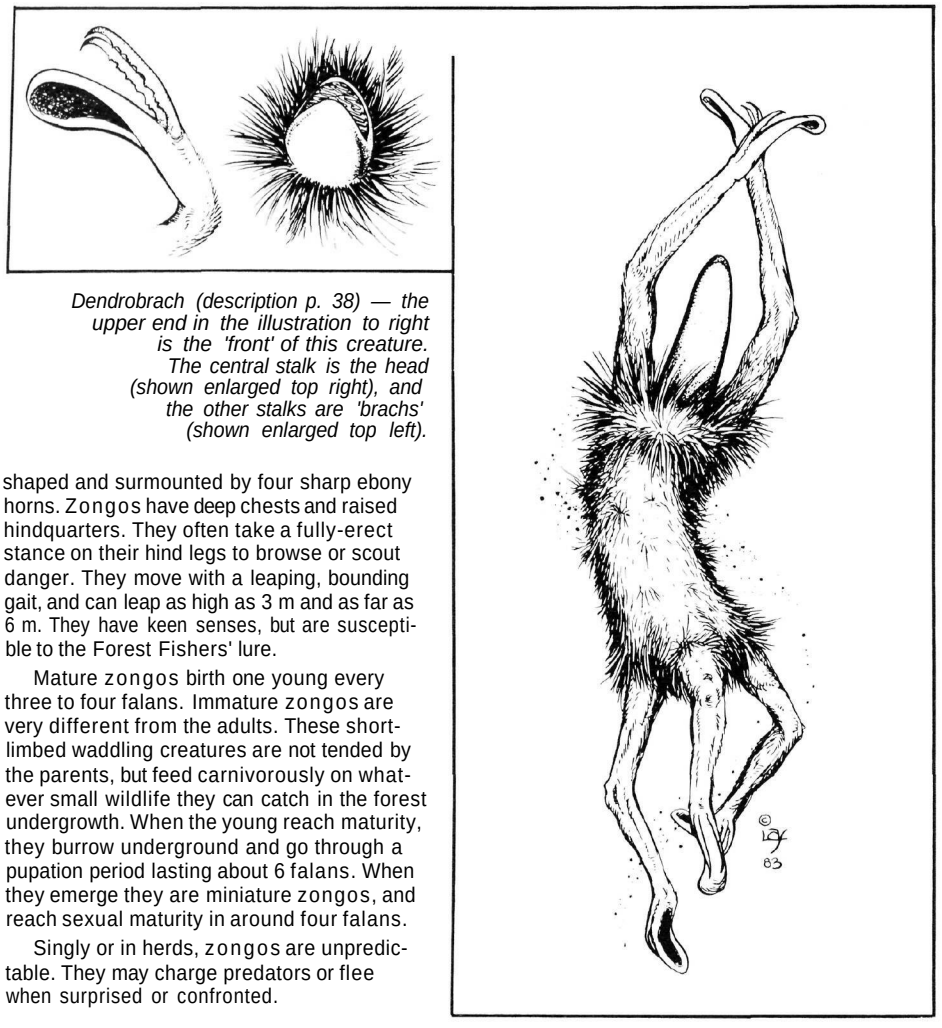
Weapon	Attack%	Damage
Butt	40%	4D3

SKILLS: Jump 120%, Observation 40%, Scent 60%, Swim 25%

Zongo Description

Zongos are colorful, fleet herbivores common in Ringworld's subtropical forests. There are several species, varying rather widely in size and coloration.

Zongos stand 0.6 to 1.3 meters high at the shoulder. Most are a deep green color overlaid with complex patterns of lighter colors such as tan or ochre. The head is heart-



Dendrobrach (description p. 38) — the upper end in the illustration to right is the 'front' of this creature. The central stalk is the head (shown enlarged top right), and the other stalks are 'brachs' (shown enlarged top left).

shaped and surmounted by four sharp ebony horns. Zongos have deep chests and raised hindquarters. They often take a fully-erect stance on their hind legs to browse or scout danger. They move with a leaping, bounding gait, and can leap as high as 3 m and as far as 6 m. They have keen senses, but are susceptible to the Forest Fishers' lure.

Mature zongos birth one young every three to four falans. Immature zongos are very different from the adults. These short-limbed waddling creatures are not tended by the parents, but feed carnivorously on whatever small wildlife they can catch in the forest undergrowth. When the young reach maturity, they burrow underground and go through a pupation period lasting about 6 falans. When they emerge they are miniature zongos, and reach sexual maturity in around four falans.

Singly or in herds, zongos are unpredictable. They may charge predators or flee when surprised or confronted.

FLORA

Like everything on Ringworld, the extent and the variety of the flora is unimaginably vast. The following tiny selection will provide gamemasters with convenient local color, with food plants which can nourish explorers and other hominids, and sometimes with items which simply harass or make uncomfortable the explorers in ways which even Known Space technology may be unable to eliminate instantly. There are no improbably-aggressive plants here; traditional fantasy-style, vegetably-gaping, carnivorous jaws and slithering, grasping tentacles should in fact be ignored by gamemasters who are uninterested in rationalizing and justifying such extraordinary creations by nature or by intelligence.

Most of the vegetable forms mentioned in the *Ringworld* novels are instanced here.

Arrow Root
Arrow-root resembles an evergreen shrub 1-3 meters high. It has stiff, crooked, intertwined branches with smooth polished bark, dark magenta or chocolate in color. Its small, rounded, glossy green-black leaves form dense clusters along the branches. Below ground, if well-irrigated, the plant produces a grouping of straight, arrow-like root-shafts a centimeter in diameter, boring down 1-2 meters into the soil. Cultivated by some hominids, arrow-root has obvious usefulness as primitive weaponry. Like Slaver stage-trees, this plant may trace its origins to ancient biological engineering.

Bellanthus Palm
A tall, graceful, unbranched tree surmounted by a bushy crown of arching, pinnate fronds, it is found in moist, warm climates. Its edible, acidic fruit resembles a yellow squash enclosed in a grapefruit-sized, watertight casing like a thick eggshell. Bellanthus looks rather like certain terrestrial tropical palms — and may have been imported from Earth long ago.

Blisterwort
An innocuous-looking shrub, blisterwort grows in a wide range of climates in all but the soggiest of soils. It causes an excruciatingly-painful, sometimes-disabling skin rash if touched. If any part of the plant is eaten, it may prove lethal, but many hominids are said to have survived. Exposure to smoke from burning blisterwort will cause severe irritation and occasional breathing paralysis. Blisterwort is identified by bright red roots and nettle-like rootlets, and by its five tooth-edged leaflets, which vaguely resemble a human hand.

Bloodtrees
These forests thrive in several moister parts of Ringworld — wherever slow-moving waters bear the characteristic red seed-bearing stain. The tree's sap-like seed medium is the color of fresh blood, hence the colloquial name. Most trees appear to seed every 3-4 falans, but the original extrusion-trigger was undoubtedly climatic. Bloodtrees are ring-trees, a series of independent trunks rising from a common root system to heights of 100-125 meters, with a complex diameter between opposing members of up to 30 meters. Progressive petrification of the lower trunks and intertwining branches between trunks grants further stability. The trunks support wide-sweeping branches with enormous fronds. The raised center areas of lesser bloodtrees are often roofed by hominids and can provide excellent permanent shelter.

Brillaba
They may be any of many related species of striking, lacy-leaved, bell-shaped trees; all have shallow roots and greatly-swollen, gnarled trunks. In undisturbed, semi-tropical lowlands and moist, warm, temperate regions, Brillabas sometimes form spreading jungles thousands of kilometers wide. Most species of brillaba bear a luxurious, red fruit resembling a soft, onion-shaped pomegranate. It possibly descends from trees long ago imported from the Pak home world. Brillabas are favorite habitats of primitive Hanging People.

Elbow Root
A sturdy, symmetrical, woody shrub planted for fences and hedges by Ringworld hominids, most varieties of elbow root grow 1-2 meters tall. The bark is a rich brown, and the foliage is glossy green. Elbow root often grows in straight rows of triangles, rising up at 45° to sprout a bushy crown of bold-textured leaves, and then dropping back at the same angle to sprout a cluster of roots. The white or yellow-pink blossoms are sometimes used for flavoring in cooking. A few elbow-root species bear musky, aromatic, edible berries which resemble large amber-green olives. Tall, thorny varieties often form hominid defensive perimeters. Except for its subdued, terrestrial coloration, Ringworld elbow root looks much like species discovered on Gummidgy.

Ferngrass
Resembling certain species found on some worlds in Human Space, many varieties of ferngrass flourish in moderately-moist to tropical climes. Whole plains covered by the long upright fronds are not uncommon. The close-packed ferns are usually dark blue-green or chocolate-brown only near the tips of their fronds, giving way to lighter coloring (yellow-green) on the stalks. Animals cropping fields of ferngrass, or travelers crossing them, leave highly-visible trails.

Karesh
Such agricultural species as Hairy Ones or Valley People cultivate this tall, nutty grain grass. Karesh produces copious, stubby small ears with sweet, berry-like kernels, somewhat like a dwarf maize. The plant has a drinkable, milky juice which is sometimes fermented. Its growing-cycle is about two falans. Karesh may have genetically-tailored by ancient City Builders.

Makai Tree
Makai are low trees seldom exceeding 2 meters in height, which occasionally form vast dwarf-forests. These trees have straight, fluted trunks topped by a rosette of narrow leaves with sawtooth edges. At intervals of roughly ten falans, most of the leaves drop off, and the makai tree sprouts several enormous, nectar-producing blossoms. The nectar in these colorful, trumpet-shaped flowers is an edible delicacy, and is fermented into a fabulous sweet

beverage by various hominids, such as the Machine People. Some species of makai almost entirely lack trunks.

Oyster Plant
Oyster plant is commonly cultivated for its rich, meaty tubers, enclosed in tough, bifurcated, shell-like pods which grow just beneath the surface of the soil in a ring centered about the surface plant. The tubers are excellent baked or roasted, having the taste and texture of a Wunderland oyster. Above ground there is a meter-wide cluster of wide-spreading, semi-rigid leathery leaves with deep-lobed fronds.

Sickle-Grass
Dominating great expanses of open veldt and savanna, this tall, coarse forage-grass usually grows to a height of two meters, and sometimes three meters in fertile soil. Its long, blade-like leaves emerge from just above conspicuous joints on the rounded, triangulate stems. The leaves widen for a third of their length, then taper gradually to a point. They alternate in their growth from successive sides of the stem in an upward spiral pattern, maximizing exposure to the vertical sunlight. Creeping underground, the stems merge into an extensive, branching, fibrous root-system well-able to withstand high winds and flooding. Many primitive constructions use sickle-grass; and it is a staple food of Grass Giants as well as many other plains herbivores.

Spaghetti Tree (Spaghetti Plant)
These prolific trees have corkscrew-like trunks which grow to a maximum height of 3-5 meters in a slender, gracefully-twisted cone. Their short branches arch outward, then up, following the curve of the trunk. Small, oval leaves cluster at their tips. From the top of the trees, festoons of greenish-yellow filaments droop luxuriously. These are edible, and very nutritious. Spaghetti tree may have been created by biological engineers or modified from native or imported flora.

Stretchvine
This is a rapid-growing, spreading vine with soft brown stems, coiling tendrils, and brilliant dark-green leaves occasionally copper-edged. Leaf shapes vary from nearly round to strongly lobed and pointed among the dozens of varieties. The resilient, flexible fibers of this plant make it useful in garments, rope, nets, snares, bowstrings, and fishing line.

Slaver Sunflowers
Slaver sunflowers stand about 30 centimeters high on knobbly green stalks. Each has a single blossom as big as a large man's face. The back of the blossom is stringy in appearance, as if laced with veins and vegetable tendons. The inner surface is a smooth, concave mirror. Protruding from its center is a short stalk ending in a dark green bulb. The primary purpose of the mirror-blossom is to focus sunlight on the green photosynthetic node, but it can also be a terrible weapon. Though lacking precision, sunflowers can aim their beams to repel plant-eating animals and insects. Modestly-sized patches can fry any and all potential enemies, converting them into sunflower fertilizer. Normally, sunflower patches contain only sunflowers; on the sunflowers themselves there are no blights, fungus growths, or disease spots, for sunflowers destroy the imperfect among their own kind as quickly as they attack intruders.

Some hominids use sunflowers for decorative or defensive purposes. In a few regions, they grow wild and out of control, evenly-spaced across the landscape sometimes for hundreds or thousands of square kilometers. Such vast concentrations of the deadly mirror-blossoms can pose a serious threat to travelers and natives alike. While sunflowers may fail to expand across large bodies of water, they spread relentlessly once established. On Earth, the "sun-trackers" of Ellesmere Island exhibit some behavior characteristic of Slaver sunflowers.

The ancient Slavers had the Tnuctipun create these plants as decorative defenses; the plants were found everywhere across the Slaver empire. Several varieties have been discovered, with stalk heights ranging from 10cm to 4m.

These social plants as a group reflect and focus sunlight at predators and competitors, thereby incinerating them. Calculate the sunflower attack by the square meters of plant actually reflecting light, and by the intensity of light available. The following attacks are for sunny Earth-normal conditions.

Sunflower Attack Table

patch (square meters)	*damage/impulse*
1	1D6
10	2D6
100	3D6
1000	4D6
10,000	5D6
etc.	+1D6

A muscular plant, the Slaver sunflower has a corkscrew muscle fiber allowing it to lower its stalk height 5cm per impulse in order to better aim at crawling interlopers; it can swivel its silvery head at a rate of 20 degrees of arc per impulse to track a moving object; and the sunflower head can contract and expand in order to vary the focus of the reflected light from about 3 to nearly 300 meters.

Beyond maximum focus, massed sunflowers are still formidable obstructions and opponents, for the reflected sunlight is still concentrated, even though unfocused. At extremely extended distances, a lucky target may escape unscathed or merely singed. Large stands of sunflowers may do deadly damage for kilometers beyond their focus range. The ability to configure the sunflower head also allows it to compensate for shifting solar angles as the day progresses.

As well as containing photosynthetic materials, the green central node of the flower has a modest pin-hole-camera eye with enough resolution to detect movement. Every 10-15 minutes, a defensive reflex in the sunflower causes it to turn from the sun, watching in a random direction. After a minute or so, the plant head snaps back to the sun. Consequently a sunflower patch glistens and pulsates as its constituent members randomly take turns standing guard in various directions, then returning to feed upon the sun.

Underground runners link local members of a patch; when an eye/energy node notices movement, a warning flashes from the observing plant in a ripple effect along the underground net. All the stimulated plants go into random search while the alarm lasts. On the average, each impulse of this random search aligns 10% of the searching plants in the right direction - thus, after 10 impulses, all the stimulated plants will be focusing on intruders, if the target is still moving — the waving leaves of a tree or the flashing legs of a fleeing man draw equal attention. The alarm signal weakens as it travels, so that smaller alarms will draw the attention of fewer plants. A major alarm, with much activity (such as a swarm of locusts, or large piece of machinery), will draw the attention of many more sunflowers.

Some folk living near sunflowers believe that a very slow, methodical crawl at a rate of about 50m per hour will not draw sunflower attention until the crawl subtends too much of the sunflower angle of search. No one seems quite certain how much angle is too much.

Sunflowers spread by underground runners 10cm to 30m long, varying with soil conditions. When the sprout emitted by the runner reaches the air, it immediately blossoms into a miniature light-collector head, complete with photosynthetic node, then undergoes several alternate growth periods between blossom, root, and stalk before reaching maturity 1 D3 + 6 UNS weeks later.

If a sunflower's runners connecting it to the rest of the patch are severed, the plant will continue to survive, but, naturally, cannot respond to intruders with the rest of the patch, and its alarm signals will not be received.

When a runner enters a new area (definable as one not visible from the mother-patch) and matures, it begins sending information useless to the patch as a whole, for from the new vantage point movement may be seen which is invisible to the other sunflowers. It can happen that a fairly large patch of sunflowers may be over a hill from the rest of the stand and sight an intruder major enough to send signals over the hill to the others. In such a case, the sunflowers which cannot see the intruder will still be stimulated and swing their heads around, watching carefully for as long as the stimulus persists or for 1 5 minutes without results, whichever comes first.

The average sunflower lives for about two UNS years before its silvery collector shows signs of deterioration; when that happens, neighboring sunflowers attack and destroy it. Runner buds lurking just below the surface of the ground detect the new warmth of sunlight reaching the ground, and sprout; one will survive to take possession of the ground as the new tenant.

The Tnuctipun adapted this plant to be a humidity-loving perennial for Terran-like worlds. All known varieties contain much water and are impossible to burn alone — no prairie fires ever sweep across sunflower fields more than a kilometer or so wide; the plant certainly will burn if enough outside heat is provided, but its worst enemies are drought, dust storms, heavy smoke, and volcanic ash. Slaver sunflowers cannot survive in areas with strong seasons.

Tarboola
A fast-growing, grassy, semi-tropical shrub, tarboola sometimes is cultivated by intermediate-level civilizations as bio-mass in the production of alcohol fuel. It is also used for textile fiber and low-grade fodder. Tarboola grows widely in regions bordering warm swamplands and rivers. It has a branched, woody stem, with many raspy-textured, broad-bladed leaves. It ranges in height from 2-4 meters. A thick stand of tarboola is virtually impenetrable on foot.

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GAMEMASTER BOOK

PUPPETEER SECRETS

Puppeteer Experimentalists

Long ago, Experimentalists came to power when the Puppeteer planet faced eco-catastrophe from industrial heat pollution. They launched a project to move their world outward from its sun, eventually relocating it in the cometary halo of their system. To feed half a trillion Puppeteers, Experimentalist regimes altered and seeded two farming worlds. Later governments added more, terraforming two great moons of distant ice-giants after moving them inward.

In subsequent millennia, Experimentalists rose from time to time seeking to expand or defend the Puppeteers far-flung commercial interests. Following six centuries of conservative rule, the emergence of the Kzinti threat again returned Experimentalists to power. Their most-recent tenure has profoundly influenced other Known Space species. Using a starseed lure, they manipulated the sale to humans of the Outsider hyperdrive — thus ensuring a string of military disasters for the Patriarchy. The Man-Kzin Wars killed off four generations of Kzin's mightiest warriors, finally giving rise to *a* dominant strain of more amicable Kzinti. Meanwhile, General Products profited immensely from the expansion of trade throughout Known Space.

Puppeteer Experimentalists also conducted an experiment in the systematic breeding of humans for the hypothetical trait of psychic luck. Through bribery and blackmail, they manipulated Earth's Fertility Laws, introducing the Birthright Lotteries. Sixth-generation descendants of Lottery winners were then selected and tested. The Puppeteers view the experiment as one of their few noteworthy failures: whether or not some humans now exhibit psychic luck their good fortune does not "rub off" others who might wish to use it as a shield.

Few humans or Kzinti suspect the shocking extent of Puppeteer interventions. Those who do (suspect) are usually silent. From one point of view, the Puppeteers have arrogantly played god with the destinies of both species. From another, they saved human civilization from imminent destruction and certain enslavement; while the production of a less-hostile breed of Kzinti made their outright extermination by the Puppeteers unnecessary.

The experimentalists were deposed once they had set in motion the Fleet-Of-Worlds' extragalactic migration. They may well be seeking means to justify the reinstatement of their talented faction. Despite their departure, it is not safe to assume the Puppeteers have learned the universe it too complicated a toy for the play of sensibly-cautious beings.

Puppeteers at the Time of Ringworld

The sudden and shocking disappearance from Known Space of the Puppeteers took place in the mid-2600s, nearly two-and-a-half centuries ago. In the wake of Schaeffer's Puppeteer-sponsored voyage which confirmed the explosion in the galactic core, General Products shut down. A stunning stock-market crash and the near-collapse of interstellar trade followed.

The Puppeteers vanished almost entirely. They left behind a handful of their courageous insane ostensibly to handle unfinished business (an immense number of defaulted contracts) and mainly to keep an eye on developments in Known Space.

The majority of the Puppeteers began an exodus from the galaxy, gradually accelerating their five worlds towards a relativistic velocity. It is difficult to imagine that they did not require centuries to prepare for such a flight. Perhaps their entire development of the Known Space economy was motivated by the need for extra resources for themselves and from the Outsiders. Or perhaps the Puppeteer rulership's efficiency is simply as much more advanced over humanity's as humanity's is over that of the planarian.

At present, the Fleet-of-Worlds is falling through space at well over .9c, arrayed in the stable pentagram of a Kemplerer rosette. Its eventual destination is apparently the Lesser Magellanic Cloud. The Puppeteers have chosen the safest possible method of travel, and certainly the most impressive. Subjective time for those involved will be foreshortened due to the effects of relativity.

Artificial suns circle the four farming worlds, while the fifth glows only by the light of its own cities. The oceans are dark, punctuated by insular floating factories, brilliant stars surrounded by mist boiling from the water. Only waste heat keeps the seas from freezing. The continents blaze yellow-white with the lights of wide streets and kilometer-high buildings.

The streets swarm with Puppeteers, always moving in groups, brushing against each other without apology or resentment. Clustered at shop windows, or flickering along lines of stepping discs, their coiffeured manes appear to glow in a glorious variety. The Puppeteers are known to have offered to let a certain few humans settle on one of their farming worlds, to accompany them on their odyssey. It is suspected that they may wish to establish an entirely community of humans or other beings in the Fleet-of-Worlds to help them investigate "interesting" (i.e., dangerous) regions ahead of their migration path.

Larry Niven's

Ringworld

GAMEMASTER BOOK

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INTRODUCTION

AUTHOR'S NOTES
by John Hewitt

DEDICATION

To Peter van de Kamp, astrometric observer of the nearby stars for most of this century

To Larry Niven, for Known Space, his fabulous vision of the next thousand years

Ringworld is set nearly 900 years in the future. In Known Space it is a time of (relative) peace, the last major Kzinti incident having occurred some two centuries before. The *Ringworld* roleplaying game should be one of high adventure, alien contact, exploration, intrigue, and discovery: it is not a space war game. Armed conflict, though unavoidable at times, should be a last resort. ("Resistance is useless!") Ingenuity in problem-solving, not brute force, should be rewarded. Ringworld-era humans are for the most part not militaristic in either outlook or behavior, nor are they obsessively fascinated with weaponry and territorial conquest. Most implements of slaughter not overtly illegal are in some way regulated by the ARM, the UN technological police. ("Have you ever noticed how peoples' intellectual curiosity declines the moment they start waving guns about?" Dr. Who, I believe, once observed.) Fewer Ringworld-era humans knowingly take foolish risks, unless utterly bored with life. Most (like Puppeteers) wish to preserve and protect their long lifespans, although they are far less compulsively cautious about it than Puppeteers. Humans, as always, are most likely to blunder into danger through ignorance, lack of foresight, and/or greed.

The forms and functions of Known Space technological items reflect the influences of new sciences, cultural aesthetics, and social values, as well as interworld commerce and interspecies contacts. New materials and techniques give devices of every kind a wide range of possible appearances, costs, modes of use, interconnection, storage, etc. Distinct styles may characterize items manufactured by different concerns on the various human (or alien) worlds. Twentieth-century design logic and aesthetic standards are archaic in the Ringworld era. As in every epoch, though, only a small minority of flatlanders ever give much thought to the technology they use, to history, to sentient aliens, or to strange events in the vast universe beyond their immediate social milieu.

There are a number of unlikely miracles in the Known Space universe: GP hulls, Slaver stasis-fields, hyperwave, and scrith among them. With Larry Niven's permission (and occasionally some evident relief), we have found ways to soften or file off the sharpest edges from a few of the more awkward absolutes — but only where necessary! Some properties of Ringworld's structural scrith may depend on the enormous electromagnetic currents generated in the Ring floor by Ringworld's terrific spin. Neither scrith nor GP hulls are "utterly frictionless" materials. The four GP hull types sold primarily to humans are not the only ones around: Puppeteers manufacture certain designs for their own use, and make infrared-transmitting variants for at least one other alien civilization. You cannot fly a GP hull through the core of a sun and expect to survive: every hull has its unique vaporization point — very high, but unknown. (It would never have occurred to the Puppeteers that any sensibly-cautious being would even consider attempting such an insane maneuver!) Even human-built stasis-fields relying on ARM-licensed generators should not be trusted under star-core conditions. Stasis-fields — whether Slaver, Puppeteer, Kzinti, or human — are time-retarder fields with a number of known or theoretically-possible stable ratios of external to internal time rates. It is imprecise to say that "no time passes in stasis." Stasis fields can be tricky — as Kzan-ol's unleashing in *World of Ptavvs* illustrates. Puppeteers trust only stasis-field generators of their own design and manufacture. Take for granted that most absolute statements bear qualifiers, and that every grand generalization, however poetic, bears a point of view. Explorers and GMs are challenged to discovered many more examples for themselves.

In the Ringworld narratives, the writer has no particular fannish axe to grind. I don't believe the Puppeteers, the Outsiders, or even then Tnuctipun run the Known Space universe from behind the scenes for a single evil purpose — the tangled web of complex conspiracies, controversies, manipulations, misstatements, misdeeds, and mysteries notwithstanding. (Of course, I could be lying!) It doesn't pay to have fixed ideas about the motives of aliens.

Still, certain prejudices born of necessity have crept in. I have found (or introduced) leaks in airtight logic here and there, and exploited them. It is possible the Pak did not build Ringworld originally, but merely conquered and modified it. There may well have been earlier Pak expeditions to Earth than the one Pssthpok followed. Earth's ARM, it must be realized, has strongly influenced the use and general availability of Known Space technology — an inevitable consequence of humanity's survival of the early atomic era. Plainly, humans have always been luckier than other species: human history reads like a series of serendipitous discoveries and hair-breadth escapes. It is more luck that the Puppeteers fear their selective-breeding experiment on humanity has backfired. After *Ringworld,* Human Space becomes known as the "Thousand Worlds," but not because of Teela's new 'hereditary luck.' Similarly, following *Ringworld Engineers,* untold billions of Ringworld natives are not necessarily annihilated by massive solar flares and attitude-jet exhausts — it is simply necessary to the story that Louis Wu face the fact that, because of his well-intentioned actions, death on such a scale may occur. Remember that the umbrella-field capabilities of the superconductor grid may be quite formidable (especially since the Ring can move its own sun); and, after all, a Night People Protector remained alive to help those in the threatened sector. In any case, hominid variants of those in *Ringworld Engineers* are spread widely around the entire Ring.

Comments and Recommendations

I had the pleasure of discovering Larry Niven's Known Space universe one tantalizing bit at a time over years of casual science-fiction reading. His wonderful stories, part of a unique, marvellously-detailed future history, always had fabulous, plausible settings, complex alien characters, challenging technology, and thoughtful, logical plots.

While chronically just at the periphery of the gaming world (for lack of leisure time), I had always hoped to see a Known Space game. I never anticipated that I would play a major role in bringing the first one into existence. Roleplaying is a singular form of performance-oriented social art, and often an effective educational technique. At its best, it is creative anthropology. Well, in my book, anything that provides an entertainment alternative to popular commercial mass media can't be all bad.

It has taken as long to systematize and synthesize the background narratives for the *Ringworld* game as it would to travel from Earth to Ringworld by quantum I hyperdrive. Before game mechanics could be seriously considered, Known Space had to be visualized concretely and accurately in space, and coherently organized in time. *(Ringworld,* the novel, takes place near the end of Niven's overall mythos.) This was a daunting task. I've been guided by Louis Wu's advice to the Hindmost: "Sometimes there's no point in giving up!" It soon became clear that many pieces of the Known Space puzzle were missing, obscure, confusing, or paradoxical. These problems were resolved, although not easily. Information in later stories (especially *Ringworld Engineers* and *Ringworld)* took precedence over conflicting statements in early works. (For example, at the time he wrote "The Soft Weapon," Larry Niven had not yet decided on the size of Known Space — hence the Beta Lyrae encounter.) Non-fiction articles and unpublished material have been very useful. Extensive direct clarifications from Larry Niven were extraordinarily helpful in many cases. His very specific, concise ideas on certain topics have been integrated into the game narratives wherever possible. It should be noted that Niven and the writer of these notes agree that in preserving the essential charm and intrigue of the Known Space universe, various of its aspects should remain enigmatic, outwardly paradoxical, never thoroughly grasped by humans, and never completely explained — Outsiders, for example. In other areas, I have been left very generously with a fairly free hand to develop Known Space/Ringworld concepts, events, settings, and aliens. Much already written has been deferred to the forthcoming *Ringworld Companion.*

I've sought throughout the *Ringworld narratives* to preserve the atmosphere and essential detail of Known Space, and to suggest endless possible scenarios. If you cannot tell which information is directly "from the books" and which has been interpolated, extrapolated, or merely created, I've done my job. I've always had faith in the flexibility and durability of the Known Space mythos.

Anyone desiring to master an expedition to Ringworld should read *Ringworld,* Larry Niven's Hugo and Nebula-award-winning 1970 novel, and its 1980 sequel, *The Ringworld Engineers.* While the totality of the Ringworld game narratives (including any in the *Companion)* is adequate preparation, only the original works can convey the fully-interwoven flavor of the mythos' separate strands. These two masterpieces, along with the short story "There Is a Tide," are the only publish-

(cont. on inside back cover)

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DYSON SPHERES and RINGWORLD: Introduction to the Essays

The Ringworld is an engineering compromise between a Dyson Sphere and a normal planet.

Ringworld is a majestic artifact, a multitude of worlds, interdependent yet each unique, set amid a single magnificent piece of engineering. Ringworld is at once a grand unity, a terrifying and paradoxical abstraction in numbers, a harmonious balance of microcosm and infinity.

Among the brilliant pre-fusion era natural philosophers who foresaw the existence of star-girdling artifacts like Ringworld were Dyson, Niven, Kardeshev, and Tsiolkovskii. They pointed out that, eventually, the ultimate development of any intelligent, technical civilization would be limited only by basic available resources: energy, matter, and living space. The need for power increases geometrically, as does population. Sooner or later, humans (or aliens) would find themselves restricted by the two-dimensional surface of their native planet. As long ago as 1895, Constantin Tsiolkovskii (in his book *Dreams of the Earth and Sky)* envisioned a cloud of space cities built from transformed asteroids. Orbiting at various distances from the Sun, these bubble-worlds would, in time, harvest its entire heat and light energy output for the benefit of their enormous numbers of inhabitants. N.S. Kardeshev, extending these ideas, suggested a convenient subdivision of possible galactic technological societies: Type I, Type II, and Type III. Type I civilizations are capable of restructuring planets, Type II civilizations of transforming solar systems, and Type III civilizations, hypothetically, of harnessing the matter and energy resources of entire galaxies.

Freeman Dyson, in the mid-20th century, argued that the massive rebuilding of solar systems would be not just possible, but inevitable: "One should expect that within a few thousand years of entering the stage of industrial development, any intelligent species should be found occupying an artificial biosphere which completely surrounds its parent star." Such objects, he suggested, might actually be observed by infrared telescopes.

Disk, ring, and shell structures are common natural phenomena in the universe. Dyson spoke in the astronomical sense of his "artificial shells" — solid or liquid, continuous or discontinuous, anything to intercept the sunlight so it can be converted into power. Others took Dyson quite literally, though. The 'Dyson Sphere' became synonymous with a hollow, inhabited solid spherical shell built around a central star, to make use of every photon of stellar radiation. Given massive transmutation of elements, Jupiter could be converted into such a shell, one Earth-orbit in diameter, and several meters thick.

The inner surface of a Dyson Sphere is vast — a billion times the area of Earth, roomy enough for any population explosion. The landscape of the interior biosphere is optional, a challenge to engineers and artists alike. But there are problems. The rest of the universe is invisible. There is no night. The sun is overhead everywhere: it is always high noon. There are no basements, no mines, no real topography. Gravity generators must be spotted all over the shell to hold down people, buildings, and air. If any one of these ever went out, the resulting disaster would make the end of the Earth trivial by comparison.

Ringworld, dreamed up by Larry Niven in the 1960's, is an intermediate step between Dyson Spheres and planets. Given a Jupiter-like mass to work with — and the hydrogen of a dozen Jupiters for fusion fuel — a Ring of solid matter could be built to encircle a star. The ring would be tens of meters thick, a million kilometers wide, and a billion kilometers long. Such an artifact would have 3 million times the surface area of Earth. It would be like having millions of terrestrial worlds all mapped flat, joined edge to edge.

Mathematically, Ringworld can be treated simply, as a suspension bridge with no endpoints. From an engineering standpoint, the Ring is a compromise, albeit a tremendously ambitious one. For Earth-equivalent 'surface gravity,' the Ring can spin at a rotational velocity of 770 miles per second. An inner ring of light, orbiting structures can be set up to block part of the sunlight, providing a regular cycle of day and night. Walls at each rim would keep the air from leaking away into space. With the Ring, you get only a fraction of the room available on a Dyson Sphere, and you intercept only a fraction of the available energy — but you don't have to worry about gravity generators, and you can see the stars.

If Ringworld didn't already exist, we Known Space humans would have had to invent one ourselves. Every sentient, industrial species is going to need one.

RINGWORLD'S SPIN

"Half a thousand miles away, blocking ninety degrees of sky, the wall sped past at a hellish 770 miles per second."

Ringworld has a terrific spin. It rotates around its central star at 770 miles per second a velocity high enough to compensate for the gravitational pull of the star and to provide additional artificial gravity for the inhabitants. The exact value for the surface gravity of Ringworld is 0.0992 gee, so the acceleration of a falling object is thirty-two feet per second. On Earth, the gravitational pull is produced by the planets mass, and directed toward the Earth's center. Ringworld's "gravity" though, is provided by centripetal acceleration arising from the fantastic spin, creating centrifugal force. The atmospheric pressure is also maintained by this mock-gravity of Ringworld.

Centrifugal force is an illusion, conjured from the basic principle of inertia: Newton's First Law. A mass at rest, or moving at constant (non-relativistic) velocity, remains at rest or proceeds in a straight line, resisting changes in both its speed and/or direction. Every mass on the surface of Ringworld is continuously being forced to deviate from straight-line motion and made to conform to the steady circular path of rotation. The actual acceleration is a "push" toward the center of the circle; but the observer experiences a fictitious "pull" which seems to emanate from the surface beneath him. Uniform centripetal force is thus being applied at all times to every object on Ringworld, at right angles to its velocity vector, simulating the effect of a true gravitational field. For gravity and rigidity, the spinning Ringworld applies its own "centrifugal force" to itself. Objects appear to fall down toward the surface when dropped, although in reality that surface is curving up (inward) to intercept them. Ringworld is a classic example of a rotating reference frame; the same "forces" that seem to push you against the door of a groundcar speeding around a fast-corner apply here.

The energy required to impart a rotational velocity of 770 miles per second to Ringworld is thousands of times greater than the annual energy output of a sunlike star. Assuming total conversion of mass to energy, we would need at least twice the mass of Jupiter to do the job. If less efficient techniques were used far more mass would be needed. (The hydrogen of which gas-giants are mostly composed could be used for fusion fuel for example — but a dozen Jupiters would be required.) The spin of Ringworld stresses the foundation material of scrith terribly, pulling the entire structure into an extremely rigid circular form. To keep the Ring from flying apart, the effective tensile strength of scrith must be phenomenal, billions of times greater than that of chrome steel.

Ringworld is not technically "in orbit" around its sun. Earths orbital velocity amounts to only 18-1/2 miles per second, trivial compared to Ringworlds velocity of rotation. A spacecraft with a continuous acceleration of one gee would require one and a half *days* to reach 770 miles per second. Placing a satellite into low orbit around Earth or Kzin requires a velocity of just six or seven miles per second, attainable with chemical rockets. On Ringworld the necessary speed for an equivalent feat is a hundred times greater, and the meteor defence system would probably fire on the satellite or spacecraft. Ringworld natives are unlikely to achieve surface-to-space travel without assistance. However, 770 miles per second is an adequate minimum velocity for fusion ramscoop vessels to operate, and it is much more than escape velocity from the Ringworld sun's gravity well. The city builder civilization, and they alone, mastered interstellar travel, flinging their massive ramships into deep space, from the farside of the Ring, where the laser could not reach.

It should be noted that the rotation of Ringworld imposes certain limits on the range over which transfer booths (or stepping discs) can be used. For example, Puppeteer discs can absorb kinetic energy differences of about 200 feet per second (.04 miles per second). These energy differences arise primarily from non-zero velocity vector differences between transmitter station and receiver site. Their maximum range on Ringworld is thus about 10,000 miles, unless compensated. Someone trying to transport himself thirty-five degrees around the Ring would arrive at the receiver with enough excess heat to raise his body to fusion temperatures, and produce enough energy to blast a city. Naturally all Puppeteer-built transfer systems are engineered to prevent such occurrences. Of course, ten thousand miles is much further than human-built transfer booths will operate. (see the technology book).

SCRITH AND THE SUPERCONDUCTOR GRID

"Here's a physics text. There are chapters on the structure and dynamics of the world, including one on scrith. It may be too advanced for you."

Scrith is an unreasonably strong material, virtually indestructible, and much denser than lead. It is the brute matter of all fundamental construction on Ringworld. Beneath fifty feet of soil, there is bedrock; and beneath the bedrock is a wall of impenetrable scrith. The floor of the Ring is made of solid scrith, everywhere at least fifty to a hundred feet thick. Beyond this structural foundation is up to a kilometer of foamed-scrith meteor shielding; and beyond that only the vacuum of space.

There are many places where the scrith has been exposed, sometimes intentionally, but usually by the elements. It is easily recognized as a grayish, translucent material, often perfectly smooth and flat, and terribly slippery. From a distance, as on a mountain crest, it may resemble "dirty ice." Sometimes it is described as "shiny and hideous"; but at the rim walls, the sheer surface between the rimwall mountains is nearly invisible, blending into the color of the sky like a blue-screen matte. Nothing will grow on bare scrith; it cannot be worked, and it cannot be pierced by known tools or weapons. Although there are no deep beds of coal or oil to mine on Ringworld, any miner who did manage to tunnel through the scrith would be harshly rewarded for his ingenuity. He would be sucked at once into the airless void beyond.

The laws of inertia and the tremendous rotational velocity of Ringworld combine to give Ringworld a strong tendency to fly apart. The rigid scrith structure prevents this. The floor also must be strong enough to withstand the centrifugal force generated by the spin, which produces an acceleration of nearly one Earth-gravity over the entire surface and maintains the air-pressure.

The tensile strength of scrith is many billions of times greater than tungsten steel. Only a General Products hull or a Slaver stasis field compare in imperviousness and impenetrability; but ultrasolid scrith does not seem to be a variant of these systems. Scrith *absorbs* forty percent of neutrinos, while stasis fields and GP hulls merely reflect all subatomic particles. A neutrino stands a fifty-fifty chance of passing through several light-years of normal matter,

GAMEMASTER'S RINGWORLD PRINTOUT

These pages contain all of the material included in the players' Autopilot Printout, and considerably more. The figures below are for the most part in English units; confirmed metricists will have to translate.

GETTING THERE

Distance Above Mean Galactic Plane: *248 light years.*
Distance From Solar System: 207 *light years.*
Direction: *near north galactic pole.*
NGP Celestial Coordinates (Epoch 2000): *R.A. 12h51m.5, Dec. 07 degrees, 7m. 7*
Flight Time: *quantum I — 603 days*
quantum II — 4.2 hours
relativistic — 30 years at 0.99c
65 years at 0.96c
Relativistic is ship time, and includes acceleration.

RINGWORLD'S SUN

Catalog Number: *EC-1752 (Puppeteer); 3027 Coma Berenices (UN catalog).*
Summary: *normal solar-type main sequence early G isolated star, barely smaller and cooler than Sol. Non-variable. Peculiar spectral emission features occasionally observed. Magnetic flare star; Zeeman line splitting, semi-periodic and irregular.*
Spectrum: *dG3e, verging on dG2e. Transient magnetic and H-emission anomalies. Infrared line broadening.*
Color: *yellow-white.*
Surface Temperature: *10,000 F; 5600 absolute.*
Stellar Type: *Population I (galactic disk).*
Luminosity Class: *V (main-sequence dwarf)*
Mass: 0.37 *Sol; 323,000 Earth masses; 2.1* x 10^{27} *tons English; 1.93x* 10^{26}*gm.*
Diameter: *845,000 UNS miles.*
Absolute Luminosity (energy output): *3.6x* 10^{33} *ergs/sec); 4.8 x* 10^{23} *horsepower); 3.6 x* 10^{26} *watts.*
Absolute Magnitude: *+5.0.*
Apparent Magnitude from Earth: ***+8.7.***
Gravitational Acceleration at Photosphere: ***27 gee.***
Escape Velocity from System (near the Ring): *24 miles/second.*
Companion Objects: *Ringworld. No planets, moons asteroids, or short-period comets. Nothing but the Ring itself — which is undetectable from Known Space by standard low-resolution survey techniques.*

SHADOW SQUARES

Number: ***20.***
Shape: *rectangular.*
Dimensions: 7 *million by 2.6 million miles (approx.).*
Average Spacing: *6 million miles (variable).*
Radius of Shadow Square Ring: *27.3 million miles (approx.).*
Average Rotation Speed: *140 miles/sec; 504,000 miles/hour.*
Solar Energy Falling on Squares: *2 x* 10^{31} *ergs/sec; 5.5% of total output.*
Rotation Period: 11.4 *Ringworld days; 14.2 UNS days.*

RINGWORLD PARAMETERS

Orientation in Space: *parallel to galactic plane. Ring does not occlude star as seen from any Known Space world.*
Mass: *2.1 x* 10^{30} *gm.; roughly 350 Earth masses (mass of Jupiter equals 318 Earth masses).*
Radius (distance of surface from star): *95,000,000 miles.*
Circumference: *597,000,000 miles.*
Width: *997,000 miles (125.8 Earth diameters).*
Surface Area: *6x* 10^{14} *square miles (approx. 3 million surface areas of Earth) (mapped: 0.1%) (explored less than 0.001%).*
Biosphere: *inner surface layered with soil, oceans, atmosphere breathable by humans.*
Rim Walls: *1000 miles high, facing sunward.*
Direction of Rotation: *same as galactic disk. Appears anti-clockwise from Known Space (i.e., from 'below').*
Length of One Rotation: *7.2 Ringworld days; 9 UNS days.*
Spin-Induced Surface Gravity: *0.992 gee (31.9 feet/sec*^{2}*.*
Average Temperature: *habitable surface 62.3 F (290 absolute); outer (darkside) -146 F (174 absolute).*
Atmospheric Composition: *Nitrogen 74%, Argon 2%, Helium 1%,* H^2O, CO^2 *and other gases less than 1%.*
Day/Night Cycle (induced by shadow squares): *30 UNS hours average; 21 hours average full daylight; 45 UNS minutes average twilight periods; 7.5 UNS hours average full night.*
Terminator Shadow Speed: 7 *million miles per hour, with respect to the Ring's surface.*

RINGWORLD ELEMENTS

SCRITH

Average Thickness of Ring Floor: 700 *feet.*
Material Type: *ultrasolid, artificial.*
Theoretical Principle: *permanent enhancement of nuclear force ??*
Manufacturing Principle: *unknown.*
Minimum Tensile Strength: *approx.* 10^{16} *lb./sq.in.*
General Properties: *cannot be worked; blocks deep-radar and hyperwave; absorbs 40% of neutrinos; absorbs nearly 100% of all other radiation and subatomic particles; rapidly dissipates heat; retains induced magnetic fields; nearly friction-less surface; appears translucent, grayish in sunlight.*

even compressed matter, without being absorbed! Slaver disintegrators do not appear to affect scrith. Deep-radar and other sensors will not penetrate it, nor will stepping-discs, unless the thickness of the scrith is limited to a few inches. (The slopes underlying the Spill Mountains, and the layer supporting the surface of the Map of Mars in the Great Ocean are examples of such thin scrith construction.) The material seems to disperse heat rapidly. If a laser is fired at scrith, there is no steam, no smoke, no crackle of material exploding into vapor. Nor is the laser beam reflected. The spot where the beam has struck does not glow, nor is it marked in any way. Scrith seems to attenuate or block even hyperwave transmissions. No messages can be sent through it. Communication between planets is much easier than communication through the rim wall, unless a relay station is provided for.

One property of scrith fundamentally useful for both natives and alien visitors is that it retains an induced electromagnetic field. Many species (including the City Builders and the Puppeteers) have developed motors and flotation-fields based on electromagnetic repulsion of the Ringworld foundation material. Repulsor ships, lift units, and platforms, and magnetic-levitation support fields are preferred for transportation systems, because they do not require large amounts of power compared to reaction engines. Generated fields of electromagnetic force thrust directly and continuously against the floor of the Ring, and this works as well for ships, barges, dredges, and surface vehicles as for aircraft or floating cities. Superconductor repulsor units were employed by the City Builders to elevate and maintain their aerial metropolises. Flying scrith-repulsion craft is similar to using negative gravity field vehicles, except that, if you are close to the rim wall, or any similar uplift, you must compensate for repulsion from more than one direction. On a slope, one must compensate for the tendency to slide back down, due to the centrifugal pseudo-gravity of Ringworld. The major drawback to electromagnetic scrith-repulsor vehicles is their vulnerability to external control. Police fields can override them or burn them out. They can be jammed. Unless they have an independent power source, the beams supplying them with energy can be cut off. An intense wash of microwaves can be sufficient to disable one of these vehicles (called MAGLEV vehicles) unless careful precautions are taken.

Electromagnetic energy is distributed evenly within Ringworld's floor in a hexagonal grid of superconductor cables imbedded in the scrith. A single hexagon in this pattern is nearly fifty thousand miles across its long dimension, and about forty-three thousand miles across its shorter width. Vertices of the hexes lead into and away from two out of three of the Spill Mountains, and along the rim through the third. There are twenty-three grid faces across the width of Ringworld, and around the circumference, nearly sixteen thousand. The total number of hexagonal areas mapped off on the surface of Ringworld is thus well over 350,000! The network can be traced fairly readily using magnetic compasses, and has been used as a cartographic convenience by a number of species, including the Healers and the City Builders. There is an ancient coordinate system based on the superconductor grid pattern. In this system, a hexagon is

OCEANS

Hydrosphere Coverage: *approx. 53% of habitable surface.*
Shallow Seas: *10,000 to 10 million square miles; 20-30 feet average depth; freshwater.*
Great Oceans: *there are two, the Great Oval Ocean and the Great Star Ocean, counter-balanced 180 degrees apart on the Ring; approximately the same general characteristics (2000 Earths surface area; 20 Earths approx. volume; 20 miles max. depth; minimum shoreline 20 million miles; saltwater composition).*

METEOR DEFENSE SYSTEM

Type: *solar-flare gas laser (ultraviolet and X-ray).*
Average Beam Power Output: *above 10^{27} ergs/sec.*
Beam Width: *0.1 mile minimum; 1-10 miles average; maximum beam width is unknown.*
Target Threshold Speed to Trigger Firing: *4.4 miles/sec.*
Minimum Interval Between Acquisition and Fire: *20minutes.*
Comments: *ignores small objects; ignores objects with orbits not approaching the Ring; will not fire on upper rim wall regions; otherwise dangerous.*

METEOR SHIELDING

Foamed scrith on farside; average thickness 1200 feet.

SPILL MOUNTAINS

Spacing: *approx. 25,000 miles.*
Number: *47,760.*
Height: *30-40 miles.*
Fraction Active: *30% (approx.).*

RIM TRANSPORT SYSTEM

Continuous construction complete along 40% of starboard rim wall, 15% of port rim wall; intermittent sections near attitude jet mounts.

SUPERCONDUCTOR GRID NETWORK

Approx. Dimensions of Each Hexagon: *1.6 billion sq. miles; widths 50,000 by 43,000 miles; roughly 8 times the surface area of Earth.*
Number of Grid Hexagons (approx.): *23 across; around entire Ring 15,920; total hexagons 376,160.*

ATTITUDE JETS

Number: *200 mountings on each rim wall.*
Spacing: *3 million mile intervals (1.8 degrees).*
Height of Towers: *50 miles.*
Diameters of Toroids: 7500 *feet.*
Fully Operational: *at least 5% (22 known on starboard rim).*
Comment: *toroid fields may be lethal to unshielded humans within 300 miles.*

SPACEPORTS

Width: *70 miles at base; 35 miles at tip.*
Comment: *three spaceports on each rim wall, regularly and alternately placed at 60-degree intervals around the Ring.*

SPACECRAFT LANDING SYSTEMS

Number: *6 (three on each rim wall).*
Length of Each: *700,000 miles.*
Diameter of Primary Deceleration Toroids: *100 miles.*
Average Spacing: *1000 miles.*

ON THE FLOOR OF RINGWORLD

Traditional Units of Time: *day (30 UNS hours), turn (7.5 days), falan (10 turns or 75 days), celestial cycle (23 turns or 172.5 days), Ringyear (10 celestial cycles or 1725 Ring days or 5.9 UNS years).*
Fundamental Directions: *spinward (in the direction of rotation of the Ring), antispinward (direction opposite that of the Ring's rotation), starboard (to the right as one faces spinward — the starboard rim is the rim nearer to Known Space), and port (to the left as one faces spinward).*
Motion of Stars in Night Sky: *1.67 degrees per hour.*
Angular Width of the Great Arch:
77.5 degrees at one degree elevation
3.5 degrees at five degrees elevation
1.7 degrees at ten degrees elevation
0.6 degrees at thirty degrees elevation
0.4 degrees at forty-five degrees elevation
0.3 degrees overhead
Comment: *full moon seen from Earth is 0.5 degrees.*
Angular Maximum Height of Rim Wall
maximum, as seen from 500,000 miles — 0.11 degrees
100,000 miles - 0.57 degrees
50,000 miles — 1.15 degrees
10,000 miles - 5.71 degrees
5,000 miles - 11.31 degrees
1,000 miles - 45.00 degrees

GENERAL INFORMATION

Age of Ringworld: *minimum 250,000 years (time since Pak died-off); Initial Construction Era, 1,000,000 - 500,000 B.C.; Era of Mapping Expeditions, 500,000 - 250,000 B.C.*
Number of Sentient Hominid Species: 7000 - 2000 *estimated; Estimated Total Number of Inhabitants, 30 trillion.*
Forms of Energy Commonly Available on Ring Floor: *hominid, draft animal, water, hydroelectric, wind, steam, bio-mass (wood), alcohol, methane, hydrogen, solar, electromagnetic.*
Superconductor Plague: *Date of introduction, 1733 A.D.; Status, consumed unsealed superconductor materials in most areas exposed to air and died out. May have survived in some areas, possibly in mutated form. Did not affect superconductor grid, or systems in vacuum.*

viewed as a two-dimensional projection of the edges of a cube. The nexus of the superconductor network lies in a hidden control center below the north pole of the Map of Mars in the oval Great Ocean. (Whether another antipodal control center exists is unknown; nor have any auxiliary control centers been located as yet.) From this center, massive currents in the Ringworld floor may be manipulated, for use in generating magnetic fields which control the automatic meteor defence system. Other purposes and capabilities of the superconductor grid are not well known at present. The system is intact and has never been breached by a meteor puncture. It is not vulnerable to the superconductor plague that ravaged the empire of the City Builders. Careful research by some experts hints that the system, operated manually, may be capable of carrying out the function of the externally mounted attitude jets, and may be used to generate umbrella-fields to protect surface dwellers in times of greatly enhanced solar activity. Manual override controls are known to be available, if only at the concealed repair center(s).

Scrith is an artificial substance. Most of its properties are still mysterious. One of the best theories concerning it postulates that massive electromagnetic fields are used in strengthening the inter-nuclear force, so that atomic bonding within the substance no longer relies on molecular chemical and crystalline phenomena. The increase in strength is about right if enhanced nuclear bonding (rather than molecular or atomic) is involved. Currents maintained by the spin of Ringworld in the superconductor grid may well be actively involved in maintaining the integrity of so large a structure under such stresses. The existence of the cziltang-brone, a device which appears to be a scrith-osmosis-generator, supports this theory.

Machines which can render scrith semi-permeable were discovered by the City Builders when they spilled over the rim walls and found the spaceport ledges. There were great ships there, with no airlocks. There were no readily-visible ports, corridors, or tunnels leading through the rim walls. Instead, there were cziltang-brones still in operating condition. Recognizing their purpose, and learning how to operate them was one of the major achievements of the City Builder's civilization. When a cziltang -brone is fired up, it projects a field into the scrith of the rim wall, and the material softens enough to walk through. Massive winches were found on the spaceport ledges for dragging heavy machinery or fusion ramship cargo through the wall. Some air rushes through the semi-permeable corridor created by the cziltang-brone; so that one must push or "swim" along as if against a substantial wind if entering from the airless side. Ramships and some of the structures held portable devices of this nature. At the height of their dominion on Ringworld, the City Builders used cziltang-brones to travel through the rim walls, and even to make mounting brackets on the roughened scrith rim wall tops for the electromagnetic loops of their rim-transport systems.

If the City Builders learned the deep physics behind the operation of the cziltang-brone, that knowledge has been lost, or well obscured. The machines themselves were ruined by the superconductor plague. Some failed while in operation, trapping City Builder ramship crews and spaceport personnel within the scrith of the rim walls, and isolating those remaining outside on the spaceport ledges. The City Builders were never able to repair the cziltang brones successfully, though attempts at using low-temperature superconductors were made. Repairing such a machine is an extremely hazardous operation, since an improperly adjusted field will render a creature's biological membranes more permeable, regardless of the effect it has on scrith! The mildest possible result of this catastrophe would be irreversible brain damage. At present the theory of the operation of the cziltang-brone and the secret of scrith lies with the long-dead Pak engineers.

The mass of Ringworld is on the order of the mass of the planet Jupiter — a mere 2 x 1030 grams. Much of this mass is scrith. The construction job must have required the solid residues at the cores of a dozen Jupiter-sized planets, or a smaller number of larger objects. Since bodies of this size are composed mainly of hydrogen, fusion engines must have been used to provide power for the scrith manufacturing machinery, burning the hydrogen for fuel. The energy required to spin Ringworld up to its phenomenal rotational velocity of 770 miles per second probably came from the same source. Perhaps the planetary bodies used as raw material were initially arrayed in a Kemplerer rosette — at the same distance from the sun. Then they were gradually dismantled with long arcs of processed scrith stretching between them until the worlds became a single ring.

The use of scrith to fabricate Ringworld has some interesting consequences. Only a few can be listed here. Just as there can be no extremely deep mines on Ringworld, there can be no deep underground fossil fuel reserves. There are no large-scale natural processes to produce any such organic fuel. Alcohol or methane must be produced on the surface, using decomposition and distillation. There is no continental drift on Ringworld, and no hot mantle of liquid rock to trigger earthquakes or volcanic eruptions. There is no geothermal power. If a circling ring of bare scrith becomes exposed, natives in a mountainous region may become trapped and isolated, for scrith is a dozen times more slippery than ice, and there can be no handholds. Steep, bare slopes of naked scrith may prove as impenetrable a barrier as the rim wall itself. In the vicinity of huge meteor punctures such as Fist-of-God, it is possible that pieces of scrith may be found lying about on the surface. In fact, small bits of shattered scrith could easily have flown away from these colossal impacts through space, intercepting the ring at distant locations. It is not known whether the meteor-defence system is powerful enough to vaporize a large fragment of scrith.

One of the most overwhelming implications of scrith is that it stops virtually all subatomic particles, and thus protects the inhabitants from high energy explosions. Since the Ring is oriented in the plane of the galaxy, the inhabitants are probably immune to the powerful explosion of the galactic core. The shock front from this cataclysm should sweep through Known Space in about 20,000 years. (The explosion may be a chain-reaction of supernovae in the core, possibly occurring at semi-regular intervals, when star density reaches a critical amount.) The spray of hard radiation associated with the event will create a wave of mutation and even extinction of species on unprotected worlds, such as occurred on Earth 65 million years ago, destroying the dinosaurs.

If all of humanity, or even the entire population of all known sentient species, were transplanted to Ringworld, the population on the Ring would barely change — and most would survive. Some scattering of radiation would occur, especially near the rim walls, but most of the population would remain unharmed. In the worst case imaginable, Ringworld could serve as a refugee ship. The superconductor grid could be used to induce a powerful plasma-jet exhaust from the sun, moving the whole system. At high velocities, the star would no longer be necessary. The Ring would proceed on its own, as a giant ramship. Thrust would be derived from channelling interstellar hydrogen into the axis and pinching it magnetically to produce power. The glare of the fusing hydrogen would even create light, making an artificial sun — though it would be rather bluish and might not properly support Ringworld's plant life.

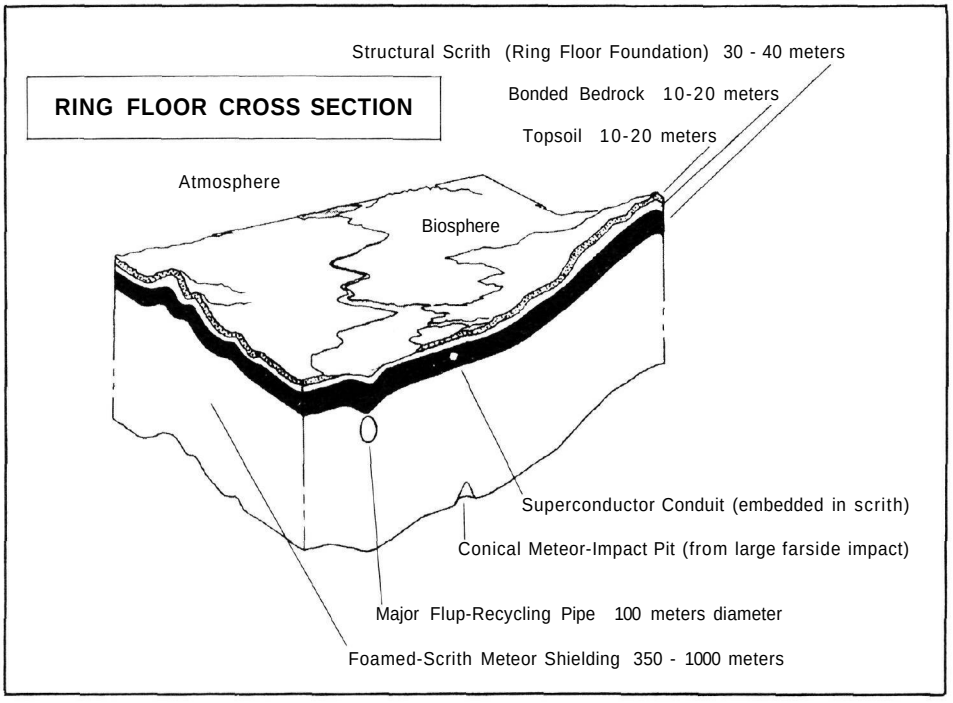


Illustration by John Hewitt

SHADOW SQUARES

"At the zenith swarmed a ring of black rectangles. . ."

The sun never rises or sets on Ringworld. It is always overhead, everywhere, because the habitable lands are on the inner, sunward surface. It is full noon wherever the sun is visible, and the lengthening shadows of late afternoon are never seen. To provide intervals of darkness, the Engineers placed a daisy-chain of opaque shadow squares in a concentric ring much closer to the blazing G-type primary than Ringworld. There are twenty of them, dark rectangular shapes orbiting the sun at a distance nearly that of the orbit of Mercury in the Sol system. From a great distance, one might assume that they are natural objects, perhaps dust clouds arrayed in the stable configuration of a Kemplerer rosette — except that they are moving comfortably faster than orbital velocity, and there is no easy way for twenty large masses to arrange themselves accidentally at the vertices of such a polygon. The shadow squares are obtrusively artificial, placed in orbit to provide a uniform thirty-hour cycle of day and night for Ringworld.

The shadow squares are immense, thin rectangles, a million miles wide and at least two-and-a-half times that long. Since the yellow-white sun is approximately 850,000 miles in diameter, the shadow squares readily eclipse it at regular intervals. The spacing between shadow squares is six million miles, and the radius of their orbital ring is 27 million miles. Their induced orbital velocity is about 140 miles per second, so a shadow-square "year" is just over fourteen days. (For comparison, Mercury's year is 88 days.) The additional speed puts tension on an essentially invisible network of tough, thin filaments strung between the shadow squares, keeping them oriented face-on to the sun. The shadow squares are optically flat black — the definitive, expensively-achieved carbon black used to coat the interior of a refracting telescope tube. The geometry of the shadow-square ring, in relation to its rotational velocity and that of Ringworld itself, results in approximately nine hours of "night time." There are two 45 minute periods of transitional "twilight" in this interval, often referred to as "half-daylight" or "half-night." These twilight periods visually resemble the partial stages of a total solar eclipse seen from the surface of the Earth.

Power is generated on the shadow squares, with solar-thermoelectric converters, and is then beamed to collector stations on Ringworld. Each square-inch of the shadow squares' surface area intercepts more than twelve times as much sunlight as does a square inch of Ringworld's surface. Over half a percent of the Sun's total radiated luminosity is available to the shadow squares. Ringworld itself would intercept slightly less if unshaded, while our Earth manages to trap only about a half a billionth of our Sun's output. The concentrated power theoretically available to the shadow square converters is roughly 2×10^{31} ergs/sec—or approximately fifty billion times the annual pre-fusion power consumption of terrestrial civilization. The shadow-square power beams are fail-safe, but they shut down automatically when the solar power receivers are not in use. Unfortunately, the superconductor plague long ago disabled almost all of these collecting stations, causing a Ringworld-wide power failure, and the Fall of Cities. It would be necessary to repair the receivers and distribution network, find hidden control centers with manual reset capabilities, or perhaps fly to the shadow squares themselves, to restore beamed solar power to Ringworld. No such expeditions have been attempted by human explorers.

Many other systems are located on the shadow squares. Real-time holographic images of Ringworld's surface are sometimes available in City Builder Map Rooms. These pictures must be beamed from shadow-square telescope installations, since no detail on the farside of Ringworld is visible in the Map Room projections, and no detail on the shadow squares themselves ever shows. Acquisition and tracking computers for the automated meteor-defense system must be situated on the shadow squares, independent of Ringworld surface systems. The entire shadow-square ring evidently has a separate guidance and control system. It is capable of sliding closed to protect the Ringworld surface from massive solar flares, and individual squares have been observed to move aside to let the meteor-defense laser beam pass. Elsewhere, the ring constricts to maintain balanced insolation to Ringworld. There must be systems functioning to reel in, play out, and automatically replace strands of shadow square wire when necessary. No global "seasonal" variations have been programmed into the shadow square system, however, so that the overall day/night cycle keeps the same ratio from falan to falan.

SHADOW SQUARE WIRE

"Do not touch it. You might lose fingers!"

Ringworld's shadow-squares are linked together, and kept face-on to the sun, by strands of shadow-square wire over six million miles long. In space, shadow-square wire is a virtually invisible, gossamer-fine filament, strong enough to cut through hullmetal. (It will not, however, affect General Products hulls.) Between squares, the wire is kept stretched very taut by the rotation speed of the shadow square ring. It is not known how many strands of wire tie the trailing edge of a shadow square to the leading edge of the following square. It is clear, however, that each strand attaches via sockets to some device on the edge which is capable of reeling in or playing out the wire. This mechanism allows two shadow squares to increase their distance, opening up and allowing the meteor defense beam to pass, or to slide closer together, constricting to protect portions of the surface of Ringworld from intense solar flares.

Shadow square wire is dense, heavy, and very strong. It stays solid at temperatures where any natural material would become plasma; its capacity to absorb and re-radiate energy is phenomenal. Like a variable-sword or Sinclair molecule chain, shadow square wire can be very dangerous. It cuts cleanly through steel with only the slightest of tugs, leaving a highly-polished plane surface. Unlike a variable-sword, shadow square wire is flexible, and does not require a stasis field generator. Slaver disintegrators do not disrupt the wire, and it is unaffected by flashlight lasers or other hand weapons. An X-Ray laser cannon would eventually melt through it, or a shard of scrith could cut it, if such an object could be found. Shadow square wire cannot be handled safely without taking special precautions, as it cuts through buildings as readily as through one's hands. It might be manipulated with a glove made of the same monofilament thread; or it might be wound upon a spool of scrith.

Shadow square wire is present on the surface of Ringworld. At least one previous expedition tore loose a strand by hitting the wire while traversing the shadow square ring. The wire came trailing down from the sky, shrouding a city, enveloping it, and eventually cutting it to dust. Seen en masse, a tangle of shadow square wire appears like a cloud of translucent black smoke. Close up, within an inch or so, a single black thread of shadow square wire is barely discernible, but it is there. If one's eye waters for an instant, or blinks, it might disappear. If handled with great care (or reckless abandon), shadow-square wire can be an extremely useful tool, or a formidable weapon. Its capabilities are easily utilized even by primitives. It has been found that Slaver sunflowers, which easily burn through Sinclair monofilament, leave shadow square wire intact.

At each end of a strand of shadow square wire is a teardrop-shaped handle, which tapers into a spike. This spike narrows to become the shadow square thread. The sockets on the shadow-square-edge mechanisms are evidently shaped to accept the teardrop-handles. Finding such a handle on the surface of Ringworld would be most fortuitous. The wire itself is rare enough!

METEOR DEFENSE SYSTEM

'With such a weapon I could boil the Earth to vapor!"
"Shut up."
"It was a natural thought, Louis."

The Ringworlders do not take meteors lightly. A single large puncture in the Ring floor would drain all the world's breathing air and spew it into space. A major impact might set the Ring wobbling uncontrollably. Ringworld's system was therefore entirely swept clean of debris: there are no planets, asteroids, large meteoroids, or comets left in it. The primary dangers are from rogue objects falling into the system, very rarely, but at random, from the interstellar void. Such a body might strike Ringworld with a relative velocity of a thousand miles per second. A spacecraft trespassing above the surface at merely orbital speed would be a hellish threat, for one touch of atmosphere could send it shrieking down at several hundred miles per second. Even a ship with its drives on, holding a curved path at faster-than-orbital speed, would be dangerous. If the drives failed, 'centrifugal force' would hurl the ship outward/down at populated lands, possibly to puncture the Ring. The location of Ringworld, well above the galactic plane, reduces but does not eliminate the possibility of interstellar interlopers, either natural or artificial.

The Ringworld Meteor Defense system includes active and passive elements. The active element is an awesome weapon, a massive gas laser capable of vaporizing or deflecting just about anything. Hexagonal patterns of superconductor cable embedded in the Ringworld floor magnetize the scrith when needed, producing complex field-configurations strong enough to manipulate hydrogen-plasma streamers at the surface of the sun. These induced solar flares do not arch over along the star's natural magnetic

fields, but instead are extruded and stretched out — to lengths of several million miles in 20 minutes. The hydrogen is then made to lase, and the coherent beam is directed at the unfortunate intruder. Even a moderate-sized solar flare can power the gas laser beam at 3 x 10^{27} ergs/second energy output for an hour. (For comparison, a solar-type star emits somewhat less than 4 x 10^{33} ergs/second total luminosity.) This beam is sufficiently energetic to have "polished clean" the Number 2 General Products hull of the First Expedition, almost instantaneously depriving them of all external drives, tanks, motors, weapons, and sensors.

The meteor defense system is programmed to fire automatically on anything that might hit the ring. Its manual overrides are hidden in the virtually inaccessible Control Center, concealed beneath the Map of Mars in the oval Great Ocean. The meteor defense system will not fire at the rim wall transport system or the attitude jet towers. It cannot fire at the dark spaceward side of Ringworld, which is protected by deep meteor shielding. If you are in a ship whose projected orbit intersects the sun and/or does not intercept or approach the ring, nothing will happen. Otherwise, the laser will probably annihilate you within 20 minutes of acquiring your ship with its sensors. The meteor defense system is even programmed to fire on inhabited territory, if necessary to protect the structure. The intense violet/ultraviolet beam is about ten miles wide, creating a swath of firestorms wherever it touches down, cremating all life. The laser system is considered to be absolutely fail-safe. It was determined empirically (by the Second Expedition) that a velocity of four miles per second with respect to the surface is 'safe.' but speeds in excess of 4.4 miles per second always trigger the laser firing sequence. The meteor defense system would be an immense handicap to the development of space travel by technologically advanced civilizations on the surface of Ringworld.

The underside of Ringworld is covered by a passive meteor buffer, 1000-3000 feet thick. The material is foamed scrith. Deep-radar will penetrate no more than a hundred feet of it. The shielding follows the major contours of the underside, but tends to fill in the detail. A few massive impacts have vaporized the meteor buffer down to the shiny scrith floor, where flup-recycling pipes up to 100 meters in diameter, can occasionally be glimpsed. Very rarely, the Ringworld floor is actually stretched and ruptured by a meteoroid impact, but most of the punctures have been repaired.

The Pak Protectors who built the meteor defense system were intelligent and warlike xenophobes. They certainly programmed the giant laser to fire on invading spacecraft, and they may have built other defenses not yet discovered. Ultimately, Ringworld itself may be moved, by using the meteor defense system to manipulate solar flares along the solar axis, producing a photon drive for the sun. The sun itself would be accelerated, dragging Ringworld along gravitationally. Maximum thrust would be small (0.0002 gee), but velocity would steadily accumulate.

It should be noted that independent acquisition sensors and tracking controls for the meteor defense system are located somewhere on the shadow squares. The system has been left on automatic settings and cannot be turned off. Shadow squares have been observed to move aside when necessary to allow the laser beam to pass. The inter-square spacing decreases elsewhere along the ring, constricting to maintain a balanced thermal influx to Ringworld.

The meteor defense system is naturally set to ignore very small objects incapable of causing serious damage to the Ring floor. Small meteoroids seldom reach even the lower atmosphere, though, because of the terrific rotational velocity of the structure. They tend to burn up and explode in bright horizontal streaks at very high altitudes, adding occasional splendor to the starry night sky. The larger objects which trigger occasionally catastrophic events are fortunately very, very rare.

SPACECRAFT LANDING SYSTEM: SPACEPORT LEDGES

/ know this place. It's the starship haven, outside the world!

A spacecraft visiting Ringworld, falling in at merely orbital velocity, has a surprise in store for it. Rushing by beneath the ship at over 1200 km per second, the side rim wall forms a dark, geometrically-straight vanishing plane. Its few incredible features are blurred by the Ring's terrific rotation. If one is unprepared, the approach of the spaceport ledges may be missed, and the crew might not live to regret it!

First, a low thick ledge appears, growing like a Euclidean abstraction along the base of the rim wall. Then, mounted on the ledge, a row of upright rings speed toward the ship, expanding rapidly from the infinity-point — toroids 160 km across, dully gleaming . From a distance, the rings pass by in a steady stream: hundreds of them, spaced well apart, all identical. This is the Ringworld spacecraft landing system, a giant linear accelerator or 'electromagnetic cannon' hundreds of thousands of kilometers long. There are two others like it, 120 degrees in either direction along the farside of the Ring. Three more identical systems are situated along the further rim, symmetrically staggered by 60 degrees relative to the near-rim systems. The existence and placement of the rim wall spaceports is logical: it is terribly dangerous to land anywhere else on Ringworld, even if the meteor-defense system were not functioning.

The method used for landing a spaceship may be viewed in old City Builder holotapes. The ship falls into orbit alongside the rim wall. It does not attempt to match the rotational velocity of the Ring, but positions itself about 80 km from the base of the rim wall, on the axis of the linear accelerator. As the rim rotates, the cradling fields of the electromagnetic cannon sweep the ship up and gradually accelerate it from free fall, to precisely match the velocity of the Ring. The fields glow and pulsate in pastel colors, enabling operators to track and manipulate feedback systems. Ringworld ships never came close enough to the rim to be dangerous, being deposited gently on projecting spaceport ledges at the end of the deceleration loops. Gravity generators and hyperdrive were never developed on Ringworld, and the electromagnetic landing cannon were designed specifically for use by large, metal-hulled, fusion ramships.

The spaceports themselves are on the sunward face of the tapered landing ledges. During final approach, these ledges are seen edge-on, appearing to be nearly dimensionless narrow lines erasing a thin strip of starscape. In reality, they are 110-plus-kilometers-wide shelves, projecting from the spaceward base of the rim wall past the axis of the electromagnetic cannon. The spaceports dwarf even the tremendous Ringworld ramships they were built to service. Rows of mile-long cradles still hold ships that were being fitted for expeditions, off-loaded, modified, or dismantled. There are tall cranes built in graceful curves, vast rounded buildings, and dozens of low, wide flatbed crawlers. There are large domes with flexible tubes, booms, and cziltang brone generators, for boarding and disembarking passengers and crew. Some of these mobile terminal domes are still floating by magnetic repulsion, moored in place on their hexagonal bases. Cargo-handling structures are easily identified, equally large and mobile. Scattered about the ledges, there are many square kilometers of materials, spare parts, tools, and miscellaneous equipment, preserved in vacuum. Far out on the antispinward edge of the spaceport is a 'hot' materials holding facility — for the radioactive components of returned ramships.

The guidance center for the landing system is a long, narrow building at the far edge of the spaceport shelf, at the very lip of eternity. The launching facility is a large, relatively simply structure above a huge trapdoor. Ships were simply tumbled or ejected into the void from the spaceport. With Ringworld's great speed imparted to it, a departing ship already had low ramscoop velocity, and several times the speed required to escape from the star's gravity well. Flung clear by Ringworld's rotational velocity, pilots could begin to accelerate away almost immediately on ramscoop fusion power, fueled by the solar wind.

The view from the spaceport ledge is stark and awesome. Sharp outlines, details of the rings, can be seen hundreds of thousands of kilometers distant. In three directions, the infinite black vanishing-plane of the rim wall cuts definitively across the brilliant shifting starscape into nothingness.

Although the space port visited by the second expedition from Known Space was dark, the overall operational status of the spacecraft deceleration system is unknown. No energy generation or sensor activity was recorded, but some of the Ringworld ramships were found to possess working life-support and auxiliary power systems. The electromagnetic cannon, immune in vacuum to the ravages of the superconductor plague, probably only lacks its supply of beamed power. The ramship landing system also served as a major rapid-transit system for the Engineers, and perhaps for the City Builders. Ramship designs probably were adapted from surviving Pak ships left on the ledges, and attitude jet toroids were moved around the rim to the spaceports where the City Builder spacecraft were constructed. In any case, parts of the electromagnetic cannon were seen in use by repair crews engaged in remounting attitude jets taken from disassembled ramships.

RINGWORLD RAMSHIPS

"Making a Bussard Ramjet is no task for primitives."

Only the City Builders traveled between the stars. Lacking gravity polarizers and hyper-

drive, they rode the winds of relativity in Bussard ramjets.

Ringworld interstellar spacecraft are vast and massive. Under favorable conditions, their cruising velocity reaches 99% of the speed of light. At this velocity, relativity begins to play a role in starflight. Passing time experienced by those shipboard is very slow compared to the 'normal' rate measured on the home world or at the destination. Because of this time-dialation effect, immense distances may be crossed within a human lifetime if the ship moves at relativistic velocities. At 0.99 of the speed of light, time slows down by a factor of ten. A round trip to several nearby stars (including a few years for acceleration, deceleration, and stop-overs) might take only a few decades ship-time, while centuries pass on Ringworld. City Builder ramship crews used a potent longevity drug, allowing them to make many such voyages.

On Earth, hydrogen-fusion interstellar ramjets were described first by Dr. R.W. Bussard of the United States of America. His concept approached elegance in an era of brute-force sublight reaction-driven ships. Bussard ramjets use interstellar hydrogen gas for fusion fuel and reaction mass, gathering the hydrogen from the space ahead of the ship using high-density magnetic fields. The interstellar medium is 98% hydrogen and Helium. In operation, an ionizing beam is pulsed before the ship, converting the atoms and molecules into plasma (lone nuclei and electrons), which can be collected much more easily than neutral particles. Incoming fuel is channeled into the main fusion-reaction tube, and can also be routed to inboard storage systems and compressed for later use. The forward cross-sectional area of the ramjet intake field is seldom less than 500 square miles. Magnetic monopoles are used to generate these intense magnetic fields by all advanced sublight technologies, though actual spacecraft designs vary widely.

Ringworld's City Builder civilization took advantage of some important off-the-shelf hardware for their interstellar fusion ramships. They dismantled many of Ringworld's attitude jets, which collect and fuse hydrogen from the solar wind, and adapted the huge toroids to serve as ramscoop-field generators. The design of the attitude jets basically fixed the dimensions of the City Builder ramships. All are nearly identical, and are probably elaborations of abandoned Pak craft left on the spaceport ledges.

From a distance, a Ringworld ramship is an enormous blunt-ended cylinder, larger than the biggest No. 4 GP hulls. It is ringed at the waist by a pair of massive, copper-colored toroids, separated by their own diameter. The ramscoop electromagnets clearly comprise at least a third of the mass of the entire ship, and have a major dimension of 1500 feet. The central iron-alloy tube, 800 feet in diameter and nearly a mile long, has three main sections: the forward, or life-support section; the ramscoop/accumulator solenoid section; and the fusion drive. In flight these sections can maintain independent, respectable spins relative to one another.

An elevator built into one of the retractable landing legs gives access to the front section via a large airlock. The plan of the ship utilizes radial corridors converging into a central tube at the axis of the great cylindrical hull. Touchpoints on walls, bulkheads, and door-jambs control internal lighting, causing wall-panel areas to glow a soft yellowish-white. Maps employing tiny detailed pictograms and schematics cover other sections of walls, showing access tubes leading to living areas, ship's galley, medical facilities, recreation and storage areas, auxiliary power, and primary control centers. There are central control centers for engineering/science/communications/life support; for interstellar ramscoop fuel feed; and for fusion drive/intrasystem maneuvering/weapons control. Beneath the featureless front shield of the ship is the hangar deck for re-entry and return vehicles, and a major storage area. Sprinkled over the surface of the cylindrical front sections are thousands of windows, glittering like crystal flecks in any light. In flight, the life-support section, carrying up to a thousand passengers and crew, is spun at a rate sufficient to provide light centrifugal 'gravity.' Magnetic field-reversal effects induced by the spin are manipulated to seal off the front section from the stream of incoming hydrogen ions.

The central section of a Ringworld ramship supports and controls the 1500-foot-diamter ramscoop toroids. In addition, there are several sets of contour and shaping magnet systems which guide the flow of hydrogen ions away from the front section and into the primary mirror-fusion solenoid along the central axis. The aft third of the ramship contains the big fusion reaction motor, auxiliary maneuvering jets, accumulator tanks, and the main exhaust cavity. Inspection tubes from the forward section give access to all the major components of the fuel-feed and drive systems. It should be noted that most of the ramscoop toroids have been removed from the abandoned ships and remounted as attitude jets. But many ships still have functioning auxiliary power and life-support systems, and a few are even intact — presumably in operational condition.

The Ringworld ramship's beautifully-integrated design surpasses that of similar human-built craft. When these ships reached interstellar turnover, awkward reconfiguring was unnecessary. The ramscoop fields and fusion exhausts of Ringworld ships, though, would be just as deadly to anyone in range as those of the antique human ramrobots. Magnetic induction could burn out unshielded electronics hundreds of kilometers away. Near Ringworld's spaceport ledges, ramscoops would never have been used at full intensity. Ramscoop ships, though nearly obsolete in Human Space (due to the advent of thruster drives), remain the cheapest, most convenient way of achieving sublight relativistic speeds in Known Space.

The fantastic spin of Ringworld allowed the City Builders to launch their interstellar flights with relative ease. The ships were simply tumbled or ejected from the spaceport ledges. Ringworld's spin of 770 miles per second is adequate for low ramscoop velocity, and it is several times the speed necessary to escape the Ringworld sun's gravity well.

A typical interstellar flight followed a loop 300 light years long, covering five or six Earth-like worlds in four solar systems. Only a few dozen years of ship-time would pass for the crew and passengers before their return to the starship port on the outside of Ringworld, but their own culture sometimes changed enormously in these intervals. The City Builders knew of, and may have explored and even partially terraformed some of the habitable planets in Human Space, in the distant past. During that epoch, Earth may have been used as a base for a time. In any case, because of time dilation, City Builder ramships may still be coming in, from centuries ago, from abandoned worlds. They may carry representatives of alien species long extinct, destroyed, or altered unrecognizably. They may have picked up blue whales, condors, or other vanished wildlife from Earth — or exotic Slaver artifacts in stasis boxes. Naturally, disabled offworlder ramships, or lost colony slowboats with their passengers in stasis might also find their way to Ringworld.

Landing a space vehicle on Ringworld is extremely dangerous, because of the high rotational velocity, and because of the meteor defense system. Only the spaceports on the outside of Ringworld are safe havens. Using the electromagnetic cannon to match velocities, the ancient ramships gently touched down on the spaceport ledges.

No known physical passages lead through the rim wall to the habitable surface. Rather, a remarkable machine known as a cziltang brone was used to generate a field which temporarily renders the Ringworld floor material semi-permeable. Passengers passed en masse directly through the rim wall with the aid of this 'osmosis generator' for scrith. Ramships often carried their own cziltang brone field generators — if something went wrong, there was no airlock to stick open and spill out large volumes of breathing air. Unfortunately, no working cziltang brone ever has been found, and none has ever been repaired successfully. The physical principles involved in their operation are not fully understood. An improperly-repaired cziltang brone would be quite dangerous, as partial operation of the field can break down biological membranes, causing death or severe brain damage.

ATTITUDE JETS

"We did it to ourselves, didn't we? My people took the world's steering motors for our starships

The rotating Ringworld structure is stable along its axis with respect to the sun, but is unstable in the plane of its orbit. A strong solar flare, or a very large meteor strike, could throw it off balance. Even the meteor-defense laser firing and striking Ringworld might exert enough pressure, over time, to push the Ring off-center. So, a system is necessary to restore equilibrium — to keep the sun and the axis of Ringworld synchronized.

The wheel of a bicycle has spokes to keep its rim centered; Ringworld has attitude jets. There are 200 mountings on each rim wall, regularly spaced every 1.8 degrees, making them about three million miles apart. Along the base of the rim wall, 120 spill mountains lie between each jet. These Ringworld steering motors are big Bussard ramjets which produce thrust by fusing hydrogen streaming in from the solar wind. In operation, each jet collects the solar wind over a 4000-5000 mile radius, gathering and compressing it electromagnetically until it reaches fusion temperatures. In braking mode, the jet fires back toward the sun. Attitude jets can never run out of fuel. A single pair of massive toroids generate the magnetic scoop-field for each engine, and these 1500-foot doughnuts are mounted at the tips of 50-mile-high towers poking out from the rim wall. The mountain-sized brackets seem to be a piece of the rim wall itself, as if the scrith had been stretched out like taffy, then frozen to form them. From a distance, the copper colored toroids resemble a pair

of thick washers, separated by their own diameter, dwarfed by their mounting bracket.

Many of Ringworld's attitude jets are missing. Only the City Builder civilization achieved interstellar travel, taking advantage of pre-existing hardware. They dismounted the attitude jets, built ramships to fit them, and reached the stars. They got their motors for free, but many ramships never returned. The attitude jets that remain still function perfectly, and enough additional toroids have been remounted by repair crews to keep Ringworld stable. In vacuum, attitude jets (and other systems) are immune from the ravages of the superconductor plague.

The centerline of the attitude-jet towers is about 150 km below the top edge of the rim walls. Though the towers have not been visited by Known Space explorers, Map room images show massive toroid-mount and control structures at their tips, which obviously rotate to optimize the inflow of hydrogen.

When the jets fire sunward, they provide surface travelers with a visual spectacle at night. Named "ghost-flames" by various hominid species, the jet exhausts appear overhead as faintly luminous violet flames, clipped off abruptly by the rim walls. Amplified by lensmen, they are intense violet, fanning out like a rocket firing in vacuum — tenuous and tremendous. Farther up the Arch, operating attitude jets look like small iridescent candle-flames. A small pinkish dot can sometimes be seen at the base of the violet plume, like a glowing wick. Attitude jet towers cannot be seen from the surface of Ringworld, and the flames are not bright enough to be visible during the day.

What if some enemy managed to destroy most of Ringworld's attitude jets? The Pak Protectors who built the Ring may have provided alternate means of re-centering it — backup systems for the attitude jets, probably manually operated. It has been speculated that their method could have involved control of the superconductor grid crisscrossing the Ring floor, to produce bursts of large-scale magnetization.

RIMWALLS; RIM WALL MOUNTAINS

"At the Rim there are mountains, just as high as Fist-of-God, as decorative, and more useful — for they hold back the air."

At the edges of the Ringworld are low rim walls, a thousand miles high, rising sunward, which keep the atmosphere from spilling into space. The walls are low only in comparison to the Ring itself. The bulk of the atmosphere lies below 35 miles altitude. Above that, the rim wall is sculptured, irregular, like eroded rock the color of the moon. If you count both rim walls, there are over a billion miles of sculptured, thousand-mile-high mountains on Ringworld. Between the mountains, the vertical rim wall is a smooth grayish glassy cliff, nearly invisible from the surface. Over the millennia, a small amount of air leaks over the edges of Ringworld, but it is continuously replaced.

The top of the rim wall is narrow, no more than a hundred feet across. It is flat, and the scrith has been roughened for traction. The spaceward side of the rim wall is black, vertical, and quite lacking in detail. Deep-radar does not penetrate the rim wall, and no messages can be sent through it. Stepping-discs will not transmit through the scrith, either. From just beyond Ringworld, the space-exposed outer side of the rim wall is sharply silhouetted against the distant, sun-blue landscape of the surface.

From the median line of the Ringworld surface, under the most favorable conditions, the upper reaches of the rim walls are barely visible as blue-black lines. From this distance, the lines are located about where the horizon would be if Ringworld had a horizon. Their theoretical angular width is only a tenth of a degree (for comparison, Earth's moon subtends an angle of about a half a degree). Blurred by a half-million miles of atmosphere, the rim walls show no detail — they are merely fuzzy threads resting lightly at opposite edges of the infinite terrain.

As one travels nearer the rim walls, there is a remarkable visual effect. From 15,000 miles away, it is quite noticeable; from less than 5,000 miles, it is spectacular and compelling. Directly to starboard (or port, if you have approached the portward rim), the wall is at its highest elevation, but the height seems to decrease smoothly according to an inverse function in both directions. Visually, one has the impression of standing near the rounded corner of a gigantic fortress whose sculpted walls recede from you at ninety degree angles to one another. Yet, you know that the rim wall is smooth and has no corners. Traveling parallel to the rim wall, one sees detail on the rounded, moundlike apparition slowly changing, flowing across it — but the shape and direction of the spectral mountain never varies. It is always just opposite, like the moon moving with you at night, seen through the trees from the cockpit of a ground car. Very rarely, one might catch a glimpse of an elevator-shaft tube, as a fine silver thread leading up the rim wall to the top. Technological features originally designed into the rim walls (such as flup-dust jet nozzles and atmospheric recycling generators) are never visible from the surface of the Ring.

THE RIM TRANSPORT SYSTEM

"Civilization tends to spread, if there's a transport system to spread it!"

The Rim Transport System is an electromagnetic rapid-transit system constructed by the City Builders along the tops of the rim walls. As a linear accelerator it is small in comparison to the Spacecraft Landing System, but for the City Builder civilization it provided a major transportation network. Without transfer booths, it was the only feasible way for them to travel Ringworld distances. No point on the rim wall would require more than 14 days journey, including acceleration and deceleration. As the City Builders turned their attention to starflight, the work on the rim transport system slowed and shifted emphasis. It was only partly-completed, extending continuously along 40 percent of the starboard rim wall, and just 15 percent of the portward rim, centered roughly on the oval Great Ocean. The zero median-line of Ringworld's coordinate system runs through the pole of the Island Map of Mars, in that ocean. Major centers of City Builder culture were located near the shorelines, and close to the bases of the rim walls, where there was access to the rim transport system via elevator-shaft tubes. Short segments of the system were built at well-separated sites much farther around the Ring, near the attitude jet towers. These were evidently used during the toroid-dismounting operations of the ramship-construction epoch. The City Builders had discovered by trial-and-error experimentation that the meteor-defense system is not programmed to fire at the tops of the rim walls!

From space, or a Map room, the rim transport system appears as a line of tiny rectangular loops, widely spaced along the rim wall. From the lands below, the system is invisible, hidden by mountain peaks and sheer distance. The 200-foot electromagnetic loops cluster thickly around the rim shuttle stations, but in a few locations are nearly a million miles apart. In operation, a rim transport shuttle is decelerated to free-fall from the spin velocity of the Ring. It then 'coasts' around the rim at a relative 770 miles per second to be accelerated and stopped by another cluster of loops at its destination. Rim shuttles always travel to antispinward — except over short distances. The shuttle-cars themselves are typically 30 feet in diameter and 190 feet long. Passenger shuttles often appear magnificently aerodynamic for vehicles intended to operate mainly in total vacuum, with rows of shiny oversized windows, and tapering ends containing magnetic-interlock couplings. Occasionally, auxiliary braking rockets are fitted in addition to the MAGLEV repulsor motors and induction-sheath. For passengers, the rim stations are generally rather spartan, serving primarily as elevator transport junctions. There is seldom room for more than four shuttle-cars at an average station, and most of the space consists of a service-shed, parts and freight storage, system monitoring and local traffic control facilities. The whereabouts of the rim transport main control center, or of the major shuttle repair hangars is not known.

The rim transport loops are mounted on the roughened-scrith tops of the rim walls, which are at most 100 feet wide. Evidently, the City Builders employed a cziltang brone to soften and stretch the scrith to make mounts for the accelerator loops, a thousand miles above the Ring floor. From most of the rim stations, elevator shafts lead down the slopes of rim wall mountains. In the vicinity of the spaceports, vertical shafts drop directly to inactive Spill Mountains. Each shaft contains twin 20-foot-diameter tubes, and appears as a barely-visible slender silver thread descending finally into layers of cloud and haze at the bottom of the Ringworld atmosphere. Although crippled long ago by the superconductor plague, the rim transport system escaped catastrophic damage since most of it is in vacuum. Major sections of the system are currently operational. For small spacecraft or probes, the rim transport system remains the only safe route above the surface of Ringworld for traveling large distances at truly high velocities.

THE ECOSYSTEM OF RINGWORLD

"Every so often I lose it. I think I've accepted it all, and then all of a sudden it's too tanj BIG! And I lose it. . . ."

The Ringworld engineers layered the inner surface of the scrith foundation with bonded bedrock, soil, oceans, and an atmosphere. The walls were raised a thousand miles high at each end to keep the air from leaking away into space. Ideally, Ringworld should have been an endless garden — it was not, after all, a randomly-evolved world.

The Ringworld imitates the topography of Earth-like worlds, but it isn't thick enough to let the landscape carve itself. Everything is contoured-in so that, from beneath, the sea

bottoms are bulges, the mountain chains look like dents, and riverbeds resemble veins in a weight lifter's arm. There are no tectonic processess to carve and redistribute elements of the biosphere, so vast recycling systems were designed in to sustain the ecology. In the seas and Great Oceans, there are dredges which push the sea-bottom silt into great pipes running beneath the foamed-scrith meteor shielding on the dark side of the Ring. This material, known as flup, is reprocessed and distributed back to the mountain tops, recycling the topsoil. Much of it flows back down from the Spill Mountains, spaced at regular 40,000 km intervals along both rim walls. Swirling fog from their glaciers and snowfields blanket the lower slopes, and play a major part in the overall pattern of water circulation on Ringworld.

A moderate temperature is maintained over the surface of the Ring — on the average - by the shadow squares and the superconductor grid working together to ensure proper distribution of solar heat. The shadow squares adjust their spacing as necessary to regulate the amount of sunlight passing by them to fall on the Ring. Naturally, as the shadow squares adjust their spacing, when one area is heavily shadowed, some other region must be exposed more than usual to the sun.

One property of every superconducting substance (whether cryogenic or not) is that it maintains the same temperature everywhere within it. The superconductor grid embedded in the scrith floor of Ringworld keeps an area equivalent to the surface of three million Earths at an average temperature of about 62 degrees Fahrenheit (290 degrees Kelvin). The figure includes the entire range of nighttime, daytime, desert, and Spill Mountain temperatures. Additional heat control is provided by huge radiator fins (to cool ocean bottoms and mock-polar wastes on the Maps, for example) attached to the underside of the structure. A fairly even distribution of shallow seas and rivers helps to maintain uniform temperatures; and there are a number of localized strategies available for temperature regulation.

Ring-girdling wind patterns were originally set up to provide smooth atmosphere circulation. Jet streams and lesser air-currents shaped by carefully-contoured mountain ranges and river valleys play an important role in counter-erosion processes, keeping soil on the higher slopes and plateaus. At the rims, there are strong winds and vortices which lift flup-dust into the jet streams. Nozzles on the rim walls spray more of the fine dust across the Ring. Atmospheric gases are generated, filtered, and monitored along the rims, and air-replenishment (to replace eye-storm losses) takes place at several hundred thousand small climate control stations across the Ring. These are located near the intersections of the subsurface network of superconductor cables. Local regulation of moisture content, acidity, and other factors also occurs at these stations. Water-condensation field generators are concealed as necessary over the landscape, sometimes in surprising places! Erosive rainfall is generally kept from high places on Ringworld, so mountainous regions tend to be drier than they would be on Earth.

The scrith foundation of Ringworld underlies the ecosystem everywhere, like permafrost below tundra. Only above this impermeable ultrasolid layer can there be a biosphere. In regions where counter-erosion processes have broken down or were ineffective, bare scrith may be exposed. Nothing will grow on mountain slopes. Sometimes relatively large expanses of landscape become isolated by boundaries of naked scrith.

Many unusual habitats for life have resulted from other peculiarities of Ringworld. Hominid species have adapted to life on and in the seas, high up on the Spill Mountain icefloes, and in permanently-shadowed regions below floating cities. Others have become scavengers and nocturnal predators. At least one race has evolved glider wings, and another has mutated sufficiently to conquer the desert wastes.

Moisture generally cannot seep far down to form stable underground water tables, so it is pointless to dig wells in remote or arid regions. The big condensation generators are spaced around the perimeter of 50,000-mile hexagons, and many do not work. Fire-storms can sometimes sweep across continent-sized areas unchecked, even though the relatively-uniform distribution of rivers and shallow seas was originally designed to prevent such calamities. The placement and contours of mountain ranges initially helped to guide windflow patterns in the overall plan of re-circulation, counter-erosion, and fire-control, but this is not always enough. The winds on present-day Ringworld are a major factor in wearing down exposed bedrock. The disrupted airflows of modern Ringworld can even make matters worse when a fire starts.

The ecology of Ringworld has been catastrophically changed by meteor impacts and the meteor defense system. Farside collisions which have penetrated the foamed scrith shielding have subjected the terrain immediately above to flash-heating and shock-waves. A few actual punctures have occurred, creating vast rolling eye-storms, and maelstroms, and enormous waste deserts, like that surrounding Fist-of-God. Nearside encounters have triggered the meteor-defense laser to fire on lands, often inhabited ones, vaporizing nearly everything in swaths ten miles wide.

Since the introduction of the superconductor plague nearly 1200 years ago, systems designed to sustain the ecology have deteriorated. Dredges have broken down, causing seas to silt up and rivers to block. Swamplands have spread rapidly, as well as deserts. A number of the automatic climate-control stations have ceased functioning or been buried. Basically, any and all equipment tampered with by the City Builders has failed. Exposed faces of bare scrith have changed the climate in formerly-verdant valleys, and there are even regions where the composition of atmospheric gases has become dangerously abnormal. Other spots are subjected to radiation from overloaded fusion generators or misdirected communication lasers and microwave beams. Systems sealed in scrith and systems in vacuum (like the rim wall dust jets) have continued to operate as long as power has been supplied.

Of course, much of the Ringworld environment remains hospitable and magnificent. Nonetheless, even the most idyllic habitats are not without their complications and hidden dangers.

THE SPILL MOUNTAINS

"Surely we want to question them regarding the secrets of their peculiar mountains?"

Along the bases of both rim walls, spaced at nearly regular 25,000 mile intervals, are the Spill Mountains. There are about 50,000 of these curious features (actually 47,760) or roughly 66 per degree on each rim. Their heights vary from 30-40 miles. From far above, they appear as oddly-regular half-cones, leaning drunkenly against the rim wall. They have an incongruous, smoothly-weathered look, banded or layered in half-circles: bare dirt-colored peaks; strata of ice and snow far below; then brown and green, spreading down into rocky 'foothills' the size of the Andes. On the lower slopes broad belts of thick ice show the flow-patterns of glaciers, with great gray rocks and blocks of permafrost protruding from the icefalls. Swirling fog frequently hides the mountains' bases. In the distance, at the very limit of vision, the next-nearest Spill Mountain appears as a mere bump at the base of the rim wall.

The Spill Mountains are part of Ringworld's vast recycling system. With no counterbalance to erosion, the topsoil would be stripped from the hills and plains in a few thousand years. Carried inward by winds and rivers, it would all become silt in the sea-bottoms. There are dredges in the shallow seas, though, and great submarine plows in the beds of the deep oceans which keep the sea-bottom sludge flowing. Ultimately, this muck ('flup') is forced down huge heated drainpipes, hundreds of feet in diameter, leading to the underside of Ringworld. A branching network of flup-pipes returns eventually to the rims, buried safely beneath the foamed-scrith meteor buffer. Here the material is filtered, processed, and pumped up the rim walls in molded translucent gray scrith tubing. The flattened tubes, a quarter-mile wide at the top of the rim wall, are fitted through shallow notches as they hook over the lip to lead back into the biosphere. There are baffles on the way down to maintain a smooth flow, and convert the kinetic energy of the descending flup into heat and mechanical power. Flup-dust nozzles well above the Spill Mountains spray precisely-aimed jets of fine material outward, to be carried in the Ring-girdling atmospheric circulation patterns. The bulk of the processed sea-bottom ooze is finally deposited on the tops of the Spill Mountains. Much of the water boils to vapor in the near-vacuum at the peaks, the rest freezes, and the mountain-slopes gradually collapse under their own weight. In this way soil is continuously being regenerated from the ocean-sludge and recycled into the environment.

The Spill Mountains and spillpipe system well illustrate the straight-forward, large-scale engineering of Ringworld. The Pak built with clarity and efficiency, often using brute-force techniques. Though they planned in very long time-spans, they could not have anticipated the superconductor plague introduced 250,000 years after their demise, which caused the beamed-power supply automatically to shut down. The idealized ecosystem of Ringworld has been compromised severely in a number of ways since this event. Many dredges have failed. Some rivers and seas in nearly every region have silted up, creating vast swamplands. Elsewhere, rivers forced to cut new channels through soil and bedrock have left the lands they once traversed as bleak deserts. Less than a third of the Spill Mountains themselves still function with much efficiency, because of the interrupted flow of flup to their summits, and other factors. Most have

insubstantial, irregular flows, or do not work at all.

The dormant Spill Mountains are often inhabited by a strange, specialized hominid species known as the Spill Mountain Folk, or Babrians. Their vertical cities are carved into the rocks and great blocks of permafrost in the ice floes. Strangely-branching stairways and slender suspension bridges interconnect the dwellings and public gathering-places. Generally a single flight of arduous rock-cut steps tumbles all the way down to the timberline of the towering foothills. Biologically well-adapted to life at very high altitudes, the Spill Mountain Folk rely heavily on balloons for transportation. Before the Fall of Cities isolated them, the Spill Mountain dwellers were close allies of the City Builders. They did most of the work on the rim transport system, ran the elevator tubes, and helped operate the spaceports. More recently, some of them assisted in repair crews remounting Ringworld's attitude-jet toroids. Spill Mountain Folk cannot live on fully-active Spill Mountains.

From the spaceward side of the rim walls, the Spill Mountains can be detected using infrared enhancement. They appear as regularly-spaced triangles of coolness strung along the bottom of the otherwise featureless walls. Unlike most other Ringworld topography, the Spill Mountains are not molded or contoured-in to the thick scrith base. The mountains are hollow, defining considerable volumes! Beneath the slowly descending sheath of permaflup and ice, an half-mile or more deep as a rule, is a smooth half-conical shell of non-structural scrith about a meter thick at the base. The steep angle, shape, and slipperiness of the spill-shells guides flup-flow efficiently into the ecosystem — when the spill-pipes are operating. Bonded to the rim walls and Ring floor, the Spill Mountains also serve as reinforcement struts for the walls. Standard deep-radar sets will penetrate no more than 20-30cm of scrith, so the Spill Mountain interiors have not been examined — nor have they ever been explored. The existence of certain machinery within may be deduced, but most of the hidden volumes' purpose is entirely unknown. The great hexagonal grid of superconductor cables in the Ring floor ties into the Spill Mountains along the rims, and the reasons for this are not thoroughly understood. On the darkside of Ringworld immense pipes may occasionally be glimpsed in areas where impacts have vaporized most of the meteor shielding, but the spill-pipe system and other conduits to the Spill Mountains cannot be traced by deep-radar beneath the foamed-scrith buffer.

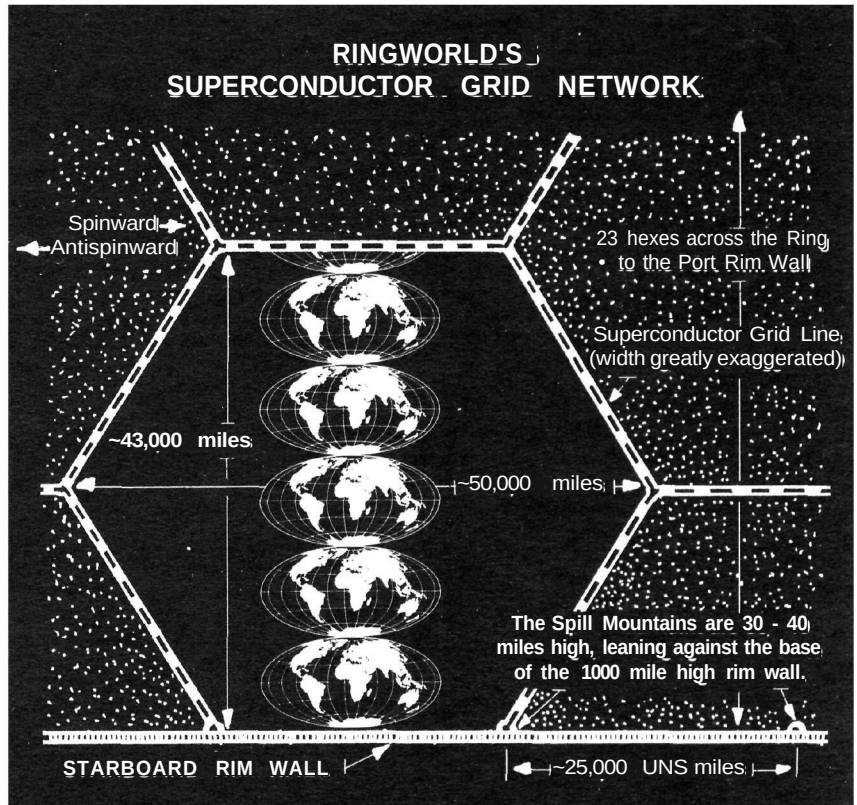
THE GREAT OCEANS

"Those who dared to cross that vastness had not been cowards, and those who returned had not been fools. . ."

Ringworld's surface is more than 50% water. In the beginning, no region was without it. There are countless fresh-water lakes, rivers, deltas, bays, seas, and oceans. The seas and saltless oceans range randomly from ten-thousand to several million square miles in area. They are more or less evenly distributed, linked by networks of rivers. Most of the seas and oceans are rather shallow, seldom exceeding thirty feet in depth. Their edges are usually ragged and irregular, with all the bays anyone could ever use. These highly-convoluted shorelines were designed for the convenience of boats and shipping, for fishing and shallow sea harvesting. Everywhere there are graceful beaches of clean, white sand. Near the shorelines are seaweed forests, numerous small islands, and gentle seabeds sloping out to a uniform depth. Like humans, Ringworlders make extensive use of the perimeters and surfaces of their seas, and there are those who live exclusively on ships and boats.

There are only two "Great Oceans" on Ringworld: tremendous deep masses of salt water, counterbalanced on opposite sides of the Ring. Dwellers in or near one of the Great Oceans might well be totally oblivious to the existence of the other, for it would always be hidden behind the sun. From other vantage points along the Ring, the Great Oceans would be the only major features on the arch discernible to the naked eye, with the possible exception of Fist-of-God mountain. The Great Oceans are truly impressive constructions, each having a total surface area at least two-thousand times that of Earth. From afar, one fails understandably to comprehend and appreciate their true dimensions. Their depth exceeds 20 miles in many places, so that the total volume of water contained in a Great Ocean is at least five-trillion cubic miles. Over twenty Earth-volumes of water would be required to fill a Great Ocean.

One of the Great Oceans was partially explored by the first and second expeditions to Ringworld. It is roughly elliptical in outline, and often referred to as the Great Oval Ocean. The long axis of the ellipse runs across the width of Ringworld nearly 850,000 miles. Its minor axis is 550,000 miles. The total length of shoreline can only be estimated. Taking into account the deltas, bays, peninsulas, and other convolutions, it must be at least 20 million miles. There are several vast projecting bays, with area of 100 planets. It is suspected



Ringworld is 997,000 miles wide, 597 million miles in circumference. On the scale of the diagram, the Port Rim Wall would lie five feet above the center of the page.

A network of massive superconductor conduits buried in the structural scrith floor of Ringworld traces out a pattern of hexagonal areas on the surface of the Ring — the superconductor grid. There are 376,160 such hexagonal areas in all, 23 across the width of the Ring and 15,920 around a circumferential great circle. In some regions, Ringworld natives possess maps based on these hexes. Such maps were once made by City Builders, using magnetic compasses to follow the grid lines. At (or near) the vertices of these hexes there may sometimes be found solar-thermo-electric power receiver stations, climate-control stations, Maglev transit system focal points, etc.

Each of the major hexagonal areas in itself is huge — 1.6 billion square miles, or roughly eight times the total surface of the Earth. The major and minor widths of each hex are approximately 50,000 by 43,000 miles, and each of the six sides is approximately 25,000 miles long. Across the shortest (minor) width of a hex, roughly 5.4 Earth-diameters would stretch, 125 across the entire width of the Ring.

Along the rim walls the superconductor grid network ties into the Spill Mountains in a regular fashion: two out of three Spill Mountains hook into the converging conduits as well as the major circumferential line buried along the base of each rim wall. The Spill Mountains are spaced at intervals of slightly less than one minute of arc around both rim walls. On the Earth, one minute of arc on a great circle is a little over one mile.

Illustration by Yurek Chodak

that some of these bays have induced tidal cycles driven by the action of huge underwater flaps (known as hydrons or aquavators) which force water-masses to flow slowly into and then out of these great marine cul-de-sacs. Fist-of-God mountain is located approximately100,000 miles from the spinward shore of the Great Oval Ocean, along the Ringworld's median line. One of the main urban centers of City Builder civilization, now mostly fallen-to-ruin, lies on the starboard shore of a major bay 200,000 miles further to port. The first expedition to Ringworld, in 2850 A.D., flew over the terrain between the City Builder metropolis and Fist-of-God, a distance only one fifth the width of Ringworld. The other Great Ocean, shaped like a ragged four-pointed star, has never been mapped or explored by humans or City Builders at all. It is known as the Great Star Ocean. The Great Oceans are flamboyant, outrageous features not at all in keeping with the style of the Pak described by Brennan. Though they do serve as handy visual positional references, the reason for their existence is otherwise puzzling. Their great volumes are known to conceal control complexes, repair centers, hidden stockpiles of equipment and supplies, and perhaps even a huge Pak "refugee" ship. Some speculate that the Great Oceans may be merely convenient reservoirs of hydrogen fusion fuel (heavy water), but their deuterium content has not yet been tested. Others maintain that the reason for their design may have been an "intent to deceive" — to keep secret the true identity of the Ringworld's engineers. Mystified invaders might waste precious moments examining the Oceans, time the Pak would use to defeat them.

From the darkside of Ringworld, the Great Oceans are deep bulges with a myriad of molded-in detail. Unlike the shallow seas, the underbellies of the oceans are not smooth, but resemble an inverted topological map of the deep Pacific. There are valleys, ridges, undersea canyons, shallows, depths, and peaks tall enough to be islands the size of continents. The edges of the Great Oceans display a maze of gulfs, bays, river deltas, peninsulas, and island clusters. Jutting from the depths of the oceanic bulges, black triangular fins, hundreds of thousands of square miles in area, project into space — radiators to keep the deep waters cool. The scrith floor of Ringworld is particularly thick beneath the Great Oceans, because of the mass of the water above, and because any meteor puncture in the bed of a Great Ocean would be an extremely serious, potentially catastrophic, event.

The beds of the deep oceans are certainly important in recycling and maintaining the ecology of Ringworld. The sea-bottoms are generally too shallow to allow the sludge (or "flup") to flow to the spillpipe drains by itself. There are dredges in most of the shallow seas, to maintain the flow pattern. Those without independent power supplies failed at the time of the Fall of Cities, crippled by the superconductor plague. From above, a dredge appears as a huge, flat, mud-colored disc. At the front, its seamless rim angles up like the blade of a wood-planer. The long undersea canyons at the bottom of the Great Oceans contain great dredges, still functioning. Major outlets to the spillpipe system, located at one end of each trench, serve to keep the whole ocean bed clear, with the assistance of the submarine dredges.

Whether or not the Pak engineers had originally valued marine life, it is now present in profusion. Only in the Great Oceans are there salt-water fish, deep-water creatures or really huge marine organisms of every description. Legends tell of intelligent sea-serpents miles long, with nostrils steaming like fusion-exhausts and cavernous mouths lined with gigantic, sharp teeth. Life-forms resembling white sharks, sperm whales, orcas, giant squid, Wunderland shadowfish, Gummidgy destroyers, and trapweed jungles have been observed. Sedentary krill-eating sea beasts the size of small islands are thought to exist, camouflaged with entire ecologies established on their backs. In the shallow seas and rivers, there is at least one aquatic hominid species, the sea people, with otter-like adaptations; and hominids may have entered the realm of the deep oceans. Reports of salt-water vampires and giant Sea People have been heard far inland. On Ringworld, if nowhere else in the galaxy, there may be marine dryads — mermaids of a sort. It is not surprising that colorful tales of the Great Oceans inspire myth, mystery, and legend everywhere on Ringworld.

Traditional superstitions run the gamut of fierce storms and sea-monsters, lost civilizations, demons, ancient magicians and powerful immortality potions, among the terrors and delights traced to the Great Oceans. "If something came from afar but comes no more, astronomers who study the arch will say that it comes from one of the Great oceans. Who can deny it, or offer a better explanation?" On Ringworld there may be some truth to these stories, for the original source of City Builder longevity drugs might have been Tree-of-life from beneath the Great Oceans. And unlike the magicians of most earthly lore, legendary Ringworld sorcerers are often mighty armored warriors who never take moral stands. Neither arbitrarily good or evil, these warlike wizards are spoken of as unpredictable, random dangers to be avoided — never challenged and fought. These magicians may have been Pak protectors.

Other tales of the Great Oceans are vivid and variegated. Though replete with heroes, royalty, treasures and incredible feats of detection, the flavor is different from that of most human fables. On Ringworld, every contact is a first contact, and love is seldom eternal. In City Builder myths, heroes' and heroines' loyalties are usually held by imaginatively described rishathra. In the legends of other hominids, conveniently-strange powers possessed by godlike strangers are often taken for granted. The Grass Giants tell of an immortal vampire from the Great Oceans who haunted them for a thousand falans. It grew incredibly cunning with the passing years, and its treasured hoard of the longevity-drug was never found.

Tales of furious tempests at sea are not likely to have required much embellishment. Storms can build terribly over the Great Oceans, and roll for vast distances. There are seldom any spiral patterns of typhoon or hurricane on Ringworld, because no terrestrial coriolis forces exist to create and sustain them. But there are tremendous jet-streams, with cloud-patterns moving visibly within them like rivers in the sky, to drive incredible waves across the vast marine expanses.

The most mysterious features of the Great Oval Ocean are the large island clusters, scattered across its blue ellipse, widely separated from one another. Each is a one-to-one scale polar projection map of an entire planet. The maps of Earth, Mars, Jinx, Down, Kzin, Kdat, Trinoc, and Pierin are all present as well as several known only to the puppeteer species. The puppeteer homeworld itself is not represented. The maps are (or were originally) stocked with the appropriate native intelligent, or proto-intelligent, inhabitants. The geological relationships of the Earth continents suggest that the maps are at least a quarter of a million years old. Why the maps were built, and the present conditions on most of them, are unknown. The reader should refer to the section titled, Island Maps of Worlds, for more detailed information.

THE ISLAND MAPS OF WORLDS

"I wonder how they even knew there were otherMaps...."

In the Great Oceans, groups of tiny island-clusters are visible from a considerable distance, like specks upon the water. These are in reality one-to-one maps of entire worlds — detailed copies of whole planets each millions of square miles in area.

In each Ocean, several dozen such Maps are nearly lost in a marine expanse two thousand times the surface of the Earth. Typical distances between the island-clusters are on the order of a hundred thousand miles.

A close inspection of the Great Oval Ocean reveals a number of the planets in Known Space among those represented in its Map collection. Earth and Mars are there, as well as Kzin, Kdat, Jinx, Down, Pierin, and even the non-terrestrial worlds of Trinoc. Half a dozen unknown maps can be seen, too; including one said by the Puppeteers to harbor a strange communal intelligence. The island Maps are splayed-out polar projections with rather accurate continents. Distortions are confined to sea-space. The geographic arrangement of the continents on the Map of Earth suggests an age of 250,000 years, while the Map of Kzin hints at a somewhat earlier mapping. No one knows whether the Maps were molded (or fitted) in place all at the same time, or separately in their sequence of discovery. For that matter, no one is sure why the Maps were created at all. Perhaps the best clue is that each Map was stocked with the flora and fauna of the world it simulated, always including an intelligent (or semi-intelligent) alien life form. The Maps may simply have been isolated, open zoos for future study, in lieu of time-consuming, scientific experimentation and record making in distant solar systems. Perhaps the Maps were rosters of potential enemy species slated for later extermination by the Ringworld Pak; or perhaps their existence was meant to convince outsiders that Ringworld was not Pak-built. At least one Map has been used as camouflage to hide a great control and repair center.

Little is known about present circumstances on the Map of Earth. Reportedly it was conquered manymillenniaago by explorers from the Map of Kzin, who may still rule it. Presumably the inhabitants of the Map of Earth were originally semi-sentient plains apes and hominids divergent from the main line of Pak breeders. Perhaps the Australopithecine species of *robustus* and *africanus,* which vanished from Earth, were transported to the Map, for example. In any case, hominids from the Map of Earth are said to have subsequently been taken to the Map of Kzin and bred for slaves and non-sentient food animals.

The Map of Mars is raised twenty miles above the surface of the Great Ocean in order to achieve an atmospheric pressure low enough for the Martians. Martians are evidently alive and well on Ringworld. Since they must have adapted to a one-gee environment, they may be more robust than their ancient cousins. Deep-radar scans by the Second Expedition showed vast seas of marsdust fine enough to flow like oil. Under the dust were cities of a sort: stone buildings much denser than the dust, with curved walls and rounded corners and a good many openings. Of the Ringworld Martians, little else is known. Of the vast repair center concealed beneath the Map of Mars, a great deal is known, and the reader should refer to the Control and Repair Center section. Running all around the Map of Mars is a tremendous waterfall. Water condensers remove the moisture at the edges, since it would otherwise prove lethal to the Martians. Presumably, the chemical environment in the dustseas has been modified with oxides and acids of nitrogen to accommodate Martian organisms. Mars' area is 58 million square miles.

The Map of Kzin is filled with primitive Kzinti, and is quite active. There is a substantial civilization based on a hydrogen-powered technology. The culture is ruled from a mile-long ship, the *Behemoth,* once used to explore the Great Ocean. Ringworld Kzinti are not bothered by water, and have never been subjected to Puppeteer selective-breeding programs (such as the Man-Kzin wars). They are ferocious, implacable warriors with no inclination to negotiate, even when faced with hopelessly superior weaponry. The primitive Kzinti use chemical explosives and fly aircraft resembling jet fighters which burn hydrogen. The females on the Map are sentient, unlike those on modern Kzin. Contemporary Kzinti find them strangely appealing. Lush colorful vegetation imported from Kzin flourishes everywhere, and there is plenty of open space. Herds of piglike beasts, yellow with an orange stripe, graze on vast expanses of yellow grassy veldt. In remote regions are feudal Kzin states whose lords build massive stone castles on the peaks of rocky hills. Though their "Age of Exploration" has temporarily come to an end on the Great Ocean, the primitive Kzinti of Ringworld are a force to be reckoned with anywhere in the universe, at least potentially. The exploration-ship *Behemoth* is likely to contain an extensive library with records of past voyages, imagine a human being foolish enough to try gaining admission to it!

The Map of Down is stocked with Grogs, and Kzinti explorers never returned from their voyages to it. Perhaps the Grogs are able to exert telepathic control over species in the Ocean far from the shores of the Map of Down. Opposite edges of the Map of Jinx rise up out of the atmosphere, simulating the conditions at the East and West Ends of that egg-shaped planet. A channel passing through the middle of the Map represents the ocean-band of Jinx. Presumably, Bandersnatchi could be found along the shorelines of that mock-ocean. It would be interesting to try to contact them.

Conditions on the Maps of the other Known Space worlds are presently undetermined. Trinoc is a non-terrestrial planet, and it would be intriguing to find out how its ecosystem is sustained. The Trinocs themselves may be quite different from the suspicious race encountered by humans recently. Kdatlyno, in somewhat lighter gravity, may have become slighter in build — have they adapted to Ringworld air, or are there special atmospheric arrangements? Being able to see would be of advantage on Ringworld. The Pierin may vary substantially as well. The other, unknown Maps, which include the communal intelligence referred to by the Puppeteers, are completely mysterious.

There are no Puppeteers on Ringworld. There seem never to have been; the Puppeteer homeworld (according to the Hindmost) was never mapped into the Great Ocean. This remains unexplained.

The other Great Ocean, the Great Star Ocean, has never been studied carefully — even by the City Builders. Telescopes show glimpses of the island clusters in it, but no expedition from off-Ring has ever traveled there to take a close look. Experts have speculated that the Pak homeworld is Mapped there, as well as the colony worlds of the Ringworld Engineers. Planets along the Pak route from the galactic core may also be there. Amazing discoveries and incredible dangers may lurk there for future explorers.

EYE-STORMS AND PUNCTURES

Beyond the iris region, opaque black clouds swirled around them, moving at greater-than-hurricane velocities.

Eye-storms are impressive, surreal, and quite dangerous meteorological phenomena unique to Ringworld. Although small ones can arise from atmospheric imbalances, especially near the shores of the Great Oceans, they are usually associated with asteroid punctures which have not yet been repaired. A puncture in the Ringworld floor creates an air-sink. Atmosphere spews downward into space through the rupture, and produces a partial vacuum, creating a low-pressure area. Air masses then flow in from all directions. The air from spinward tends to rise, becoming fractionally lighter than the surrounding air. The air from antispinward becomes relatively heavier and tends to sink slightly, since its rotational velocity is fractionally increased with respect to the Ring. A massive, vertical 'rolling hurricane' is formed — an eye-storm.

A large eye-storm may be a thousand miles long. From a distance it resembles a huge, disembodied human eye, brooding over the landscape. Eye-storms are blue and white — white from clouds, blue from distance. The deep-blue pupil of the eye is a foreboding corridor, a dark tunnel of churning winds lit by lightning flashing continuously on all sides. The middle of the corridor is relatively calm, like the center of a terrestrial hurricane. Flying into the axis of an eye-storm gives one the visual impression of "falling into the eye of God." Not the least danger of such a flight is the risk of being sucked downward through the ring floor, and flung into deep space at 770 miles per second.

Eye-storms upset the weather patterns for tens of thousands of square miles around them. Near a looming eye-storm, the sky is always overcast, *a* steel-gray lid over gloomy domains. Slaver sunflowers never grow in such regions. Solar-electric vehicles are useless, but wind power is always available. The idealized ring-girdling circulation patterns set up in the beginning have changed considerably over time, but in few places have they changed more radically than in the vicinity of an eye-storm. Remarkably, the overall air loss at eye-storm punctures is not too serious, compared to the total supply available. Ruptures of the Ringworld floor are rare, and so far replenishment systems have compensated even for eye-storm losses.

On Ringworld are vast flowing rivers of jet-stream clouds, tremendous tempests on the Great Oceans, and there are eye-storms. There are no swirling typhoons nor hurricanes. The flat spiral form of a hurricane derives from coriolis force — the differences in the velocities of air masses at differing latitudes on a normal rotating world. On Ringworld, there is no such whirlpool effect. On Ringworld, the only spiral hurricanes are *vertical* whirlpools — eye-storms!

FIST-OF-GOD

"Every world should have at least one unclimbable mountain!"

A hundred thousand miles from the spinward shores of the oval Great Ocean, almost on the Ringworld median line, stands Fist-of-God mountain. It is an isolated tower, a tilted mock-volcano a thousand miles high, rising above a vast Mars-colored desert, baked and barren of life. Its peak, and most of the steeper slopes, gleam dully like dirty ice. Fist-of-God is capped with naked scrith. The mountain is a massive puncture in the foundation of Ringworld — but the 'crater' at the top is far too high to allow any atmosphere to spill through into the void.

The event that created Fist-of-God must have been equivalent to a collision with an object the size of the Earth's moon falling in from interstellar space. An enormous amount of energy must have been generated by such an impact — the equivalent of ten million trillion megatons of TNT! In seconds, the moon-like body would have heated and vaporized into plasma. The Ringworld floor, and the landscape above, deformed upward catastrophically, as the fireball raised the mountain a full thousand miles. The scrith stretched to its limits, and the incandescent eruption punched through the summit. The brilliant blast must have been visible to both rims, like an atomic explosion. A scorched, sloping, lifeless desert still remains around the base of Fist-of-God, larger in area than all of Earth. Far beyond this shattered terrain, the upthrust has forced the Great Ocean to drain away and recede eight hundred miles to antispinward of its original location, leaving a vast expanse of salt-poisoned land.

Fist-of-God is not a symmetrical cone. It is tilted and skewed about ten degrees from the vertical, to antispinward. Its spinward slopes are therefore the gentler, but even these exceed ten degrees in the middle and upper elevations. At the very top of the mountain, where the fireball ripped through, is a crater that could swallow most asteroids. The lip of the hole is a jagged ring of scrith shards like obsidian spearheads — but these spear heads are the size of normal mountains. The scrith at the top is only a few feet thick, stretched by the terrific stresses of the impact. The mountain's origin is still a mystery, and the date of the impact is unknown. Some very ancient City Builder holo tapes and maps do not show Fist-of-God. A monstrous tidal wave may have swept across the Great Ocean at the time of the mountain's creation, inspiring legends and altering the histories of the Island Maps.

The best available information suggests a lower limit to the age of Fist-of-God: roughly 12 centuries, approximately coinciding with the introduction of the superconductor plague. The geologically recent event may not have been a chance hit by a rogue planetoid. It may have been a near-miss — an intentional massive potshot intended to take out the Repair Center and puncture the Great Ocean. A returning City Builder ramship might have been the cause: unable to slow appreciably from interstellar velocity, the crew perhaps dead, a ramship could not have been targeted by the meteor defense solar laser. The resulting ultra-high speed collision and fusion explosion may have been energetic enough to raise Fist-of-God.

Whatever the cause , it is a tribute to the structural integrity of the Ring, and the ultra-solid properties of scrith, that only limited damage was sustained. Attitude jets must have compensated for any dynamic instabilities produced by the impact.

Fist-of-God is one-fifth of a degree to spinward, and slightly to port of the Map of Kzin, 330,000 miles away. From beneath Ringworld, from the darkside, the immense, tilted conical shell is merely a dimple filled with fog, big enough to shine by starlight. To appreciate the size of Fist-of-God, one must view it from the surface, standing behind a Euclidean landscape vaster than the habitable exteriors of all the worlds of Known Space.

CONTROL AND REPAIR CENTERS

"Mars is missing!"

The Map of Mars in the oval Great Ocean is a polar projection, with the north pole at the center and the south pole spread out around the rim. The top surface of the map is 20 miles above the sea, with a great waterfall running all the way around the rim to take the water vapor out of the atmosphere with condenser-fields. The rarefied air must be kept dry, since moisture is lethal to Martians. The base of the Map is hidden in a sea of white mist where the wall of falling water thunders into the ocean.

The Ring-girdling web of superconductor cables has a major nexus in the scrith floor 20 miles beneath the north pole of Mars. Here a narrow scrith pillar leads down to a main control complex protected by a system of huge airlocks. The rest of the space hidden below the surface is a vast, labyrinthine Repair Center for the Ringworld. Its area is 56 million square miles, and its total volume is 1.12 billion cubic miles. Seen from the dark-side of the Great Ocean, the indentation contours for the Map of Mars are missing, hinting at something big concealed above. Deep-radar scans from sea level clearly trace the outlines of massive curved doors in the wall of the Map, hidden behind the curtain of falling water. These six tremendous hatches could pass a war fleet, or a blowout patch big enough to cover the crater in Fist-of-God. There may be specific signals to open the main doors, but none have been discovered.

Inside the Repair Center is a separate world, built for Pak. There are power storage rings and fusion generators, some working, some not. Tremendous heat-exchangers and pumps cool the Map of Mars and prevent temperature anomalies from showing up in the environment. There is a maze of plumbing, gas pipes, and electrical-control conduits. A great deal of space is residential, mainly room-sized cubicles spartan in their simplicity. There is a mile-high exercise room and a gigantic Map Room. Food storage bins, tool lockers, shop facilities, and utility nooks are everywhere. Six-foot-diameter scrith-repulsion floating disks are stored in the thousands. A half-dozen monstrous cavities around the perimeter of the Map-wall evidently house major repair equipment and at least one really huge spacecraft. One such bay contains winches and scaffolding for remounting attitude jets, and there may be spare attitude jet toroids sealed in scrith vacuum-vaults. Patches and patch-handling machinery for major meteor punctures are in another bay. A hangar cavity enshrouds a fleet of ancient Pak attack craft. It has been speculated that the entire Map of Mars may itself be detachable for use as an emergency refugee ship. Perhaps it was used to import breeders from Earth long ago when 'Ringworld' was new.

There is a hemispherical chamber in the Repair Center 38.8 miles in diameter, lit by an artificial fusion sun. Tree-of-life grows there, in what was once a thousand square-mile garden. Now it has turned into a gentle wilderness of ponds, streams, low hills, and lush vegetation. Most of the life forms here must have been imported from the galactic core by the Pak. There are dense forests of lacy, bell-shaped trees. Hundreds of square miles of yellow bushes and low plants with dark green, glossy leaves still flourish. For this reason alone, the Repair Center is one of the most hazardous places on Ringworld. Hominid visitors must wear pressure suits in this Pak mini-world or they will go mad with the smell of Tree-of-life root.

In the complex beneath the north pole of Mars there is a much smaller patch of Pak-like environment isolating automatic controls and manual overrides for some of the Ringworld's major defense and power systems. The superconductor grid's manipulation of solar flares can be controlled from here, and there is a subsystem to trigger the meteor defense laser. The main ecosystem monitoring computers are here, and solar power from the collector stations is balanced out (when they are operating). Even the spacecraft landing system can be operated manually from the control center — but attempting any such task will be difficult and hazardous for the boldest, luckiest explorers.

Travelers to Ringworld are urged to avoid the Repair Center beneath the Map of Mars. It is nearly impossible to enter safely and explore; the risks are tremendous. For a quarter of a million years, it has been protected successfully by the natural barriers of distance, Great Ocean storms, and a dozen formidable predatory ecologies. There are rumors of serpents miles long in the sea around it. There are "unnatural" barriers, too — primitive Kzin-ti and robust Martians who have adapted to one-gee gravity, to name just two. Auxiliary control centers for particular systems and small utility/repair stations are known to exist on the Ring floor and elsewhere, though their precise locations are often obscure: the Spill Mountain interiors are an attractive possibility. Explorers seeking profitable knowledge and hidden treasures on Ringworld would be well-advised to restrict their explorations to auxiliary centers. Even then, spectrometers must be carried, set to register traces of thallium oxide.

A second major repair center (or more) may exist, perhaps concealed in the Great Star Ocean, which has never been mapped, or even closely observed.

It is likely that any other such complexes would be just as well-guarded as that beneath the Map of Mars.

THE ARCH

"It is said that, in the days of wonder, even this very world was bent to its present shape,
And the Arch raised above it."

Darkness falls quickly on Ringworld. A midnight-blue shadow sweeps suddenly across a mountain in the distance. In seconds, it is gone. The sun is only a golden sliver now, cut by blackness. Something takes shape in the darkening sky. An enormous parabolic Arch, like some vast handle attached to the vanishing edge of the Euclidean landscape.

From beyond the infinity-plane, the Ringworld arches over itself, in stripes of baby-blue, interrupted by narrower strips of near-black. At its base, the Arch is very broad. It narrows swiftly as it rises. Overhead it is no more than a slender broken line of blue-white, glowing like ceiling light panels. At the zenith, the Arch is occulted by the otherwise invisible halo of shadow squares, silhouetted by pearly streamers in the luminescent solar corona.

Nightfall on Ringworld resembles, more than anything else in human space, a total solar eclipse viewed from the Earth's surface. At night, the great Arch glows far brighter than moonlight, masking the fainter stars and nebulae. Since the ring is oriented parallel to the galactic plane, the central band of the Milky Way, and the galactic core, can never be seen from the Ring floor. The beauty and mystery of the Arch is enhanced at night when the Ringworld attitude jets fire, for they resemble ghostly violet candle flames along the edges, rising vertically. In the daytime, the Arch remains visible, if one knows where to look (most natives do), melting into the blue of sky, providing a valuable directional reference on the endless terrain.

With the naked eye, one can pick out just two features on the Arch, the Great Oceans. There are two of them, balanced 180 degrees apart on the Ring, they are easy to see — unless the observer is within a million miles or so of either one. It is not surprising that many of the hominid cultures worship the "Arch of Heaven" and view the Great Oceans as origins of magic, myth, and legend.

Some natives have made gods of the Ringworld engineers whom they believe, "raised the arch in a sign of the covenant with man." Their religions commonly employ sacred alters depicting a flat disc-shaped landscape with blurred details around the edge, surmounted with a parabolic golden arch. A highly polished golden ball (representing the sun) is suspended from the Arch by "sunwire." The travelers of the first expeditions found little difficulty in passing themselves off as dieties when they descended from the sky on their cycles. Only when, through ignorance, they violated local religious conventions were they attacked by the natives.

The great Arch, while visually engaging and theologically practical, is also indispensable as a landmark. The two "bases", 180 degrees apart, are (naturally enough) located to spinward and anti-spinward. When no rim wall is visible (which is most of the time, unless one is quite near) the Arch provides a valuable directional reference. Facing spinward, starboard is to the right, and port is to the left. Verbal directions are often given with respect

to the Arch. For example one might say "slightly to port, near the base of the spinward Arch." The shape of the Arch's curve gives a good indication of ones position across the width of the Ring. On the median-line it raises with perfect symmetry, while close to either rim wall the nearside of the Arch looks almost straight. Furthermore, if one of the Great Oceans is visible (or Fist-of-God, through a telescope) it may serve as a reference point whose altitude gives a precise measure of chordal or angular distance from it around the Ring.

From behind the infinity-horizon the arch swoops up rapidly. One quarter degree above the horizontal, its base is 62 degrees across. By one-half of a degree (the angular size of Earth's full moon) elevation, it is 33-1/2 degrees wide. At one degree it's shrunk to 17 degrees; and by five degrees (the apparent width of a fist held at arm's length) its breadth is only 3-1/2 degrees. At 45 degree elevation the arch is less than half a degree wide, and it narrows to just one third of a degree overhead. It should be noted that the angle of arc around the Ring is always twice the elevation of that point in the sky.

The great Arch is important in the psychology, history, and the mythology of most Ringworld hominids. Worship of the Arch is frequently encouraged among subject species by more sophisticated species whose own covetously-guarded knowledge of the Ring helps them to dominate others. Some individuals become so deluded that they have dedicated their lives to heroic quests in search of "the Base of the Arch" — a task comparable to seeking the pot of gold at the end of the rainbow. Whatever its local cultural significance or magico-religious interpretation, though, the great Arch is an ever present natural fact of daily life on Ringworld, like the vast Euclidean landscape and the constant full noon. It may be presumed that, if a Ringworld native were transported to Earth, he would find the close horizons, the lengthening shadows of late afternoon, and the loss of the arch fearfully unsettling.

ENERGY AND POWER ON RINGWORLD

"Ancient magicians were said to be able to turn glass into diamonds. But these were children's tales!"

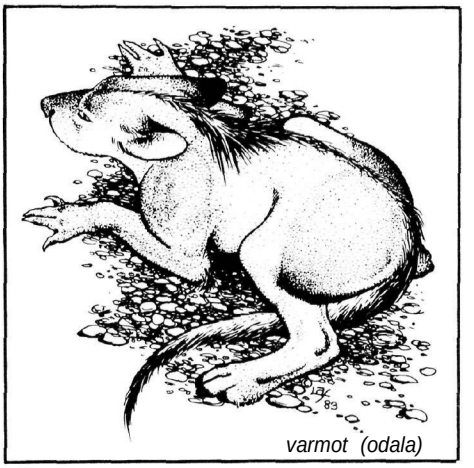
Primitive modes of energy generation and power use on Ringworld superficially resemble the archaic methods of non-technological cultures everywhere. Hominid labor is always available, whether in the form of exploitation for wages, or the slightly less subtle expedient of forced-work gangs without compensation. Equitable division of social tasks is most common among the hominid species closest to the land. Draft animals are common, and creatures ranging from greldiks to snorters are used for transportation. The Grass Giants build heavy wagons which they themselves pull. Teams of Runners hire themselves out to draw tour buses full of Hanging People in sparsely wooded territories, and rickshaw variations are found everywhere.

Along the shallow rivers and canals, barges, boats, and rafts are pushed with poles or hauled along by hand with rope. On land is a wild profusion of hominid-powered primitive railroads, sled-trams, and even vertical balloon-car lift systems cranked by animals in harness or hominid pulley-operators. The list is endless, and only the Healer Encyclopedia attempts a complete compilation.

The natural power sources available to Ringworld natives are pretty much limited to sun, wind, and flowing water. Crude windmills and waterwheels are regular inventions, especially where the airflow is enhanced (near oceans, eye-storms, or the rim walls) or where the terrain is steep enough to create fast rivers. Sometimes surprisingly efficient generators of this type are built using advanced technology supplied by, forgotten by, or stolen from higher cultures. Passive solar designs are used by Ringworld surface-dwellers much more extensively than on the worlds of Known Space, where clean cheap fusion power is plentiful. Chemical fuels are scarce on the Ring floor, and there are no tectonic processes to produce geothermal energy. Fossil-fuel reserves such as coal, oil, and gas are essentially unknown in quantity beneath the soil, though methane produced by decomposition in the swamps is sometimes used. There is peat from the bogs, and wood is plentiful in many regions. Ringworld has no moon to cause tides, so the only areas with significant tidal-energy resources are those bays and oceans with submerged aquavator flaps for induced water flows. One of the most ingenious schemes used by any primitive culture was suggested by the Sea People. Lines were attached to working dredges in the shallow seas and used to power machinery in factories built along the shoreline!

Intermediate-level civilizations on Ringworld are always in an energy pinch. The Machine Empire relies heavily on alcohol distilled from bio-mass, so considerable acreage is devoted to cultivation of fuel as well as food. Methane gas as a byproduct of organic decay is used extensively by some cultures to power vehicles, for cooking, and for lighting. There are even mechanistic societies based on hydrogen, such as that of the primitive Kzinti on the Map of Kzin. Species lacking knowledge of electromagnetic technology sometimes possess solar electric generators built by more advanced races, and these are often used simply to break down water into oxygen and hydrogen. Hydroelectric power is uncommon except in regions where there is enough waterflow to make it practical; though high-tech jury-rigging is seen occasionally in the gentler rivers. Steam is a favorite dynamic energy technology on Ringworld, and there are some impressive expanses of landscape spanned by wood-burning railroads similar to those of ancient Earth. Human muscle is applied more efficiently in the intermediate-level cultures, many of which have reinvented the bicycle. Alcohol-powered motorcycles and light aircraft are popular in a number of these civilizations. When there is a substantial industrial base, moderately sophisticated technologies frequently achieve solar thermo-electric power generation, flywheel-storage and motors, chemical batteries, fuel cells, electromagnetic dynamos and low-temperature superconductor energy systems. A few are rumored to have learned about beamed microwave power.

Advanced energy systems on Ringworld for a quarter of a million years were based on solar energy beamed out from the shadow squares to microwave collector stations. Thermoelectric converters generated the power, and it was distributed throughout the



varmot (odala)

Ring surface via the superconductor grid buried in the scrith floor. Auxiliary power was usually fusion, and of course the attitude jets were magnetic ramscoops incorporating monopoles. The City Builders learned how to tap into the energy flowing through the solar receiver sites, and used it as a base for the most technologically advanced civilization on Ringworld. They developed MAGLEV scrith repulsion motors and built floating cities held aloft by MAGLEV generators fed by microwave power-beams from the receiver stations. Because of the City Builders, electromagnetic technology is widespread and some of the "old machinery" still works, particularly sealed solar-electric superconductor units and storage-rings. Reconnecting them is surprisingly easy, on occasion, to Known Spacers with knowledge of basic wiring. There are four basic structures for room-temperature superconductors used by Puppeteers, and only one has a chance of being affected by remnants of the superconductor plague they spread. It is therefore possible to import power-systems based on an immune superconductor technology, and it is also possible that Ringworld hominids other than the City Builders may presently possess advanced systems of this type rivalling anything in Known Space. Other useful relics of ancient science include the sealed thermoelectric superfluid generators, now occasionally used to power steam engines by intermediate-level cultures. These closed-cycle units required only moderate temperature differences to operate, but often fail in marine applications if they are removed from the water and allowed to dry out.

Exotic power sources are not common on present-day Ringworld, but some surprises may be in store for Known Space adventurers. Gravity generators, mass conversion, and reactionless thrust technologies are unknown to Ringworld natives. Material and devices dependent on zero-gee manufacturing industries are absent. Nothing like the Slaver stasis field has been found, although given the presence of Slaver sunflowers (for example) in the ecology of the Ring, there may be Slaver artifacts in stasis on Ringworld. Hyperwave theory and transfer booth (or stepping-disc) systems seem never to have been discovered. Magnetic monopoles are rare on the Ring floor, except as they have been incorporated into technological systems and fusion generators by advanced races like the City Builders. Fusion generators which have absolutely no weapons potential by themselves have been used to produce fissionable materials for nuclear reactors and bombs, on occasion. Laser systems are more common

than one might expect, considering that "fighting with light" is forbidden by some species. Powerful energy sources based on the mutual secret of scrith and the cziltang brone may be possible, and would certainly be worth investigating. In the final analysis, though, the tremendous flow of beamed solar energy from the shadow squares is the most logical choice as a readily available power source, if only part of the system could be restarted. Such an undertaking would probably require a trip to the shadow squares themselves. Tapping into the superconductor network in the Ring floor might be worthwhile in the meantime ...

LIFE ON RINGWORLD

"What is it that shapes a species?"
— Louis Wu

Several billion years before the construction of Ringworld, a race known as the Thrintun developed an irresistible telepathic ability called the Power, which made it easy for them to impose their will on other species. The Thrintun enslaved all the intelligent organisms they encountered, using the technological skills of the slave races to build a vast interstellar empire spanning much of the Milky Way. Often a single Thrintun family owned and ruled an entire slave planet. Eventually, a slave race of advanced biological engineers, the Tnuctipun, found a way to rebel. They created semi-sentient species immune to the Power and used them to help destroy the Slavers.

The Thrint homeworld is a terrestrial planet slightly smaller than Earth, with lower gravity. Worlds not initially Thrint-habitable were seeded with a Tnuctipun-developed food-yeast, becoming food planets, their oceans full of the cheapest source of nutrition in the galaxy. (Such food was fit only for slaves, of course, but there were plenty of slaves.) After the original yeast had mutated to the point that it was no longer edible, even to a slave, the world was colonized with herds of yeast-eating white-foods. Whitefoods (later known as Bandersnatchi) ate anything, and were a rich source of meat for the slaver Thrintun.

In the war between the slavers and the Tnuctipun, nearly all sentient races in the galaxy were destroyed. The Thrint used powerful thought-amplifiers to order their rebellious slave races to commit suicide; but without slaves the Thrintun too soon perished. All that remained of the vast Slaver empire, scattered through the spiral arms of the galaxy, were the primitive food planets — hundreds of them. The Tnuctipun-developed yeast-scum survived and mutated. Several billion years later, it evolved into terrestrial life on Earth, Pak life in the galactic core, and a variety of other advanced species — Puppeteers, Kzinti, Pierin, and Kdatlyno (and others) in Known Space. It is no coincidence that carbon-based species are so similar, down to the molecular level, on Earth, the Pak home world, and Ringworld. Millions of years ago, it was no accident that stargoing Protectors singled out Earth as a possible new Pak home.

Life on Ringworld began as a careful selection of beneficial plants and animals imported from Pak worlds. All was planned as an endless garden for the breeders, and environmental monitoring went on continuously. There were no dangerous predators or bothersome parasites. Exotic organisms and semi-sentient races from nearby Pak-like (or quite different) worlds were stocked on isolated Island Maps for further evaluation. Mutations were not permitted, unless planned by the Pak. When the Ringworld Protectors imported *Homo habilis* from Earth en masse, they may also have transplanted flora and fauna to which the terrestrial breeders had become accustomed. In a much more recent epoch, City Builder ramships returned with a variety of fascinating life-forms taken from dozens of other planets, in Known Space, and beyond.

After the Pak Engineers of Ringworld died off, mutation and speciation progressed rapidly. The breeders from Earth had acquired a great deal of genetic variability. Non-lethal mutations now usually survived. The hominids expanded into the limitless space available, filling empty niches in the ecology and creating new ones. As new habitats evolved, hominids spilled into them and diversified, so that there are at present several thousand known separate species. The total population of sentient hominids on the Ring is approximately thirty trillion — a thousand times the population of Human Space. Some species have become quite specialized, adapted to vast, strange habitats peculiar to Ringworld.

Plant and animal life have also changed and diversified over the millennia. Predators, parasites, and disease-producing bacteria have evolved. In some areas there are dangerous genetic viruses, capable of producing drastic transformations in hominids, possibly a relic of the plague which killed all the Protectors a quarter million years ago. In other regions, exotic species such as Tnuctipun-bred Slaver sunflowers completely dominate the landscape, accidentally spread by cultures such as the Grass Giants, who use them to defend their longhouses. Creatures up to and including the Bandersnatchi have escaped (or been taken) from the Maps of Worlds, conceivably by City Builders or other, more ancient peoples. Biological engineers have existed on Ringworld, and they too have made contributions to the inventory of life, both non-sentient and hominid. The wildest habitats are the Great Oceans, which hold a plethora of almost entirely unknown species, some of truly mythic dimensions.

For the most part, life on Ringworld is abundant, variegated, and benign, the foregoing exceptions notwithstanding. The biosphere is a complex cycle of checks and balances flourishing above the scrith floor as arctic life flourishes above the permafrost in summer. As on terrestrial worlds, the animal life ultimately depends upon the plant communities for stored energy from sunlight. In the areas originally traversed by off-world expeditions, there were grazers, croppers, and even creatures like warthogs which root in the soil. Like Earth's African savannas, the most fertile grasslands can easily sustain many thousands of kilos of animal mass. There were flocks of birds above the herds, feeding on insects. Also observed were scavengers, hominoid, animal, and vulturine, as well as large carnivorous birds. Creatures resembling the heavily-armored pangolins of Earth preyed on insects, and there were dung-beetle analogs which returned the animal wastes deep into the topsoil.

Although there are many atypical habitats, such as caves, shadow farms, and artificial bogs, usually there is coexistence and a sense of order in the environment. As with complex natural ecosystems everywhere, little is wasted on Ringworld. The past two hundred thousand years have given enough time for equilibrium to arise in the system — though the web of life still changes, it remains fairly stable, barring catastrophes.

Animal species seen on the first two off-world expeditions included green dwarf 'elephants' called zanjii; as well as varmots, havligs, greldiks, and snorters. Sausage-plant varieties were common, as well as elbow root, and there were many other interesting forms of vegetation ranging from dragonvines to cultivated ivory-trees. Maps in the Great Ocean, of course, have their own distinctive biosystems.

CITYBUILDER LORE

The Rise and Fall of the City Builder Civilization: The Superconductor Plague

You are of the species that conquered the Ringworld and the stars!

Seventeen thousand years ago on Earth, the last magnificent cave paintings were being created at Lascaux in southwestern France. At just about the same time, the City Builders became the undisputed masters of a large sector of Ringworld. They achieved the most widespread technologically-advanced civilization in the history of the Ring. As far as is known, they were the first race to spill over (and through) the rim walls to the spaceports, and the only race to travel between the stars. They profoundly influenced dozens of other hominid species — even biologically modifying some for specific purposes. In the Ringworld era, the City Builder empire lies in ruins, the victim of a technophytic bacterium that destroyed superconductor material. City Builder artifacts can be found everywhere across their old domains, though, and in some areas their magnificent floating cities once more are being pieced together. Ringworld natives in many regions still use the old City Builder tongue, or dialects derived from it.

Many factors contributed to the City Builders' success — but their political power came first. They long ago discovered that other species were useful as allies and often were good company. Unlike their remote Pak ancestors, the City Builders were never xenophobic. Their extraordinary fertility led them to adopt the practice of rishathra for birth-control. Soon, they found that this custom also gave them power and influence among other hominids. A potent tool for political control emerged when vampire-scent was refined for use as "rishathra perfume." Other chemical agents were also developed to manipulate the behavior of visiting dignitaries. The City Builders had learned cooperation between species millennia before they became

sophisticated enough to exploit and dominate their allies. Mutually beneficial associations with 20-30 other species already existed when their empire-building era began. It was easy to form a powerful industrial base, by capitalizing on the good nature and trust of their friends. Many of the hominids who became subservient to the City Builders were not consciously aware of it, and some became highly dependent on them. Others pragmatically realized that their support of the City Builders would secure them a far better standard of living than they could achieve themselves.
Like any powerful, expanding civilization, the City Builders and their allies conquered those species they could not persuade.

With an empire came the need for maps — lots of detailed maps. Using magnets for compasses, City Builder explorers traced a web of lines running in 80,000-kilometer-wide hexagonal patterns through the Ringworld foundation. (This is, of course, the Superconductor grid). Everywhere the network was the same, intersecting the Spill Mountains at regular intervals. Suddenly, Ring-cartography became much easier. Ages passed before the City Builders learned enough physics to guess what they'd been mapping, but their speculations led to the development of their own superconductor material. Magnetic fusion power, beamed microwave energy, and MAGLEV scrith-repulsion transportation systems soon followed. The City Builders' rapid rise to dominance culminated in their discovery of the solar power flowing in from the shadow squares. When they figured out how to tap into the collector stations (located at superconductor grid intersections) they had more energy resources than they could use!

The City Builder civilization became fabulous and resplendent. They built tall even where there was no need. Incredibly beautiful floating cities balanced hundreds of meters above the Ring floor. They were spacious and grand, often with a million inhabitants. Floating isolated in remote regions were the private dream-castles of the elite — ten stories high, and stocked with exotic flora and fauna. Giant MAGLEV ships plied the Great Oval Ocean; while flying cars, shuttles, and transports rode the skies on beamed microwave power from the receiver stations. Holo-images from shadow square telescopes were intercepted and their secrets decoded in huge Map Rooms, where details of the entire Ring could be viewed. Holographic magnifier-booths revealed the spaceport ledges on the outside of the rim walls, and hinted at their contents. Elevator tubes were built up the rim walls with the help of species biologically-adapted to high altitude, and construction of the Rim Transport System began at the top edges. The City Builders were brilliant, resourceful engineers. Though they learned about the meteor-defense system the hard way, they did not let a few catastrophic setbacks halt their progress. Hominid species traditionally close to the City Builders prospered along with them in this era.

When they spilled down the outer rim walls to the spaceports, the City Builders found incredible treasures. There were big laser cannon and other new weapons. Several huge fusion ramships were there — primitive, but intact and serviceable. The ships' ramscoop-field generators were obviously of the same design as the attitude-jet toroids. The spaceport facilities were massive and unsophisticated, but there were cubic-kilometer stockpiles of building materials. Few (if any) physical passageways could be found through the rim walls, but crawlers, winches, and big, strange-looking field-projectors were parked next to the bases of the walls. Smaller versions of the field-generators were found on the ramships. Learning how to use these *cziltang brones* was a remarkable achievement. It is not clear if the City Builders ever thoroughly understood the basic physics of these devices, but they became adept at operating them. Cziltang brones project an osmosis-inducing field which renders scrith temporarily soft enough to walk through, pushing against a flow of escaping air. The big spaceport generators allowed the City Builders to drag through crews and machinery in quantities sufficient to expand the spaceport facilities and construct new ramships. They began dismounting many of the Ringworld's attitude-jet toroids to generate their starships' ramscoop fields. The stage was set for a golden era of interstellar exploration and colonization.

Massive City Builder ramships were tumbled off the spaceport ledges, flung well clear of the Ring by its tremendous spin. For landing, the 160-kilometer-diameter electromagnetic loops of the spacecraft decelerator system were used to match velocities. City Builder expeditions naturally headed toward the stars, since the system of the Ring had been swept entirely clear of planets and other debris by the Pak. Perhaps they learned of the existence of small spherical, naturally-evolved worlds through holos left at the spaceports by the Pak. Normal planets probably seemed as exotic and mysterious to the City Builders as Ringworld seems to flatlanders. The City Builders are likely to have visited and explored the solar systems of Known Space from time to time, thousands of years ago. The total volume traversed by the ramships must be hundreds of times greater than Known Space, though. Traveling as they do at velocities approaching lightspeed, ramships are subject to relativistic time-dilation. Moreover the City Builders supplied their ramship crews with a longevity drug much more powerful than boosterspice, a side effect of which reduced their fertility. How many of the huge spacecraft may still be plying the interstellar void on return trips to Ringworld (and with what cargoes) is unknown — but ramships could still come in, from systems a thousand light years beyond the tiny bubble of Known Space.

Grass Giant

In the year 1733 A.D. on Earth, the last of 13 American colonies was founded in Georgia. On Ringworld, the superconductor plague was introduced by the Puppeteers, no doubt from a safe distance, avoiding any possibility of detection or direct confrontation. According to the Hindmost, the Puppeteer Experimentalist government was seeking ways to expand their interstellar trading empire at minimal risk. They purchased Ringworld's location from the Outsiders. Telescopes and automatic probes equipped with laser spectrographs were used to study the structure. Since they were hesitant to contact a civilization so powerful as the City Builders, the Puppeteers analyzed the Ringworld superconductors, and developed a technophytic bacterium capable of feeding on the material. Probes seeded this superconductor plague across the habitable surface of the Ring. Puppeteer strategy called for trading ships to follow, coming opportunely (and profitably) to the rescue. Unfortunately, a Conservative faction took over the government, and the Ringworld venture was abandoned. Not until 600 years later — under the threat of Kzinti expansion — did Experimentalists regain political control; and not until the end of the Man-Kzin wars did the Puppeteers again considered sending trade and rescue missions to Ringworld. Alien affairs experts caution that the Hindmost's account may not be thoroughly accurate or truthful.

On Ringworld, the superconductor plague was catastrophic for the City Builders. Most of their machinery began to break down.

Cziltang brones failed in operation, trapping spaceport personnel and ramship crews on the spaceport ledges, and sometimes in the rim wall itself. The solar-power receiver stations began to fail too. Their tremendous energy-beams, which sustained most of the MAGLEV flotation units and transportation systems, began to flick off all around the Ring. Because of the vastly-decreased loads being drawn, the shadow square thermoelectric generators shut down automatically. The floating cities fell, taking billions of City Builders with them. Urban centers on the ground below were smashed to rubble by the falling towers, crushing tall buildings and driving themselves like spears through the lower levels. On the oceans, huge seafarms and marine metropolises fed by the beams sank almost as abruptly. Ships and air-shuttles everywhere met disaster. The City Builders' civilization had collapsed, almost overnight, with the event which came to be known as the Fall-of-Cities. Only a relative handful of the floating buildings with sealed, independently-operating power sources, survived.

The City Builders at the time of the game know essentially nothing of the spacefaring civilizations of Known Space, though they know of the strange inhabitants of the Island Maps. Most blame the destruction of their empire on sabotage by enemy species, or on bacteria brought back to Ringworld by one of their own expeditions. Whether or not the superconductor bacterium still survives in isolated pockets is unknown. Of the four superconductor structures known to humans, only one type is susceptible — but the microbe may have mutated. Obviously, travelers would be wise to carry only superconducting devices that are either immune to the plague, or that are totally sealed units.

In the wake of the superconductor plague, the ecosystem of Ringworld deteriorated rapidly in many regions. Dredges failed with increasing frequency, causing rivers to block, seas to silt up, and vast new swamplands to form. Marshes and jungles overran many ruined City Builder metropolises. Shifts in the Ring-girdling atmospheric circulation patterns created deserts where there was once verdant farmland; winds scoured the landscape down to bedrock or bare scrith in certain areas — particularly mountain peaks. Great rolling eye-storms and wide tracts of permanently-overcast terrain have arisen from unrepaired meteor punctures and damaged climate-control systems. Firestorms have turned huge expanses into barren wastes. The hominids (and other species) have adapted or died out in these new marginal lands.

The existence of Ringworld is considered top secret by the governments of Earth and Kzin — who have also recently learned the secret of the quantum II hyperdrive. Much of the information about Ringworld may be misleading or inaccurate, though, since it is based on the tales of a single City Builder woman who visited Earth. The existence of a powerful longevity drug has been confirmed, but its effects on humans (if any) are not known.

RISHATHRA

The City Builder term for sex with a partner not of one's own species but within the hominids is *rishathra.* The custom is widely known, a cultural relic of the ancient City Builders' rise to power on Ringworld. Many hominid species still preserve the practice, as a venerable tradition or for more practical reasons — a means of mutual birth control, a first move in a trade agreement, or perhaps a way to seal a truce. Rishathra may be a formality or an official duty, but frequently it is done enthusiastically, accompanied by much ceremony and ritual.

Often there exist well-established codes of protocol regarding rishathra — the circumstances under which it is necessary, who must suggest it, who must perform it. For many hominid cultures the practice is strictly taboo; for some species physical or biochemical differences make rishathra impossible. Attitudes may vary widely even with a single species. For example, interspecies sex may be much more common in borderland regions than among the central population of a species spread over a large area. Hominids in isolated habitats may never have heard of rishathra; species valuing their own fertility may discourage the practice through laws and religious training.

Long ago, the City Builders found that rishathra provided an indispensable tool for promoting cooperation among the many hominid species with whom they dealt. The City Builders' extraordinary fertility initially drove them to interspecies sexual contact as a way to control their own population, but they quickly learned that rishathra could as well influence the behavior of the representatives of other species. Especially effective with members of less-sophisticated cultures, rishathra often was carefully orchestrated amid settings of imposing grandeur. The City Builders even refined a powerful aphrodisiac from the scent of vampires as an aid in rishathra — super-stimulus pheromone irresistible to male or female.

The City Builders exhaustively studied rishathra, mastering its nuances and variations. With (and without) the cooperation of other species, they recorded tapes and kept extensive archives. They detailed the preferences, limitations, and peculiarities of all the hominid species they encountered: mating cycles, customary positions, modes of deference and aggression, social taboos and rituals. Some species preferred only to watch rishathra, while others suggested specific practices from their own culture instead of rishathra. The attitude of a human protector toward interspecies sex was succinctly stated by Teela Brown: "rishathra is for breeders."

Rishathra remains an important tool for social cohesion. Where enclaves of City Builder civilization endure, rishathra is still used to control more primitive species and to maintain favorable trade agreements. Old loyalties and alliances sustained in part by periodic rishathra provide a link with the 'days of wonder' before the Fall-of-Cities.

Interspecies sex is not always pleasant duty. Some contemporary orphaned City Builders, for example, must help pay their society's debts before they can mate and start their own families — and sometimes society requires them to do rishathra with repellent hominids who cannot tolerate the scent of vampire-perfume (such as the Ghouls), even when used by a partner. Yet these same species may have come to expect rishathra from City Builders, and would find its discontinuance a grave insult.

In some areas, intermediate-level industrial civilizations have risen which use rishathra to expand their dominions in much the same way that the City Builder empire did during its early epoch. Many species have complex traditions of rishathra, but have forgotten the origin of the practice; they may automatically assume that their own customs are universal. Other hominids may have strong proscriptions against interspecies sex which occasionally are traceable to ancient conflicts with the City Builder empire. Travelers on Ringworld will do well to inform themselves of the local customs regarding rishathra.

RINGWORLD MYSTERIES

"I'm paranoid — but am I paranoid enough?"
—Louis Wu

Within the Ringworld system lie countless unexplored places, unexplained phenomena, and unanswered questions. Of them, here are listed a small fraction, to stimulate thought and tantalize the imagination. The discoveries hinted at by these questions may be crucial to Known Space civilization.

• Why and how was Ringworld built? When? Was it built by Pak, or conquered by them and modified? Did the Ringworld Pak differ from their cousins at the galactic core? Were they more daring, more visionary, more intelligent, more tolerant, possibly even more peaceful? Did they have assistance from an even more advanced species in the construction of Ringworld? Are there any records in the ancient Pak library of the Ringworld Pak or their expedition?

* Why was Ringworld built at its present location? Did the relative proximity to the lost colony of Earth breeders influence its placement? Did the Ringworld Pak retrace the path of the earlier expedition to Earth and then turn upward to the security of galactic north? What was the Ringworld system originally like — much more massive than the solar system? Has Ringworld always encircled its present star, since it can be moved? The orientation of the Ring blocks radiation from the galactic core: does this mean the Ringworld Pak knew of its periodic outbursts? Or might they have intended to initiate an explosion that would destroy their enemies at the core?

• How was Ringworld spun up to 1239 km [770 miles] per second? If giant fusion motors were used, might they still exist, perhaps concealed in the Great Oceans? Do any of the original immense Pak supply-and-construction ships still exist, either camouflaged or hidden in Ringworld's remote Oort cloud? Is the tremendous spin of the Ring related to the integrity of the rigid scrith foundation structure?

• What are the secrets of scrith? Do any stockpiles of scrith materials (plates, pipes, pre-fabricated fittings, etc.) exist? Where? What were the Pak scrith-making machines like? Where are they hidden? Do scientific

treatises on the characteristics of scrith still exist in the libraries or archives of any Ringworld civilizations? Could scrith be used as a (perhaps superior) substitute for General Products hulls, which no longer are available from the Puppeteers? Have any species built (or found) subsurface rapid-transit systems, based on the frictionless properties of smooth scrith? What bizarre evolution has taken place in isolated regions of Ringworld, cut off by uncrossable expanses of bare scrith?

• How does a "cziltang brone" work? Are any still to be found in operating or repairable condition — perhaps on one of the unexplored spaceports, or inside the conical sheath of a spill mountain?

• What are the shadow squares made of, and how thick are they? Do they have internal volumes, or external control centers? How do the thermoelectric generators work, and what does it take to restart the beamed-power flow to Ringworld? What else is on the shadow squares in addition to the power generators, holo telescopes, meteor-defense acquisition and tracking, and shadow-square-wire control mechanisms?

• Is shadow square wire related to scrith? Since some Ringworld natives know how to handle the wire (and occasionally use it for defense and weaponry), could there be stores of it somewhere on the Ring floor? It is likely that the City Builders explored the shadow squares: did they learn the secrets of the wire?

• Five of Ringworld's six spaceport ledges have never been visited or closely examined. What treasures do they hoard? Are there stockpiles of equipment and supplies of incalculable value? It seems more than likely! The ramship cargoes themselves, abandoned at the time of the superconductor plague, would be of incredible interest. Might there also be remnants of Pak technology in the structure of the spaceports?

• Where did the City Builder ramships go? How often did they visit Earth, and when? What did they bring to Ringworld from Earth and the other worlds of Known Space? What solar systems far outside the volume of Known Space did they explore? Did they colonize star systems relatively near Ringworld? How many City Builder ramships might still be plying the stars at sublight velocities, returning to Ringworld? With what cargoes? What exotic displays and records might be found in City Builder museums, if any are left from the golden age of interstellar travel? What could we learn of our own ancient history in them? Could a study of one of the intact ramships revitalize human interest in cheap, relativistic spaceflight techniques?

• Does the spacecraft landing system still work? Does it work only for huge, metal-hulled, monopole-ringed ramships? Could it be used to change (or to trim) the rotational velocity of the ring, over time? Are there any major shuttle craft built specifically for transports using the spacecraft landing system?

• How much of the rim transport system actually exists around the Ring? Can it be used easily? What are the rim stations like? The elevator-transport tubes? Where are the rim transport shuttles stored?

• What do the hidden volumes of the Spill Mountains contain? Are their underlying sheaths of smooth scrith too thick to be deep-radared? Can access passages be found, perhaps constructed by the City Builders? Are there auxiliary control stations and materials caches within them? How much do the Spill Mountain Folk remember about the many millennia of spacefaring civilization on Ringworld?

• What other fail-safe systems like the meteor defense system still operate? If thermoelectric power from the shadow squares is restarted, what other devices might also begin to function? Are there darkside meteor-defense lasers, or were these dismantled by the City Builders? Can (or should) the automatic settings of the meteor defense system be altered? How?

• What force thrust the Ring off-center in the plane of its orbit as set forth in *Ringworld Engineers?* If it was a plasma-jet from the meteor-defense system, at what was it firing? As the Ring re-stabilized, was extensive damage done to inhabited areas? Could over-design features, magnetic shields, or the Night People Protector have intervened to prevent serious radiation exposure in the arc beneath the attitude jets?

• Are there Slaver artifacts, including stasis boxes, on Ringworld? Are there Slaver lifeforms other than sunflowers and bandersnatchii, engineered by the Tnuctipun? How did they get there? What knowledge did the Ringworld Pak have about the ancient Slaver Empire? Would human protectors have even more interest in stasis boxes than do humans?

• Are there castaway or refugee colonies of human or other species on Ringworld?

• How much do the Outsiders know about Ringworld? What has been their policy toward the Pak, whose presence in the galactic core must have threatened the peaceful Outsider interstellar trade activities, and imperiled the starseed population? How many trillions of stars would answers to these questions cost?

• Did the superconductor plague entirely disappear after consuming all accessible superconductor materials on Ringworld? Might there yet be active pockets or dormant forms? Might it have mutated in some areas, and pose a threat to Known Space superconductors? Did the Puppeteers actually introduce the plague to Ringworld, or did they merely claim to have, to impress customer species? Did they introduce it to destroy Ringworld and, failing this, fled the galaxy?

• Why are Ringworld's longevity drugs so much more powerful than boosterspice? Were they tailored from mutated Tree-of-life by ancient hominid civilizations with advanced knowledge of genetics and biological engineering? Are there still-hidden stores of these drugs, or do some cultures still exist which know how to synthesize them? Are there supplies of City Builder longevity drugs in any of the surviving floating cities, or on the ramships?

• How many floating cities still exist, or have been rebuilt? Where are they located? Are the City Builders themselves patiently awaiting the return of their ramships to provide knowledge and technology necessary to rebuild their empire?

• What created Fist-of-God mountain? Was it a rogue planetoid, or was it something more sinister? Did it coincide with the introduction of the superconductor plague, or precede it by millennia? Could it have been caused by a weapon, a chunk of neutronium, a large ship in stasis, or a dead ramship impacting at a sizable fraction of the speed of light? Was the impacting object aimed at the Great Ocean or the repair center beneath the Map of Mars? Were scrith shards from this massive puncture scattered like tektites all over Ringworld? Are there other such punctures?

• What are the full capabilities and undiscovered functions of the Ring-girdling grid of superconducting conduits buried in the scrith foundation of Ringworld? What are the beamed-power receiver stations like? How were they isolated from the breeder population, and what modifications were made to them by the advanced Ringworld civilizations who learned to tap into them? What is the connection between the superconductor grid network and the spill mountains, which hook into the grid at the rims?

• What are the climate control stations like and what other functions might they have? How are they secured from tampering? What are the major water-condensation field-generators like, and what else might be situated at the intersections of the superconductor network? Are there City Builder MAGLEV vehicle hangars or electromagnetic transportation-beam generators? Weapons systems? Map rooms? Would they have stored precise data recording every large-scale physical event ever to have occurred on Ringworld?

• Why were the island Maps of worlds built? Were they molded in place one by one as the planets they simulate were discovered? How was their stocking accomplished? What are their present conditions?

• When did the Ringworld Pak visit Earth to import breeders and other hominids *en masse?* What happened to those placed on the Map of Earth, which was later conquered and colonized by seagoing Kzinti explorers from the Map of Kzin?

• What is the history of oceanic exploration by the primitive Kzinti? Why did they give up their great voyages? What factors kept the primitive Kzinti females sentient on the Map of Kzin? Are they even more ferocious than the males, or actually more intelligent—so that a process is taking place the reverse of that which occurred on Kzin itself?

• How are conditions maintained on the map of Trinoc, which must have a cooler, primordial reducing atmosphere? Are there robust, incautious Trinocs there?

• Have the Pierin evolved to fly in one-gee gravity, or have they lost their ability altogether? Have they retained their infrared sight?

• Have the Kdatlyno kept their ultrasonic "vision," or have they begun to adapt to the environment of Ringworld? How are conditions maintained on the Map of Kdat? Are these lighter-gravity Kdatlyno physically different?

• What do the Bandersnatchi know, and how did they get off the map of Jinx?

• Why, exactly, did the Grogs allow themselves to be transported to Ringworld, and how have they since evolved? Are they more or less powerful than those on Down? Do they control the sea-life near the Map of Down? Are they sessile, with only one sentient sex?

• What are the Ringworld Martians like? Are they more robust than those who remained (and became extinct) on Mars itself? Are they more, or less, xenophobic? Should they be offered a chance to re-populate Mars — which is considered worthless by the UN and the Belt alike?

• What is the hostile communal-intelligence 'hive' thought to exist on one of the unknown Maps? What planets do the remaining Maps represent?

• What are the conditions on the Map of Pak, and on the Maps of the Ringworld Pak colony planets in the Great Star Ocean? What are its other Maps?

• Why are there no Puppeteers on Ringworld, and why have there never been, according to City Builder archives? Why is there no map of the Puppeteer home world? Was the Hindmost concealing something, perhaps concerning an ancient conflict between the Puppeteers and the Ringworld Pak? Could this explain the fear in the Puppeteer genes, their interest in guiding the evolution of humans, and their classic approach-avoidance fascination with Ringworld and its inhabitants? Is it true that the Puppeteers once "considered" building a Ringworld structure for themselves? Did they ever consider "using" the one that already exists for their exodus?

• The disease that killed off the Ringworld protectors was evidently a genetic virus whose side-effects generated among the Pak breeders rapid mutations away from the true breeder form. Where did this disease come from? Is it still present, or dormant, anywhere on Ringworld? Is it still lethal to protectors?

• How much do the Puppeteers really know about Ringworld, and why would they make it accessible to humans as their Fleet-of-Worlds exits the galaxy? Would their Conservative leaders seek to correct this oversight, or is it for some reason to their advantage to leave it available to Known Space species?

• Do the Puppeteers plan to import hominids from Ringworld to populate their farming worlds and help them "explore interesting territories" that might lie ahead of the Fleet-of-Worlds?

• How widely distributed is Tree-of-life on Ringworld? Has the virus been "neutralized" in most places, as it was on the human colony Home? Are there hidden Pak environments or seed-caches in other locations than the Repair Center beneath the Map of Mars? Is there a second, antipodal Repair Center in the Great Star Ocean?

• What are the marine (and submarine) environments of the Great Oceans themselves? What are the giant sea beasts, and the creatures of the depths? What is the history of the advanced civilization which once centered on the Great Oceans, destroyed millennia ago? Are there Sperm Whales in the oceans, and could they be re-introduced to the oceans of Earth? Are there Dolphins and Orcas? Are there salt-water Vampires and the ferocious Giant Sea People rumored to exist by inland races? Is the water of the Great Oceans enriched in deuterium to make them good fusion fuel reservoirs? Was there a great tidal wave at the time of the Fist-of-God impact?

• There are at least a thousand distinctly different hominid species currently in existence on Ringworld. Each has its own special evolutionary heritage, and some have actually been genetically modified. The City Builders are known to have biologically engineered several major species, including the Spill Mountain Folk. There are millions of different cultures, all with unique histories. On Ringworld, as elsewhere, truth often is to be found disguised as custom and legend.

• The City Builders probably consider their present circumstances as a temporary (though major) disaster. How powerful are they at present in unexplored regions of Ringworld? Are they likely to consider the worlds of Known Space as allies or as future subject-species to assist them in the restoration of Ringworld? Will they try to visit vengeance on the Puppeteers for the mass slaughter during the Fall of Cities? Will they suspect Known Space humans of the deed?

• What is the secret of the Vampire perfume used in rishathra? What other sophisticated techniques did the City Builders and others develop to influence and control less advanced hominids?

• How widespread are the Sea People, and what is the success of their dredge-repair program?

• What legends of the spacefaring days, or of the interiors of the spill mountains do the strange Folk who live there remember? Are they engaged in repair activities aimed at unblocking dormant spillpipes, or would they resist such efforts, which would eventually eliminate their habitats? What do they discuss (by light-reflections) with the Ghouls?

• How ubiquitous are the Ghouls? Are there different Ghoul species? How much do they really know about the Ring, and where are the enclaves of their own civilization?

• How many empires such as that of the Machine People are engaged in supplying and reclaiming metals and artifacts under the subtle influence of the City Builders?

• What are the hominids like who live in the permanently-shadowed, windy lands in the vicinity of the eye-storms?

• What terrible (or delightful) secrets concerning their females are concealed by the hostile Men in the Desert?

• Is the genetic virus that has caused the hideous transformations of the Shell People into Chellons, and the Mud People into Muck Ogres still present in the environment? Is it contagious to humans?

• Is the tradition of rishathra a cultural relic of the City Builders' rise to power on Ringworld, is it a powerful reminder of relatively recent Pak breeder origins, or something else entirely?

• Do the Hairy Ones have good cause to confidently await the Engineers' return? Could a last wave of ramships have been sent forth, and others warned away, when the Fall of Cities occurred? Would they be planning to return from nearby colony worlds to restore the Ring's civilization?

• How did the Valley People become so symbiotic with their crops, animals, and insects? Why so protective of them?

• Why do the Grass Giant kings wear suits of armor made in the shape of a Pak protector, and why is this shape so familiar to many hominids? The very concept of an herbivorous Grass Giant protector should be enough to send chills up the spine of any normal human!

• What exotic aquatic herbs are cultivated in the bog farms of the Grazers? Can their destructive conflicts with the Eaters ever be resolved?

• What progress have the Healers made since the Fall of Cities, for which they were incorrectly blamed? Where are their hidden centers of learning, and is their work on a new edition of the Encyclopedia complete? From what is their immortality drug derived, and do they understand the disease which killed off the protectors?

• Does anything remain of the lost civilization that genetically marked the Boat People? What are their marine metropolises like? Their MAGLEV ships?

• Were the Wind Walkers biologically-engineered by an unknown race of advanced hominids? What explorations have the Wind Walkers made of the rim walls or of abandoned floating cities?

• Have other Ringworld hominids developed psionic abilities more powerful than the Forest Fishers?

• Could there be enclaves of sophisticated structures camouflaged to resemble the massive polished rock domes of the Hill People? What is the secret of the Hill People's achiya seed plant?

• For every species allied with the City Builders (Night Hunters, Runners, Hanging People, Herders, etc.) there may be equal numbers of species who dislike and distrust the City Builders, and who do not practice rishathra. How many more hominid species exist who have heard of the City Builders, their allies, and their enemies only in myths — or perhaps never at all?

GAMEMASTER NOTES

Ringworld presents some unusual challenges. The explorers rarely are able to deal with their antagonists on an equal basis — their foes usually will be greatly inferior in technology and equipment, or (rarely) greatly superior, and the explorers normally inferior in knowledge of the locale or species. And you, as the gamemaster, must justify your decisions scientifically — *Ringworld* is not a fantasy game in which anything goes.

Your greatest challenge occurs at the inception of your campaign for, during this time when both you and your players are least familiar with the game, you must begin to generate a logical campaign background and at the same time provide adequate

excitement to hold player interest. The *Catseye* scenario should give you a head start, and buy time to set up your own campaign.

A campaign is a series of more-or-less connected scenarios. The link need not be strong — perhaps one scenario can provide a bit of vital information useful in a later adventure. Or the link could be vital — perhaps the explorers can't complete their diplomatic mission until they first obtain some Tree-of-Life root for Machine People experimenters.

A good campaign offers the players many opportunities for explorer development and discovery. As your campaign background grows, more complex and detailed adventures become possible, simply because adventures can be continued over several evenings. In a well-run campaign, explorers and the environment begin to feel very real.

But before starting a campaign, you should understand that it entails work. For every evening the players spend participating in an adventure, you could spend an hour or more preparing scenarios and designing campaign background. The players are responsible only for their own explorers — you must do the bookkeeping for all the entities of importance, and must rule on activities beyond the players' control, but which could affect their explorers, such as Known Space events pertaining to the campaign, hominid politics, the functioning of the explorers' spacecraft, or the time available between sessions for explorer healing and training.

You must plan for contingencies, however improbable. The players are likely to surprise you again and again. Be prepared to improvise — if the players manage to find a way over the "impassible barrier," be ready to figure out what is on the other side to greet them.

The Ringworld is quite large enough to accommodate several campaigns simultaneously. Thus, you can share the burden of gamemastering with one or more of your players. This will allow you to participate in the game as a player occasionally. Each gamemaster could take a portion of the Ring for his own personal campaign, peopling it with his own civilizations, alien horrors, and secrets.

Designing a Scenario

Each of the entries in the Ringworld Mysteries section can be turned into a scenario or series of scenarios. These questions can prove a valuable aid in telling a story. Since one mystery usually leads to another, a whole campaign can be built from them. You will undoubtedly think of many more questions to solve.

Use the research rules to help build scenarios. Build at least one field research step into any major research project, and resolve that step in active play. For example, an explorer wishing to find a vaccine for a disease plaguing a population of Hairy Ones might find out that the disease is usually contracted while hunting. You can then rule that one of the explorer's research steps must be to join a hunting party.

When at a loss for a scenario, thumb through any science-fiction books you enjoy, and let your imagination run wild. Or page through the creatures book and try to think up a scenario involving hominids or animals found therein. If your background is rich enough, your players may be able to generate their own scenarios. Let them go exploring, investigate an interesting area of the Ring, or answer their own questions about it.

The Effect of Technology on Play

The explorers start with excellent mobility compared to most of the natives — flycycles and spaceships are much faster than herd beasts or wagons. The explorers have the opportunity to run away from most problems which might arise — as a result, they may be tempted to act like bandits or conquistadores, pillaging and fleeing with the loot. If the explorers engage in banditry, warn them of the implications. If the explorers commit murder or robbery, tell them so. Always present the players with the moral repercussions of their explorers' actions: before they try to destroy a hostile Kzinti settlement by blasting it with the meteor defense laser, tell the players just how many millions of innocent hominid slaves will be killed along with the Kzinti.

Make cooperation with the natives essential to the explorers' missions. Create problems not solvable by banditry and velocity and the campaign will live.

The explorers' weaponry is also superior to that of most Ringworld natives. Though this gives them some advantage, risking combat even with technologically-inferior natives can result in death. An ambush by 50 crossbowmen is not much changed if the single human target is carrying a laser pistol in a holster. Explorers who use diplomacy to achieve their ends will gain more than those who blast their way in. Combat will be necessary often enough without sponsoring deadly encounters. "Those who live by the sword will die by the sword" — an ancient truism that holds especially true in *Ringworld,* where personal weapons are lethal.

Remind the players that there are folk on the Ring who can easily out-gun them. The City Builders had equal or superior technology (with the exception of the practical hypermetrics purchased from the Outsiders) to that of Known Space. It is certain that on some parts of the Ring enclaves exist of technologies superior to Known Space — perhaps the residents have fearsome weapons capable of penetrating a GP hull or canceling out a stasis field at the flick of a switch. Possibly a tribe of hominids encountered by the explorers is being watched over by a Protector of that species — a single Protector should be a challenge for explorers endowed with any type of technology. Psionic powers, whether restricted to a single exceptional individual or possessed by an entire species of new hominids, can cause the explorers difficulties. There is even the chance that the explorers will encounter another party from Known Space. Use of these various encounters will help cancel out the enervating effect of having the explorers always faced by inferior foes. It will keep the players on their toes, and add enormously to their enjoyment.

Background and Preparation

Some gamemasters might feel that their scientific background is inadequate for running *Ringworld.* Nothing in these rules requires you to be a physicist, astronomer, or biologist. Scientific knowledge will surely be an asset, but do not worry. If one of the players knows more about chemistry than you, feel free to ask advice, but the final decision is yours. If a player of good will knows enough about a subject to bring up a final decision is yours. If a player of good will knows enough about a subject to bring up a particular point, he will normally also have a solution in mind. Don't be afraid to accept help. *Ringworld* is a game of roleplaying — the plot should hinge upon explorer reactions and decisions, not upon scientific phenomena.

Always remember that your relationship with the players is not that of an adversary, but a friend. As their friend, you must ensure that their triumphs are fairly earned, and that they gain a feeling of accomplishment when a difficult goal has been reached. If you make the game too easy for them, any gains they achieve will be hollowly won. Never forget that the purpose of the game is to have fun, though. If an argument begins or bad feelings ensue, break up the game for a while, and remember that your friendship is more important than anything that can happen inside of the game framework.

Using Creatures

Creatures represent the primary means by which gamemasters interact with the explorers and players. A creature might be a friend, enemy, information source, innocent bystander, spear carrier, or chorus to make clear the problem facing the explorers. Skillful use of creatures makes games interesting and exciting; inept use of creatures makes play dull, boring, and repetitive.

There are certainly plenty of different beings to use. Ringworld is inhabited by myriads of creatures whose ancestors were brought there by the Pak to fulfill critical functions in the ecology — and myriads more were transplanted for obscurer reasons. In the hundreds of thousands of years since the building of Ringworld, the builders' plans have gone awry, producing new creatures and dooming others. In a space so vast, almost anything which could be encountered in any Earthlike environment might exist somewhere on Ringworld.

Beginning gamemasters should select only a few types of creatures, including some hominids. Most animals want only to eat, to breed, to sleep, to protect their young, and to survive; a few want even less. Animals usually fight only to protect or to enhance these goals. However, the goals of animals are not always obvious. Did that carnivore attack the adventuring party because it was hungry and perceived the explorers as an inviting meal, or because they were violating some indiscernable territorial boundary? Herd animals may panic and charge over the explorers to make an escape from some predator.

Hominids require more decisions. Decide where and how they live. Never use an intelligent creature unless you know where he comes from, what he does for a living, how he feels about strangers, what his technical and scientific sophistication is, and why he is where he is.

A group of Valley People working in their fields will treat a party of explorers far differently than will a family of ghouls. The former may perceive the explorers as invaders or that their crops are threatened (especially if the explorers' marinex lands in the middle of prime farmland). They may even attack the explorers without warning to scare them off. The ghouls, on the other hand, may simply ignore the explorers, or might be eager to talk. If the ghouls saw the explorers burying a corpse, however, they would be quite hostile.

If a creature encountered is intelligent, design varying societies for them. These can be as complexly intertwined or as simplistic

as you wish, but they should differ visibly. Remember that Earth has only one intelligent hominid race, yet it has thousands of cultures. Since Ringworld has many species, it will have that many more societies. Also, since the natives are different species, they are likely to have societies and customs that humans would never even consider. (Ritual suicide after the age of 20? Complete generosity with respect to worldly goods?) Especially relate primitive societies to the environments in which they are found.

It is important to make at least some creatures distinct individuals. Young, inexperienced creatures will have low skills percentiles. Some intelligent creatures will be educated, increasing those skills appropriate to their culture and status.

More than just the stats and skills of a creature should be used to give it personality. Simply giving a particular hominid a name starts making it live. Only a few personality features need be given the character at first: if the explorers interact with him again and again, his personality will grow with their experiences. A character's personality can be settled with only one or two words — flighty, energetic, xenophobic, free-thinking, easily angered, cowardly, noble, greedy, lazy, brave, or stupid. Two Grass Giant kings with exactly the same statistics can be rendered completely different by the use of only a couple of words, and your explorers can dread Gromp, the cowardly lecher-slaver with an eye for small women, and look forward to meeting with Olbarng, the noble but greedy king who has usually treated them fairly. Famous enemies are also good to have around, and they can lead to whole scenarios. If your players have encountered Vilkillemall, the villainous Healer who wants to destroy or capture the explorers' technology, and whose superficial wiles have converted entire tribes to help her in her evil ways, the reappearance of Vilkillemall in a later scenario can get things rolling right along.

It is also useful to make a few notes about the creature's appearance. This also can be achieved in only a few words. Use the APP characteristic as a guide. Some descriptive terms are: warted, scarred, chinless, weasel-faced, hawk-nosed, hunchbacked, square-jawed, beady-eyed, skinny, husky, hulking, corpulent, pock-marked — or firm-browed, brawny, well-muscled, clear-eyed, beautiful, melodic, etc. — see the difference?

If characters are to meet or be attacked by a group of creatures of only incidental significance, just give the encounters the essential stats — action ranking, hit points, weaponry, and one or two skills (including weapon skills). This will make battles easier to run, and the results rarely are different than if each foe were individually generated.

Gamemasters have considerable discretion in establishing skill levels for intelligent creatures. These vary too much by individual and culture to be sensibly listed with exact percentages. Some guidelines concerning skills follow.

Hominids at home in a primitive or wild environment will be 50% or better at Hide, Listen, Scent (only if the species has good noses), Observation, and other primitive skills. If the creature is in an unfamiliar environment, though, you may want to halve his first encounters with new sights, smells, etc.

Intelligent creatures will be most adept in skills appropriate to their culture. Members of cultures with extensive road nets will be more familiar with ground vehicles than will be hominids who spend most of their lives aboard boats or rafts.

Most advanced cultures create specialists. A creature might be an expert metallurgist, but chances are he will not also be an expert fencer, tracker, and spaceship pilot. (Only explorers are that good!). Normally, expert metallurgists will not be good soldiers, nor will good soldiers be good metallurgists.

Having detailed in advance key creature areas of personality (and having detailed a few others for atmosphere), relax. While the game progresses, allow the creature to take on its own life. If something feels right, use it, even if the item, event, or quirk seems to contradict what has been previously prepared. Be sure to note any changes or additions made to a creature's personality. Then, if he appears again later, he can be played without hesitation.

For instance, if in one of your scenarios a family of ghouls might be encountered to direct the explorers along the planned path while warning them of impending dangers.

You decide that the ghoul family consists of three adults (two brothers and their joint wife) and their four children. They are returning home after visiting a tribe of Valley People 300 km spinward. You decide that only the wife will speak to the characters — this allows you to focus your creativity on her while allowing the rest of the family to add backgroundatmosphere
a family

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The wife's name, you decide, is Yellow Fur. Though she cares for only one of her husbands, they refuse to separate, so she has both. She likes talking with strangers, and will chatter for hours. However, she is sensitive to any disdain felt toward ghouls. If she detects any sign of this feeling, she will continue talking, but will begin to lie. From this point on, anything she says will be useless and perhaps dangerous. Aside from necessary statistics, this is all you need to prepare for the encounter.

When the explorers meet the ghouls, things go as expected, until the explorers offer to take the ghouls along with them in their marinex. This is not something you expected. It calls for some quick thinking. The easiest answer is to have the ghouls refuse for some arbitrary reason — perhaps the idea of flying frightens them, or they fear what lies ahead. This may not be the best answer, though. Yellow Fur likes strangers, and would probably enjoy the ride. It might even make an interesting addition to the campaign for the characters to have ghoul allies for a time. If, by some mishap, Yellow Fur and her husbands were killed, the players would be beset by the problem of tending for four ghoul children, at least until they could find foster parents or the kids matured.

Whatever the final decision is, it should have some sensible reason behind it, even if it is only that it will be fun to play that way.

Creature Cultures

Since there are thousands of intelligent species on Ringworld, and thousands of planets-worth of habitable terrain, and since civilizations have had millennia to rise, fall, grow stagnant, or progress, the creation of societies poses interesting problems.

No matter how you solve them, the satisfactory result largely will be a matter of personal aesthetics, and what seems reasonable or interesting to one playing group may seem dull and hackneyed to another. Here follow some sets of questions which you should at least think about answering.

Which species of intelligent creatures make up the culture? — might there be more than one, and if so, what are the relative standings?

Where do the inhabitants live? Do they build their own homes? Do they live in ruins? Are they nomadic, with no fixed home?

What do they eat? How do they obtain food? Do they fish, farm, hunt, gather, herd, trade, steal, or manufacture artificial food?

Is there family life? Are there many young? How are the weak, the old, the sick, and the very young treated?

Is the culture within the sphere of influence of the old City Builder empire? If so, did this heritage drastically affect their religion, myths, technology, or sexuality? — remember that rishathra was a City Builder custom.

What sort of technology do they have? Do they make simple or complex machines for themselves? Do they use still-working devices from previous civilizations?

What are their myths and religions? How strongly do they believe? Are their beliefs based upon real events in the past?

What relations do they have with neighbor cultures? Do they trade with, fight, enslave, or ignore them? Have strangers passed through recently whose behavior would affect the reception accorded the explorers?

Does the culture have taboos concerning technology, speech, sex, or anything else? Do these taboos apply to strangers? Does the culture approve of behavior which might offend explorers?

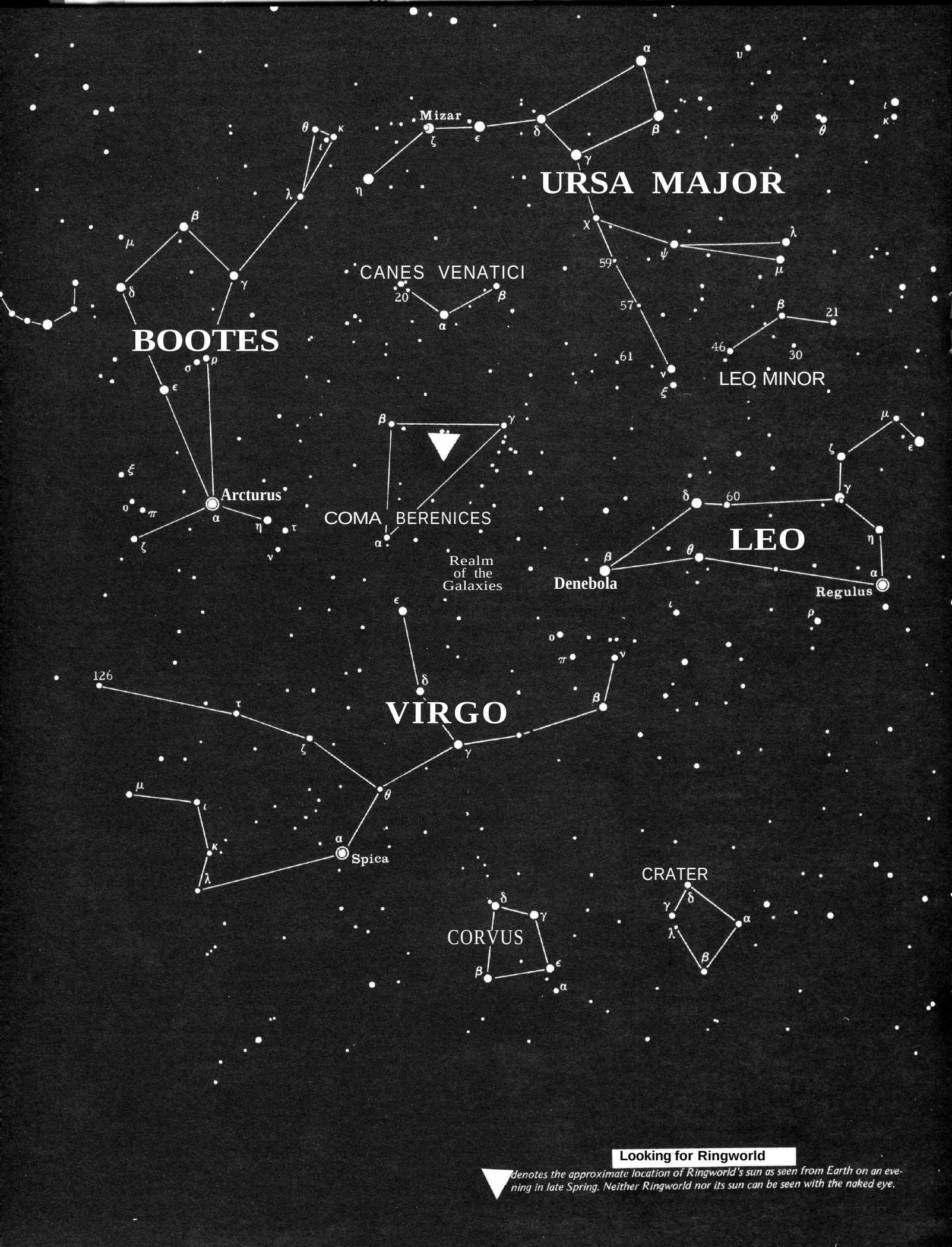
Does the culture deal regularly or intermittently with Ghouls, Healers, or Vampires? Do these dealings affect their feelings about strangers?

How is the culture governed? Who has the power? Is property owned? Are races, species, or sexes equal? Are there minorities within the macro-culture? Does a minority, in fact, rule the culture?

What are the ideals of the society? Does the accident of birth determine an individual's success of status? Or is it a meritocracy? Or some other system? How flexible is the society if an injustice seems to have been committed and needs to be rectified?

How many beings live in the society? Are there too many or too few? Is the culture expanding or contracting? Are the members fearful or complacent? Of what do they dream?

Answering these questions should fill in enough of the social details to allow the culture to be used in a game. You could create several representative personalities for each culture, thereby providing specific individuals



Looking for Ringworld

▼ denotes the approximate location of Ringworld's sun as seen from Earth on an evening in late Spring. Neither Ringworld nor its sun can be seen with the naked eye.

with whom the explorers can interact, and also continuing to flesh out the culture in your own mind.

A large number of cultures is advised because of the explorers' mobility. They can flit from culture to culture via flycycles and marinexes. Short cuts are necessary. Reuse whatever can be reused. If the characters bypass a well-detailed culture, use it somewhere else. If they only briefly explore a place, make cosmetic changes to render it unrecognizable, and use it again. Remember that the explorers' needs must be dealt with; if they want information about neighboring cultures, be concerned with those neighbors and the present culture's probable reaction to nosey strangers; if the explorers want to conquer a society, be concerned with its technology and military capability. Keep the challenges absorbing and amusing.

Deaths of Explorers

It is difficult to replace a dead explorer on Ringworld. Explorers cannot be resurrected, and Known Space is hundreds of light years away. Explorers can be trapped on Ringworld with no way to get home for more recruits even if they wished to spend the four years required to do so. What can one do?

If the explorers die frequently, either you are making play too dangerous or the players are being unusually foolish. Examine the personalities and abilities of the explorers and realign the scenarios to hold a lower potential for explorer death. This is not to say that the scenarios should be a breeze — risk enlivens most scenarios — but a happy medium must be reached between sure-death and a complete lack of danger.

Establish a reserve of explorers ready and waiting to go in. Usually a major expedition to a place like Ringworld will have more than just a dozen or so members. Each player could create several characters, leaving the bulk of them behind at the ship or base camp to do research and act as guards while others explore. If one or two die, the player can continue the game with his remaining explorers. The player need not actually roll up all these explorers — when his current explorer dies, he can roll up a new one, explaining that this is one of the 15-odd characters aboard the mother ship who was never characterized before.

Finally, Ringworld natives can become explorers. Players may enjoy playing exotic characters like grass giants or Machine People as much or more than playing human explorers. If a player wishes to play a hominid explorer, and the gamemaster agrees, he should work with the player to create a viable character. Remember, hominids have different base skill percentages than those that appear on the explorer sheet; remember to methodically make those changes.

Fun

Above all, the purpose of this game is to provide enjoyment for the players and the gamemaster. The fun and the responsibilities must be shared — if the players fail to make things fun for you, don't be afraid to remind them that they are being difficult.

HOMINID TECHNOLOGY

To explorers, Ringworld technology resembles a mysterious museum in which the displays have been arranged with no apparent order. One case exhibits technology more advanced than that of Known Space; the next holds only flint tools and reed baskets; a third holds muskets and printing presses.

In a frozen moment of time, it is unclear whether or not neighboring cultures and species learn from one another. The Grass Giants are not yet working bronze, yet they have contracted with the City Builders, a most advanced species, to acquire suits of armor impenetrable to primitive weapons as well as great swords manufactured from ultra-hard alloy. The Night People live in the open and eat raw flesh, yet exhibit some of the most advanced social techniques on the Ring.

The following examples must serve only as a hint of vast diversity; gamemasters will have to freely create additional Ringworld technical items.

Cziltang Brone

WEIGHT: 2 kg per square meter of scrith that can be affected.

VOLUME: radiating filigree cone with 30cm diameter and 50cm length per square meter of scrith that can be affected. Usually set in a permanent emplacement.

RANGE: 10 meters per square meter affected

HIT POINTS: 30

ENERGY USED: 100/im per cubic meter of scrith affected.

POWER SOURCE: usually draws beamed power from the shadow squares, or directly from the superconductor grid. An occasional portable model is powered by fusion.

SPEED OF OPERATION: must be focused for 10 impulses before scrith softens.

APPLICABLE SKILL: Heavy Weapons (Energy) if portable; Weapons System if part of a permanent emplacement.

POSSESSED BY: occasional Healers, some City Builders, possibly others.

The focused beam of a cziltang brone softens scrith into a pliable substance which can be shaped or traversed. The Protectors placed huge cziltang brones by the rim wall for access to the spaceport ledges, some of which are still in operation in the Ringworld era.

The technology was discovered and harnessed by the Healers and later by the City Builders, who used the devices to build fortresses of scrith resembling castles built entirely of smoky glass, impenetrable to all who lacked the secret of the cziltang brones. The superconductor plague permanently sealed some of these glass palaces, leaving the inhabitants within to certain death by starvation.

The beam of a cziltang brone renders scrith pliable by altering its molecular structure. It can be tuned to either render the scrith gas-like or simply soft and plastic. A focused beam is of no harm to anyone, and affects scrith only, but the device must be kept finely tuned by someone knowledgeable in its operation — or by one of the Pak maintenance machines.

Most cziltang brones are not adjustable, always affecting an identical amount of scrith in an identical fashion. To move a cziltang brone poses an 80% chance that its careful calibration will be destroyed. The device itself will be destroyed if an Engineering roll fails.

The beam of an unfocused cziltang brone kills as surely as a fusion exhaust. A living creature entering the beam immediately takes 10 hit points of damage to every hit location touched by the beam. Each additional impulse spent under the beam causes another 10 hit points of damage. The beam causes unbearable pain, and targets are immobilized, as their body parts slump like melted wax.

An unfocused cziltang brone makes an unreliable weapon: it often explodes spontaneously, spewing energy in every direction. If an explorer activates an unfocused cziltang brone, he must succeed in an Engineering roll or the device explodes immediately, spewing energy for 1D100 meters for 1D20 impulses before slumping into a puddle of metal and plastic.

Once successfully activated, the beam of a cziltang brone will continue to play out until the energy supply is cut off.

Rumors exist of cziltang brone grenades. Occasionally City Builders have trapped places with continuously-playing unfocused beams.

Electromagnetic Stunner

WEIGHT: 0.6 kg

VOLUME: large pistol

RANGE: short - 20m, medium - 60m; long — 1 50m

DAMAGE DONE: unconsciousness; additional damage possible

ENERGY USED: 60 energy units per shot

POWER SUPPLY: battery 6000/60/1.52kg/R, worn on belt

HIT POINTS: 10

APPLICABLE SKILL: Handgun (Energy)

POSSESSED BY: City Builders

Operation of the electromagnetic stunner resembles the sonic stunners of Human Space. Read the stunner description in the technology book. This stunner is non-adjustable, always set to affect a MAS of 20.

The beam is completely silent and invisible. It cannot be stopped by a sonic fold, but a diffusion field quarters its effectiveness, to a MAS 5 target. Most solid obstructions block passage of the beam.

Floater Car

WEIGHT: 1000 kg without cargo or passenger

VOLUME: 5m x 2.5m x 1.3m high

ENERGY USED: 200/im

POWER SUPPLY: fusion generator at rear of vehicle which generates 250/im

SPEED: Cruising - 6000 kph; Maximum — 6500 kph

ACCELERATION : Maximum - 40 kph/im

ARMOR: 5 points — not a combat vehicle

HIT POINTS: 50

APPLICABLE SKILL: Atmospheric Craft

POSSESSED BY: City Builders

The City Builder floater car uses powerful scrith repulsors, which allow it a maximum height of no more than 100 meters above the scrith. Consequently, it is impossible to cross certain deep oceans or formerly-deep valleys now filled with silt. The floater car has its own power source and is not restricted to the proximity of the superconductor grid.

It is streamlined for speed, and adequate storage space allows the occupants to travel for great distances without stopping. Both two- and four-seat models were built. They have no sonic-fold wind defense, so the passenger area must remain sealed while the car is in significant motion. Floater cars have air conditioners and purifiers, sanitary facilities, and other built-ins.

A cruise-control device can keep the floater car at an established velocity and altitude, but a driver must always operate the vehicle, unlike Known Space cars. Anyone concerned with preserving his or her life will stop for sleep on long journeys.

Grid Tram

WEIGHT: 20 metric tons per car; 6-8 pairs of cars per train on busy routes

VOLUME: each car 3m high, 5m wide, 10m long

ENERGY USED: up to 2000/im, depending on speed

POWER SUPPLY: superconductor grid

SPEED: cruising and maximum — 20,000 kph

ACCELERATION: maximum - 100 kph/im

ARMOR: 20 points

HIT POINTS: 100 per car

APPLICABLE SKILL: none - automatic operation

POSSESSED BY: City Builders; some grid trams continue to connect otherwise dead cities.

A grid tram is a pre-programmed, fully-automatic rapid transit system which follows the superconductor grid between floating cities (which were usually built on grid confluences). A tram arrives daily, twice-daily, or in some cases even hourly, waits five minutes, then returns to the first city. Floating cities up to 500,000 km apart might be linked by a network of grid trams. The grid tram connected these otherwise-lonely city-states.

Each tram consists of a number of pairs of cars, depending on the traffic for its route. The forward car of the pair was intended for activity — well-supplied with holotapes, exercise devices, and other amenities — and the rear car contained 20 comfortable sleeping cubicles. Pairs of cars were closed off from one another, for security reasons, although tram-board authorities could override the locks.

Grid trams are completely automated. Each travels along a designated line at a particular altitude from which it never deviates. Explorers caught on a tram will have to wait for it to reach its destination or blast their way out, dropping to the ground far below.

The superconductor grid powers the trams, which themselves do not use superconductors. Many tram systems remain in operation, though the cities have fallen around them. Explorers might witness a tram pull up and stop hundreds of meters above a former city, open its doors to the long drop, and five minutes later close the door and accelerate away in the direction from whence it came.

If a tram station were to still exist, it would be a series of platforms floating over open air. At the end of each platform is a sign listing the destination and schedule of the tram which stops at that platform. Always exactly on schedule, the tram stops at the platform, opens its doors for exactly 5.21 minutes, then reverses its direction and zips away. If a person still stands in the doors when it is time for the tram to depart, he is pulled inside by a suction device. The tram always remains on schedule.

A few tram systems are still actively used, whether by relict City Builders or enterprising cultures of other species.

Ground Car

WEIGHT: 500 kg, to 3 tons

VOLUME: varies, approximately 2m tall, 3m wide, 5m long; boxy construction

ENERGY USED: 20km/liter of alcohol

POWER SUPPLY: alcohol combustion - tank holds 80 liters

SPEED: cruising - 80 kph, max. - 120 kph

ACCELERATION: maximum - 5 kph/im

ARMOR: 20 points

HIT POINTS: 30

APPLICABLE SKILL: Ground Vehicle

POSSESSED BY: Machine People

These vehicles, extensively used by the Machine People, have alcohol-fueled internal combustion engines. Alcohol stations, required for the use of these cars, dot Machine People territories, and poured-concrete roads crisscross the Machine empire. Machine People ground cars are designed for long travel, and are comfortable by Machine Peoplestandards.

If the fuel tank explodes, it will destroy the vehicle, and do 4D6 damage to each person inside, plus 1D6 more damage per impulse they remain therein while it burns.

Longevity Drug

POSSESSED BY: Healers and some City Builders; very rare

The Ringworld longevity drug is much more powerful than boosterspice. Unlike boosterspice, this antiagathic formula is useful for every hominid species, though the dosage must be carefully matched to the patient's MAS.

One dose of the longevity drug will incapacitate the subject for up to 60 days, but will retard aging for about 400 years, when another dose must be taken. Characters with a physiological age greater than their CON x 3 can derive no benefit from the drug: if it is taken by such a person, he will die if a health roll fails, and not receive any benefit even if the roll succeeds.

The Ringworld longevity drug was originally synthesized from tree of life root, but later was lab-synthesized. The remnants of the City Builder empire have lost the secret of its manufacture; they depend on their dwindling existing supply, and are loath to sell even a single dose to anyone. Some Healers may still have the information needed for manufacture.

One side effect of the longevity drug is general loss of sexual fertility. For humans, it is unknown whether this effect reverses after the drug wears off.

Machine People Weapons

POSSESSED BY: Machine People and hominids who serve or trade with them

The Machine People manufacture a large variety of projectile weapons powered by chemical explosives. A few are outlined here.

Machine People Weapons (all projectile)

Weapon	*skill*	*range*	*damage*	*rate of fire*	*shots*
light pistol	Handgun	10/30/90	1D6	1/3im	6
mdm pistol	Handgun	10/30/90	1D8+2	1/3im	6
hvy pistol	Handgun	10/40/120	1D10+2	1/3im	6
light rifle	Heavy Weapon	20/60/180	1D6+2	1/4im	8
mdm rifle	Heavy Weapon	20/60/180	1D10+2	1/4im	8
hvy rifle	Heavy Weapon	30/80/220	2D6+2	1/4irn	10
shotgun	Heavy Weapon	10/20/50	3D6/2D6/1D6	1/3im	2

The Machine People also make automatic weapons, which are identical to those listed above, but their rate of fire is 1/im. Some Machine People have long storage clips on their rifles, allowing the weapons to fire up to 30 shots without reload. A machine gun acts as does a heavy rifle, except that it fires 6 rounds per impulse; if it scores a hit in an impulse, roll 1 D6 to see how many rounds hit.

Police Field

WEIGHT: generator weighs 900kg

VOLUME: generator 2m x 1m x 3m

ENERGY USED: 1000/im

POWER SUPPLY: beamed power from the shadow squares, or energy drawn from the superconductor grid

ARMOR: 2 points

HIT POINTS: 10

USED BY: City Builders

The ancient City Builders did not look kindly on speeding cars darting among buildings, under arches, or over monuments, but never instituted automated control of city-going traffic. Instead, they developed a powerful magnetic net which triggered whenever a

vehicle moved through it faster than 50 kph. The net fouled the transgressor's engine and drew him helplessly into a holding cell, where he awaited the police.

Some police fields still operate in long-forgotten parts of mostly-fallen cities, snaring unsuspecting vehicles which swoosh through the field and holding their occupants to be dealt with by authorities who never come.

The generator is a huge mechanism, and cannot be easily transported. One generator can cover an entire city.

Primitive Armor

Primitive cultures often manufacture armor. Depending on the technical level of the culture, the armor could be leather, wood, metal, plastic, or cloth.

Primitive Armor Table

type	*armor value*
quilted padding	1
soft leather	1
stiff leather	2
studded leather	3
varnished wood	4
ringmail (leather covered by metal rings)	5
chainmail (interlaced metal links)	7
metal plate	8

Grass Giant kings sometimes wear metal plate armor manufactured by the City Builders , worth 10 points of protection. A Giant wearing this armor bears a strange resemblance to the swollen-jointed Pak Protector on display at the Smithsonian.

Primitive Weapons

Most primitive hominids have the use of on or more of these weapons. See the species descriptions in the creatures book for specific information, but always arm as you see fit or as the adventure requires.

Primitive Melee Weapons

weapon	*damage*	*hit points*
One-handed Axe	1D8+2	7
Two-handed Axe	2D6+2	8
Dagger	1D4+2	6
One-handed Flail	1D6+2	10
One-handed Mace	1D10	10
Two-handed Mace	1D10+2	12
Rapier	1D6+1	8
One-handed Spear	1D8+1	10
Two-handed Spear	1D10+1	10
One-handed Sword	1D8+1	10
Two-handed Sword	2D8	12

Primitive Ranged Weapons

weapon	*damage*	*range*	*max. range*
Long Bow	1D8+1	30/90/180	275
Short Bow	1D6+1	30/60/90	120
Crossbow	2D4+2	30/50/180	275
Blowgun	1D3	-/30/-	30
Sling	1D8	30/50/80	100
Boomerang	1D6	30/50	50
Javelin	1D8	20/30/40	50
Throwing Star	1D3	20/25	30
Thrown Rock	1D3	20	20

Shields

type	*armor points*
Small	8
Medium	12
Large	16

Shadow-Square Wire

Similar to Sinclair monofilament, but 100 times stronger, this molecule-thick shadow-square wire is the only link holding together the huge shadow squares. Occasionally a seemingly-endless coil of it spirals to the surface of Ringworld, where it is not unknown. It can be used for similar purposes to those of standard monofilament chain. Any species on Ringworld could have found and be using this wire.

Vampire Perfume

POSSESSED BY: City Builders, and those who trade with them

Vampire perfume is a powerful aphrodisiac, synthesized by City Builders from the scent glands of vampires. Exposure to vampire perfume causes nearly all hominids (humans included) to try to succeed in a resistance roll matching their CON vs. the perfume's potency of 15. Failure indicates that the character will be hopelessly enthralled with the charms of the wearer. If the perfume wearer is the same sex as his victim, the victim will probably be confused, but will still be charmed.

Even if the resistance roll is a success, the explorer will be highly tempted. City Builders might occasionally be able to create more powerful versions of this perfume. Those they sell to other hominids are often watered down (potency 5 or 10). An application of vampire perfume wears off in about 12 hours; during that period, anyone within odor range is affected. In quiet air, or indoors, the perfume has an effective range of about 10 meters. Further than that, the potency drops off rapidly.

MAS-EQUIVALENCY TABLE

Use this table to equate an actual or estimated weight in kilograms to its game MAS. This table can be referred to when extraordinary feats are called for — lifting a dead Kzin to free a trapped friend, loading a giant egg into a flycycle, or any other event which requires resistance rolls of STR against MAS. It is also simply interesting to see how much particular objects weigh.

MAS	*kilograms*	*MAS*	*kilograms*	*MAS*	*kilograms*	*MAS*	*kilograms*
1	to 5	25	218-237	49	1741-1900	73	14,001-15,200
2	6-11	26	238-258	50	1901-2070	74	15,201-16,600
3	12-17	27	259-282	51	2071-2260	75	16,601-18,100
4	18-23	28	283-307	52	2261-2470	76	18,101-19,700
5	24-35	29	308-335	53	2471-2690	77	19,701-21,500
6	36-41	30	336-366	54	2691-2930	78	21,501-23,500
7	42-49	31	367-399	55	2931-3200	79	23,501-25,600
8	50-54	32	400-435	56	3201-3490	80	25,601-27,900
9	55-58	33	436-475	57	3491-3810	81	27,901-30,400
10	59-64	34	476-518	58	3811-4150	82	30,401-33,200
11	65-70	35	519-565	59	4151-4530	83	33,201-36,200
12	71-76	36	566-616	60	4531-4940	84	36,201-39,500
13	77-83	37	617-672	61	4941-5380	85	39,501-43,100
14	84-91	38	673-733	62	5381-5870	86	43,101-47,000
15	92-99	39	734-799	63	5871-6400	87	47,001-51,200
16	100-108	40	800-871	64	6401-6980	88	51,201-55,800
17	109-118	41	872-950	65	6981-7610	89	55,801-60,900
18	119-129	42	951-1040	66	7611-8300	90	60,901-66,400
19	130-140	43	1041-1130	67	8301-9050	91	66,401-72,400
20	141-153	44	1131-1230	68	9051-9870	92	72,401-78,999
21	154-167	45	1231-1350	69	9871-10,800	93	79 to 86 tons
22	168-182	46	1351-1470	70	10,801-11,700	94	86 to 94 tons
23	183-199	47	1471-1600	71	11,701-12,800	95	94 to 96 tons
24	200-217	48	1601-1740	72	12,801-14,000	96	96 to 97 tons

After 96 MAS, continue to increase by one metric ton each MAS point thereafter. Round off any fractions.

GRAVITY

Effects of Gravity on Humans

ZERO GRAVITY (0 to 0.2 gee): humans cannot survive in zero gravity for many months without damaging their skeletal and circulatory systems. However, Belters and others who spend considerable time in zero gravity can use acceleration, spacecraft spin, gravity generators, etc., to keep their bodies operational for planetfall.

LIGHT GRAVITY (0.2 to 0.7 gee): humans can survive in this environment, but long term exposure leads to extremely willowy body structure. Inhabitants of the Belt, Canyon, Luna, Mars, We Made It, and Wunderland live in light gravity conditions.

NORMAL GRAVITY (0.7 to 1.1 gees): this is the gravity best-suited to human physiology. Most human worlds have normal gravities, including Down, Earth, Gummidgy, Home, Margrave, Plateau, and Silvereyes, not to mention Ringworld itself.

HEAVY GRAVITY (1.11 to 2 gees): heavy gravity worlds are not well-suited to human habitation, but humans can survive here, at a grim cost to their cardiovascular systems. The descendants of those living on heavy gravity worlds eventually become squat, muscular, and powerful. Jinx is the only heavy gravity world with a large human population.

OVERWHELMING GRAVITY (2.1 to4gees): humans forced to live for extended periods subject to such gravitation will slowly weaken and die in CON x 1 weeks.

LETHAL GRAVITY (4.1+gees): humans forced into such intense gravities lose one general hit point after a number of impulses equal to the individual's CON minus the gees. This is taken every such period of time. A character with a CON of 13 in a 6 gee environment would thus take a point of damage every 7 impulses. If the gees exceed the character's CON, he must attempt a health roll every impulse or die. If the character lies down and does not attempt to move, he can withstand gravities of up to 20 gees for CON x 1 impulses before beginning to take damage.

Permanent Effects
Certain characteristics of any species forced to grow up in abnormal gravities are modified. These modifications are discussed in character generation for humans and Kzinti. Other species would behave similarly, though not identically.

Temporary Effects of Unfamiliar Gravities
Characters subject to unfamiliar gravities suffer adverse effects, including temporary characteristic reduction, associated attribute reduction, and loss of speed.

Temporary Gravity Changes Table

	— *from* —		
-to-	*light*	*normal*	*heavy*
zero gravity	-1m/im -2 DEX	-2m/im -4 DEX	-2m/im -4 DEX
light gravity	–	-1m/im -2 DEX	-2m/im -4 DEX
normal gravity	-1m/im -2 DEX	–	-1m/im -2 DEX
heavy gravity	-2m/im * -4 DEX -2 CON	-1m/im -2 DEX	–
overwhelming gravity	-2m/im * -6 DEX -4 CON	-2m/im * -4 DEX -2 CON	-1m/im -2 DEX
lethal gravity &	-2m/im * -8 DEX -6 CON	-2m/im -6 DEX -4 CON	-2m/im -4 DEX -2 CON

** running cannot be maintained for more than CON x 1 impulses.*

& in addition to hit point loss.

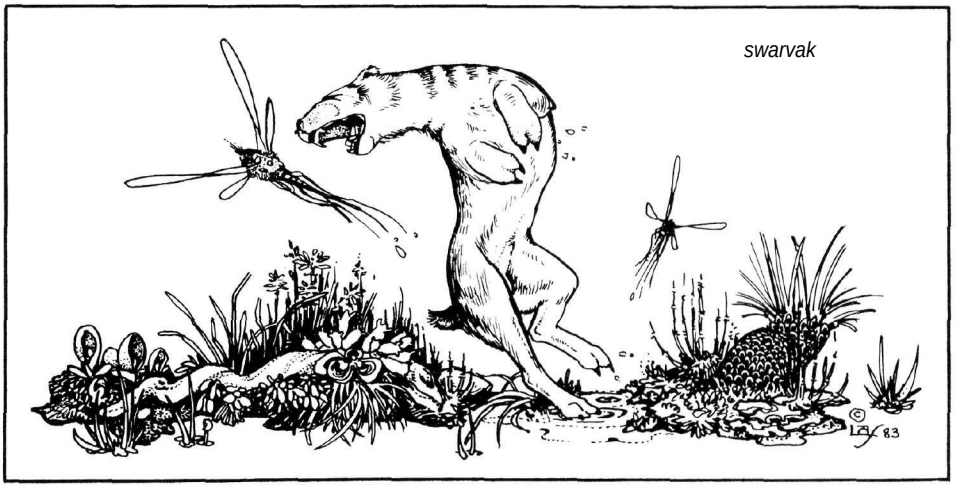
In time an explorer becomes adapted to a new gravity: his characteristics and speed return to their normal values at one characteristic point and 1 m/im per ten UNS days spent in the new gravity. Even though speed and characteristics return to normal, no one truly feels normal in any gravity but that to which he originally adapted, though he may feel exhilarated in a lower gravity.

Functioning in Zero Gravity
Normal movement in zero gravity is governed by the Athletics/Acrobatics skill. Explorers lacking this skill, or who fail to successfully use it will have difficulty moving about in stressful situations, may become nauseous, or possibly even black out on a special failure.

Any motion exerted in zero gravity will continue indefinitely until another force modifies or counteracts it. If an explorer pushes off at a rate of 3m/im, he will continue at that speed until mass or velocity changes or is changed. If the explorer hits a wall, he will bounce off, lose some velocity in the impact, but continue in a new vector at the reduced rate of speed.

Kinetic Stress
High-speed movement can be misinterpreted by human organs of equilibrium, causing extreme disorientation. Certain drugs can counteract the effects, but these sometimes cause drowsiness and reduce perceptions; they cannot be used by persons who must be active during flight. Explorers must learn to restrict head motions during high speed flight.

The forces of acceleration can, if excessive, and not counteracted properly by gravity generators, cause severe injury. Forces in the head-to-foot direction (positive gees) in excess of 4.5 gees have the effects of the lethal gravity class; in the foot-to-head direction, a mere 2.5 gees are lethal. If an explorer keeps his body perpendicular to the direction of gravitation he can tolerate stresses up to 20 gees for short durations.



INCOME

Income Skills
Explorers living in Human Space that have extraordinary skills percentages can reap monetary benefit from their superior knowledge. Skills with such cash values are called income skills.

An explorer is limited to using one skill for income a year if he is otherwise employed, and to 2 income skills if he is not. The player may always choose the skill being used for gain, but the gamemaster may legitimately rule that there is no market for a particular skill where the explorer lives: for instance, an expert scout will not be much in demand on a space station, nor will a professional lift belt racer be of use on a world where the sport is illegal.

Assuming that the skill is appropriate, an explorer makes 100 Stars per UNS year spent in Human Space for every percentile in excess of 100% with an income skill. This comes from articles, consultations, pensions, performances, exhibitions, appearances, and any other sources upon which the gamemaster and the player can agree.

Similar arrangements may or may not be possible in Kzin Space, Trinoc Space, etc.

Example: with 167% in Anthropology/ Cultural, an explorer can earn 6700 Stars per complete year spent in Human Space. He might need to obtain a position on the staff of a university or other institution to be allowed to receive this remuneration.

An income skill never earns more than 10,000 Stars (equal to a skill proficiency of 200%). Beyond that point only other experts can perceive the relative excellence of those in the field.

Income from Xenological Qualifiers
Any character with a xenologically-qualfied skill higher than the standard species maximum can treat that skill as an income skill, even if it is below 100%. Skill percentiles in excess of the normal Xenological Qualifier give the explorer 100 Stars each. As with normal income skills, percentiles in excess of 200% do not add to the income received.

As the explorer's xenologically-qualfied information is assimilated among the population of Human Space, the gamemaster should consider raising the qualifier maximum, especially as concerned with Ringworld.

Ringworldxenologically-qualifiedskills have a percentage chance of assimilation each year equal in a particular skill to the best percentage among those selling such information (typically, the returning explorers). If the gamemaster rolls D100 equal to or less than that number of percentiles, then only the explorer with the highest percentage in a particular Ringworld-qualified skill can find a market for that portion of his skills.

CREDIT RATING

Each explorer may be assigned a credit rating by the gamemaster, which indicates the explorer's social and pecuniary standing in Known Space. Credit Rating also represents the explorer's relative reliability in financial matters as perceived by the Human Space financial establishment.

The ratings range from D (the lowest) to AAA (the highest), with X indicating that a rating has been, for some reason, suspended (if the explorer has gone to Ringworld, for example).

The credit ratings below are only guidelines, and gamemasters should adjust specific information to fit their personal campaigns. Some gamemasters may choose not to use credit at all. The specific. Star amount, credit limits provided below apply only to short term, cash-on-hand credit. An explorer could get a loan larger than the listed amount, for a longer term, or at lower interest rates, if he or she can prove to a lender his or her ability to repay a loan. This can be resolved in play, using the Law/Contract, Debate, and Orate skills.

The Ratings

D: the worst credit rating possible in Known Space. Any person carrying a D credit rating is considered an impossible risk. He or she will not be issued credit even by cut-rate furniture stores. Usually only bankrupts, those who have defaulted on large loans, and convicted criminals possess D credit ratings. It is quite difficult for an explorer to increase his or her credit rating once it has descended to this level.

C: issued to those considered by the establishment to be slightly higher than average risks. Explorers, while in Human Space, usually fall into this class. Cs can get limited credit, such as small scale overdraft protection, and possibly small short-term loans. For game purposes assume that Cs have a credit limit of 50 stars, payable at 10% per month with a 5% interest rate. To increase from this credit rating an explorer must have a proven regular income, collateral, and or large cash reserves.

B: best describes a staunch, hardworking member of the middle class in Human Space. Most Bs spend the bulk of their time on a single planet, and they usually own some collateral. Bs have a standard short-term credit limit of 300 Stars payable at 10% per month with a 5% interest rate. To advance from a B credit rating to an A is quite difficult, and usually requires some sort of social class jump on the part of the explorer.

A: considered a good credit risk. Corporate executives, middle-to-high ranking government officials, and wealthy professionals often have this status. The holder of an A rating has a credit limit of 1800 stars payable at 5% per month at 5% interest, or 10% per month at 4.5% interest. A's find it particularly easy to get loans, though even an A can't get a loan which the lender considers impossible to collect.

AA: considered an excellent risk. Seldom issued to individuals, the AA rating is held most often by corporations, government offices, etc. AAs have a cash-on-hand credit limit of 10,000 Stars payable at 2.5% per month at 5% interest, or at 5% per month at 4.5% interest. AAs have no trouble getting loans and operate on credit on a regular basis.

AAA: held only by the elite of Known Space, such as the General Products Puppeteers. Credit limits for the AAA depend only on the resources of the individual lender.

Credit ratings, though possibly known by the players are not known by the explorers themselves. They are known by all the institutions which have files on the explorers.

Except under extraordinary circumstances, when dealing with aliens, an explorer's credit rating is reduced by one level.

Assigning Credit Ratings

To assign an explorer a credit rating, look at his or her pursuits. Most explorers will start the campaign with C level credit. Some pursuits can alter the rating slightly.

Explorers whose latest pursuit was dilletante receive A credit ratings Explorers who have beendilettantesearlier in life, or who have spent their entire working life following wealth level 3 pursuits receive B credit ratings. Explorers who have spent their entire working lives following wealth value 0 pursuits, and any explorers who have been prisoners (unless they have followed a pursuit of wealth value 3 or above after the prison term), receive a D credit rating. Any explorer who does not fit into one of these categories receives a C credit rating.

Changing Credit Ratings

The gamemaster can adjust explorer credit ratings to reflect events occurring during play. If an explorer is receiving money due to his or her high skill levels, perhaps his or her credit rating will increase. If an explorer is thrown in prison, defaults on a loan, or neglects to report spoils brought back from Ringworld, his or her credit rating is likely to decrease.

PSIONICS

Demonstrable psionic powers exist in the Ringworld universe, though humans are not among the most psionically-gifted Known Space species. The Kzinti commonly have quite powerful, though socially-despised, telepaths. Grogs can exert an irresistible psychic compulsion, apparently akin to that of the extinct Slavers, ancient rulers of the galaxy. Certain species of Ringworld hominids have adapted themselves to the use of specific psionic abilities in normal life.

The POW characteristic measures psionic power. For instance, psionic attacks are often made by comparing the attacker's POW against the defender's POW on the resistance table, and telekinesis can be resolved by pitting the user's POW against the MAS of the object to be lifted.

The gamemaster may or may not introduce individual psionic powers into his campaign; if he so chooses, he has complete control over just what is introduced. Psionic abilities and influence therefore will vary wildly by campaign; some gamemasters will open a cornucopia of powerful abilities, others will activate none but pre-established abilities, still others may allow no such powers to explorers, and so on. Each psionic ability might be completely different, or the gamemaster might choose to introduce a single power several times.

Human Luck

One consequence of Earth's birthright lottery was that only the luckiest flatlanders could breed, selecting generations of luckier and luckier humans — or so the Puppeteers hoped. Whether due to the lottery or some other cause, Earth native humans who are less than 100 years old may have increased POW, as explained in the character generation section. Human luck appears in the game system through the luck roll (POW x 3).

Extraordinary Human Abilities

Humans with extraordinary psionic abilities are extremely rare — even less common than Kzinti telepaths — and the power manifests differently in each "gifted" individual. The particular types of abilities are left up to the gamemaster, though many specific abilities are discussed later in this chapter.

Many psionic powers work like skill rolls, with a percentile chance for success. In the descriptions, POW is generally used as the determiner of psionic success. However, each character will use his POW at a different level of ability. Some will match their full POW vs. the opponent or object, some twice their POW, and others1/2or even 1/10 their POW. Some can divide up their effective POW to do multiple simultaneous actions and others cannot. Some can use their full POW against multiple opponents or objects, others against only a single target. The POW effect on the ability should be carefully determined by the gamemaster before the ability is bestowed upon a character. The power descriptions give the 'standard' POW multiple used for a particular ability: the gamemaster may modify this as needed.

Many psionic abilities work like skill rolls, with a percentile chance for success. Proficiency in such a psionic ability increases through experience exactly as skills increase. Experience checks are received after successful and appropriate use of the ability. But neither research nor training (nor simweb) can increase psionic abilities. A character's skill % with his psionic power may affect how much POW he can utilize in it. The gamemaster may state that a skill roll is necessary with a particular psionic ability, or state that it is not, at his option.

Explorer Psionic Abilities

No human explorer ever starts the game with any form of psionic ability other than his luck. A gamemaster never is obligated to offer an explorer a chance for a psionic ability or power. Finally, no explorer ever should have more than one psionic ability (not counting possible increased POW for certain Earth natives) — so that for the individual explorer, the actual name of his power or ability is interchangeable with the general term of psionics, and the phrase 'psionics skill' is sometimes encountered.

An explorer who undergoes a traumatic experience, such as nearly dying, or losing a loved one — may accidentally shock his system into exposing a previously-hidden psionic talent. The gamemaster should tailor the ability to be appropriate to the situation; it should not feel like a random or arbitrary choice to the player.

When he has decided that a psionic power awakening might be appropriate for an explorer, the gamemaster should ask the player to roll 1D100. If the roll is a failure, that explorer has been proven to be non-psionic, and no longer has a chance to receive a psionic ability. Be sure that the player marks 'no' in the psionics section of the explorer sheet.

If the roll is equal to or less than the explorer's POW x 1, he has gained a psionic ability (the exact nature of which is decided by the gamemaster).

Only the player of the psionic explorer should know the exact nature of the ability. Perhaps even the psionic explorer will not realize all the ramifications of his power until long after it begins to operate.

A selection of specific psionic abilities is provided. The gamemaster can pick an appropriate ability from those provided, or can use them as guidelines to design his own.

Many psionic abilities work like skill rolls, with a percentile chance for success. Such powers always begin with a proficiency equal to the explorer's POW x 1.

DESCRIPTIONS OF PSIONIC ABILITIES

Cloud Mind

This ability allows one to impose feelings of confusion over the mind of another. To cloud the mind of an opponent, the psionic's player must overcome the victim's POW with his own on the resistance table.

If the attack succeeds, the opponent's mind remains clouded as long as the psionic Continues to concentrate. It is usually possible to cloud only the minds of members of ones own species, though an exceptional psionic might be able to cloud the minds of certain other species as well.

A character influenced by Cloud Mind takes twice as long to make any decision or take any action. His action ranking is doubled, so that a character with an action ranking of 4 would now have one of 8. He is at half normal skill percentage with all knowledge and communication skills. The victim can attempt to break away from the effect after 30 impulses; he must overcome the psionic's POW with his own to do so. Once a victim has broken away, the psionic can try to re-cloud the target's mind using the method above.

Empathy

Empaths can perceive strong emotions felt by others. One type of empath ('learners') must actively attempt to perceive the feelings of others, requiring a skill roll, possibly a POW vs. POW resistance roll (but possibly not), and an interval of an action ranking per individual probed. The second type of empath ('naturals') perceive the feelings of those about them without effort, though possibly only by touch.

When an empath probes successfully, the gamemaster should inform the player of any strong feelings dominant in the subject. The gamemaster might say, 'He is full of fear,' or 'The pilot is feeling pleased.' Empathic abilities are usually species-specific.

A character actively probed by a 'learner' empath might feel a sensation, similar to that perceived if someone stared at his back. The probe of a natural empath is imperceptible.

Empathic Link

Empathic links exist between two or more characters. Often such a link is perceived by twins, or people who have been through a traumatic or triumphant experience together. When the power is gained, the gamemaster indicates who the participant(s) are, always including the original individual gaining the ability. Characters included in the link check off their psionic abilities box with this power. Each participant in the link can strongly perceive the emotional state of the other. The emotional strength of an empathic link is much greater than that received from general empathy, but the heightened sensation is restricted to the linked individuals.

Such emotional transfer is occasionally strong enough for the linked individuals to transmit visual impulses, often when danger threatens one of the members.

Invisible Arm

This restricted form of telekinesis sometimes manifests when the affected person loses a real arm, and, as a psionic, finds that an invisible limb has replaced the lost limb. The invisible replacement never is as strong as was the real arm; usually its STR equals a mere 1. The strength of the limb might be increasable with experience, at a rate controlled by the gamemaster.

Like telekinesis, the invisible limb lifts objects only when the player makes a successful resistance roll of its STR against the MAS of the object to be lifted — but otherwise is quite different to telepathy. The invisible limb usually has full sensations; with it, the explorer can feel the surface of an object just as he could with his real limb. Further, with the invisible limb he can feel the interiors of objects. Some with invisible limbs have even reached into stasis fields and touched the contents, though not affected them. Finally, invisible limbs can reach through tridee monitors and touch whatever is on the other side if the player succeeds with a psionics skill roll.

Regaining the limb through transplants sometimes causes an invisible limb to depart.

This power is usually associated with a skill roll, which must succeed for the user to sense the surface of an object with his limb. To pick up objects, he need make no skill roll, but must overcome the object's MAS with his limb's STR (usually 1).

Levitation

Using mental energy, a levitator can cause himself to float off the ground a distance of 1 meter for every 3 points of POW he possesses, rounding down fractions. He must also succeed in a psionics skill roll. In order to remain levitating, the character must concentrate, committing no other action. He will rise at a rate of 1 meter per action ranking. Sometimes the person can move horizontally at the same rate. This ability can be modified greatly by the gamemaster for specific purposes.

Mind Shield

A mind shield grants the psionic the ability to block foreign intrusion into his or her mind. If the player of the shielded character succeeds with his skill roll, then his character cannot be read or controlled by another psionic, no matter how powerful. The ancient Slavers had a well-developed mind shield. A mind shield will not stop the Perceive Life ability, nor stop any physical manifestations, whether or not psionic in nature. A character with Telepathy or some other similar power might also get Mind Shield, thus having two related powers.

Perceive Life

A character that succeeds in a Perceive Life skill roll can perceive the aura of any living thing within 60 meters. The possessor can only perceive living things, but can sense such in the dark or when blinded. Scrith and the surface of a stasis field will block this ability, but usually nothing else will.

Perceive Microworld

With this ability a character can psionically perceive fields and flow of such subatomic elements as electrons and neutrinos. Using this ability, a malfunction in an electronic device can be quickly diagnosed.

To perceive such subatomic entities, the character must receive a successful Perceive Microworld skill roll and spend a half hour meditating to reach this level of introspection. Another half hour must be spent returning to the mundane world.

The ability to perceive such quanta can be dangerous. A character under great stress may become trapped in the subatomic universe, his consciousness never to return. The gamemaster will indicate whether such stress exists before the character begins initial meditation. If the character persists in entering the trance, his player must succeed on a luck roll for his mind to return to his body. If the roll fails, the character's mind never returns. The character's body will continue to live if medically supported, but never will be more than a mindless shell fit for the organ banks.

Plateau Eyes

Plateau Eyes is a specific limited psionic power which gives its possessor a psychological cloak of invisibility, under the right conditions.

The target of this power experiences a sudden total loss of interest in the talented adept, accompanied by a powerful induced forgetfulness and loss of awareness of his presence. Plateau eyes, like all psionics, is

extremely rare, but manifests itself ten times more often on Plateau, where it was first recognized. Often the mutation is detrimental; an invisible man that cannot control his power goes nowhere in a crowded civilized society. Often, the condition even goes unrecognized by its possessor, who uses it only subconsciously and possibly unwillingly.

The power relies on eye contact. In moments of fear or acute anxiety, the mind of one possessing the ability reaches out to control the optic nerve (which is brain tissue, not ordinary nerve tissue) and the muscles which dilate and contract the victim's eyes. For the psionic to take control reflexively, his player must succeed with a resistance roll of POW vs. the target's POW. To use the ability consciously and selectively, the psionic must also succeed in a skill roll.

Normal reflexive dilation of the eyes has long been recognized as a direct measure of a subject's interest in what he sees. A successful use of Plateau Eyes works this phenomenon in reverse, like a psychologically conditioned reflex. Mentally-induced pinpoint contraction of the pupils of a target's eyes causes the psionic to vanish from his victim's immediate perception, attention, and memory. This can be extraordinarily useful at times, embarrassing and exasperating at others.

Some few possessors of this ability are able to use their talent to dilate another's pupils, inducing a trance-like rapture in the target; a state of complete attention and defenseless fascination, rendering him temporarily oblivious to everything else.

The unconscious use of Plateau Eyes normally requires that the possessor be thoroughly frightened or otherwise driven by elemental motivation. The feeling of security induced by weapons-carrying usually inhibits the power. The talent takes one impulse to take effect; it is not instantaneous, though the victim may report that it is. It is useless in darkness, or beyond the range of direct eye-to-eye contact, though it can be used through a two-way tri-dee monitor. Plateau Eyes cannot fool automatic or long range detectors. The phenomenon is ineffective against masked or hooded eyes. Peripheral vision can be used to avoid the power, if one is well-disciplined and on guard against it, doubling the resistance roll. An experienced user can affect several opponents, splitting his skill equally among them. Plateau Eyes can be used through a two-way tri-dee monitor, but cannot be used to affect those watching a one-way broadcast. Plateau Eyes will not cast a cloak of invisibility over one's allies, however close they may be to the adept.

Pyrokinesis
With a successful skill roll from his player, a pyrotic can psionically heat objects or small areas of space to temperatures usually around 1 20 degrees C. The use of this power takes about 20 impulses. At 120 degrees C, one can boil water, bake a cake, or light a wood fire. Most pyrotics cannot generate enough heat to melt any metal or 29th-century plastics, though they could set a volatile substance on fire and thereby indirectly melt metal objects. This ability usually has a limit, such as not being usable more than the owner's POW/2 times daily.

The ability generally has a range of 10 meters, though some pyrotics can set volatile substances afire from any distance at which they can perceive the target. If an attempt at pyrokinesis is interrupted, prorate the temperature reached by the number of impulses that have lapsed. A moving target cannot be easily attacked using this power.

Some psionics have a similar ability, cryokinesis, with which they can drastically lower temperatures.

Psychic Healing
Characters with this ability can heal others psionically. The amount of healing varies with the individual. Some can heal 1D4 points per damaged location once per wound. Others must lose a hit point per point or points healed. Some can only heal themselves. The effect of each healing ability is up to the gamemaster. In all cases, however, the healing is at touch range only and requires a successful skill roll.

The use of healing is reputedly exhausting, and gamemasters should take care not to permit any character wholesale healing powers.

Psychic Lens
The possessor of a psychic lens can mentally generate a light-bending field. He has a chance equal to his psionics skill to deflect any laser or other light beam aimed directly at him or her. This deflection is usually in a random direction, though the psionic might eventually learn to direct the deflection (perhaps on a special success use of the power). Sometimes the ability can only be employed while the psychic stands and concentrates. Often, it cannot stop the entire force of a laser beam.

This power can also be used to generate fields useful as magnifying glasses, or with increased skill and the use of several small, parallel, fields, up to 100x power telescopes or microscopes. Those of artistic bent can create beautiful tangles of spectra for exhibition. This power could be used to start a small fire by magnifying sunlight, but this process is much slower than pyrokinesis.

Telekinesis
A telekinetic can lift things from a distance with his mind. The ability is based on a resistance roll of his POW vs. the object's MAS. Nearly all telekinetics must receive a successful skill roll before trying the resistance roll.

Telepathic Link
Occasionally identical twins, lovers, clones, or two characters that have experienced a great crisis together will develop a telepathic link. Using this link they can mentally communicate with one another across any distance; some links are limited by the speed of light. Some links can even pass visual messages. The death of one member of the link is usually emotionally devastating to the other, possibly even death-dealing.

Telepathy
Telepaths can read the surface thoughts of others. If a telepath receives a successful psionics skill roll and overcomes the target's POW with his own, he can read the thoughts and intentions of the subjects. Sometimes this can be done so subtly that the target can only detect the intrusion with a successful luck roll.

Kzin Telepaths
All Kzin telepaths are forced addicts of a drug which drives insane most of those who must take it. Lucky survivors become shivering neurotics. Kzin telepaths are easily identified by their unkempt appearance matted fur, and tentative movements. The effects of the drug are a major ordeal to even the most accomplished Kzin telepaths; none will take a telepathy-inducing dose of the drug unless ordered to do so.

Under the drug, the telepath lapses into a relaxed hypnotic state and can probe the minds of targets up to 2500 kilometers away. Any person caught in the mental grip of a Kzinti telepath stiffens convulsively and simultaneously experiences rolling pains in his temples, forehead, and neck. The target then may lose consciousness, and always feels a throbbing headache after the intrusion.

To enter a mind, the kzin telepath must succeed in a skill roll. If successful, he must overcome the target's POW with his own POW times 2. If this succeeds, the Kzin enters his target's mind and learns all his thoughts until the Kzin breaks off contact or the drug wears off — about eight hours.

Targets at a distance are chosen randomly, unless known to the telepath from a previous intrusion. Within a few meters, however, the telepath can choose a specific target.

To survive an initial administration of the drug without going organically insane, a Kzin must have the potential telepath defect. If the Kzin survives the ordeal, he continues to take maintenance doses of the drug with no danger of permanent insanity. One telepathic-level dose of the drug lasts for 8 hours. After this time the telepath must sleep without interruption for at least 20 hours, or suffer severe health problems. Kzin telepaths can read the minds of any intelligent species except Bandersnatchi.

To humans, the Kzin telepathy drug acts as a class A poison, potency 18, effective one minute after consumption. The victim dies screaming, tormented by the darkest images from his or her own subconscious. It never induces telepathy in humans.

Grog Telepathy
During the sessile stage of a Grog's life cycle, she becomes able to control any animal within *a* range of the Grog's POW x 20 meters, calling their food to them when hungry. Grogs can make use of all the senses of any creatures around them, including humnas. They can direct the behavior of scavengers and potential predators with specific commands, and they can lodge irresistible suggestions in the conscious or unconscious minds of sentient beings.

No knowledge of a particular language is required for a Grog to use its power. The only defense is the latent Slaver mind shield present in some gifted humans. Bandersnatchi are immune to the power of the Grogs. Creatures lacking highly-centralized nervous systems are not susceptible to hypnotic telepathy.

It is possible for a human to identify an implanted Grog command, because the statement so clearly stands out as a pristine, clear, statement, among the otherwise muddled thoughts common to the human mind. This may not help the character keep from obeying it, however.

Though Grogs cannot work together to increase their total POW, they can transfer information to one another like a telegraph net. A whole planetary population of Grogs will know anything important within moments of the initial understanding or perception.

Dolphins
Dolphins, like humans, can receive specific extraordinary psionic abilities. They do not have the characteristic human luck.

Bandersnatchi
Bandersnatchi, though not psionically capable themselves, are uniquely able to resist any form of psionic compulsion or any telepathic entry into their minds. The mind of a Bandersnatch is impervious to the powers of a Grog, a Kzin telepath, or any psionic ability which intrudes into the mind of another. However, non-cerebral psionic abilities, such as pyrokinesis, cannot be resisted by a Bandersnatch.

THE JOURNEY OF THE CATSEYE

The following scenario begins a *Ringworld* campaign. In it, the explorers travel from Known Space to Ringworld to seek a new longevity drug. The scenario is designed to be the first episode of a multi-adventure campaign. Use it to acquaint your players and yourself with the game rules and procedures. Once this scenario has been completed, further adventures must be constructed by you. Others are forthcoming from Chaosium Inc.

The explorers initially have relatively few choices of action, but they have several opportunities to experiment with the *Ringworld* rules. After they reach Ringworld, the explorers will gain many opportunities to use Human Space technology, to test the game rules, and to make their own decisions.

Characters

The gamemaster should help the players create their first explorers specifically for use with this scenario. Each player should tell the gamemaster the type of explorer he or she wishes to play. The gamemaster should then try to accommodate those wishes using the guidelines given below. If necessary, the gamemaster should determine the previous pursuits followed by an explorer rather than having the player roll randomly on the Pursuit Table. The gamemaster may only need to choose the explorer's latest occupation so that he or she will have skills appropriate to the scenario.

Some of the explorers must have science backgrounds — the captain seeks explorer-scientists. Engineering and equipment repair skills are always useful. Some of the explorers should have weapon skills; Ringworld is rife with nasty surprises.

Players should prepare more than one explorer in case one dies. Play may focus upon one explorer per player at a time while the rest stay with the ship to do research or other important tasks.

A list of senior crew members used in the scenario is provided. Captain Lopez has filled the critical positions on his starship with experienced, long-time friends. The explorers should fill the subordinate crew and science positions as indicated on the Scenario Characters List.

Officer Statistics

These characters, with the explorers, will crew the *Catseye.*

GREGOR LOPEZ - Earth human; captain and owner of the Catseye

Earth born and raised, Gregor Lopez has enjoyed many advantages during his life. His family is wealthy; his grandfather was granted an Institute of Knowledge contract to produce and distribute boosterspice on Earth. After graduation from the UN Space Academy, Lopez served 12 years in the space-force, first as a pilot and eventually as commander of the *UNSS Monitor.* Upon retirement, he began his own exploration corporation. He hired the *Monitor's* former engineer, Brian Mundo, and found a battered star-racer, Calvin Degel, to pilot his ship. The other crewmembers have joined him over the years.

STR	15	Right Leg	0/9
MAS	12	Left Leg	0/9
CON	15	Abdomen	0/9
INT	13	Chest	0/10
POW	23	Right Arm	0/7
DEX	12	Left Arm	0/7
APP	14	Head	0/9
EDU	21	HIT POINTS:	27
AGE	68	(24 physiological years)	

Speed: 3m/im Action Ranking: 5

weapon	*skill*	*damage/energy*
Hand Beamer	135%	1D4+6/10
Laser Rifle	83%	1D10+15/25

See the weapons descriptions in the technology book for further statistics. Gregor has a belt pack battery for his laser rifle.

SKILLS: Archaic Melee Weapon/Foil 68%, Astronomy/Astrodynamics 41%, Athletics/Acrobatics 76%, Athletics/Swim 32%, Atmospheric Craft/Copter 53%, Bargain 128%, Computers/Software 73%, Emergency Treatment/Human 54%, Engineering 36%, Fast Talk 113%, Handgun (Energy)/Hand Beamer 135%, Heavy Weapon (Energyl/Laser Rifle 83%, History/Boosterspice Development 78%, Law/Interplanetary 77%, Law/Criminal 42%, Listen 48%, Musicianship/Piano 57%, Observe 40%, Orate 83%, Personal Flyer/Lift Belt 42%, Physics/Gravities 38%, Reactionless Drive/Thruster 82%, Repair 26%, Ringworld 1% *, Search 49%, Strategy 185%, Unarmed Combat 55%

LANGUAGE: Interworld 74%

CREDIT RATING: X (estate held by family on Earth)

DEFECTS: none

CALVIN DEGEL - We Made It human; pilot

Being a starship pilot fulfills a childhood dream for Calvin Degel. At 16, to the displeasure of his middle-class parents, he was accepted into the Futurelander Academy in Crashlanding City. After two years, he dropped out and joined the Buddy Crumbey Staracing Team. Calvin was an excellent pilot, and his future and fame seemed secure. His was one of the top 10 selling posterholos among teenage Crashlanders for three years.

Then he had the accident. Few pilots survive staracer crack-ups. Maybe it was his crashlander luck or his flaksuit, but Calvin Degel survived as an 85% transplant case. Captain Lopez heard about him from Brian Mundo and easily managed to persuade the young pilot to give up racing and become his pilot. The captain's offer to pay the autodoc transplant bill was instrumental in enticing Calvin, who has now been with Lopez for five years.

STR	16	Right Leg	0/10
MAS	14	Left Leg	0/10
CON	16	Abdomen	0/10
INT	9	Chest	0/11
POW	11	Right Arm	0/8
DEX	19	Left Arm	0/8
APP	7	Head	0/10
EDU	12	HIT POINTS:	30

Scenario Characters List

A blank space indicates a position available for filling by a player's explorer.

name	*crew position*
Gregor Lopez	Captain and Owner
Calvin Degel	Pilot
. . . . .	Co-Pilot (assistant to Mr. Degel)
Brian Mundo	Ship's Engineer
. . . . .	Engineer's Mate (assistant to Mr. Mundo)
Skreet	Navigator
Zola McFee	Ship's Accountant and Lawyer
Guardian-of-the-Weak	Head of Security
. . . . .	Scientist (any appropriate field)
. . . . .	Scientist (any appropriate field)
. . . . .	Scientist (any appropriate field)
. . . . .	Scientist (any appropriate field)
. . . . .	Security Guard
. . . . .	Security Guard

AGE 38 (30 physiological years)

Speed: 3m/im Action Ranking: 3

weapon	*skill*	*damage/energy*
Hand Beamer	76%	1D4+6/10
Police Stunner	54%	varies / 1 -25

SKILLS: Athletics/Acrobatics 67%, Handgun (Energy)/Hand Beamer 76%, Handgun (Energy)/Police Stunner 54%, Hyperdrive 166%, Listen 44%, Reactionless Drive/Thruster 198%, Repair 68%

LANGUAGE: Interworld 46%

DEFECTS: Degel suffers from chronic depression due to the severity of his past injuries and the degree to which parts of his body were transplanted. His appearance looks somewhat odd, as not all the transplant parts match up properly — in fact, he presents a bit of a piebald appearance (hence his unusually low APP). He is given to bouts of deep reflection, particularly during hyperspace flights.

SKREET - Earth Dolphin; navigator

Until he met Gregor Lopez, Skreet had never set fin off Earth. He was originally an artist, who used his peculiar psionic ability to create holographic representations of solar systems and galaxies which were very popular among certain Pacific dolphins. Lopez was fascinated when he visited an exhibit of Skreet's work at the Aliens-in-the-Park fair in San Francisco. He was amazed by the dolphin's apparent grasp of stellar and planetary relationships, and arranged a meeting with Skreet to discover how he learned to visualize the universe on such a scale. When they met, Skreet displayed such an interest in space that Lopez played a hunch. He decided to sponsor the dolphin's work, as well as give him a berth on a starship, for a cut of the sales profits of Skreet's work. Skreet's natural abilities have now generalized beyond the mere representation of spatial relationships with light, and Skreet is actively studying navigation and astronomy. He also continues to develop and refine his artistic skills

STR	19	Flukes	2/10
MAS	26	Hindbody	2/12
CON	14	Forebody	2/14
INT	12	Right Fin	2/10
POW	11	Left Fin	2/10
DEX	13	Head	2/12
APP	13	HIT POINTS:40	
EDU	16		
AGE	26	(26 physiological years)	

Speed: 5m/im swimming; 12 m to 4m in Walker suit Action Ranking: 4

weapon	*skill*	*damage/energy*
Head Butt	68%	1D10 / 0
Stun	84%	see below

NOTES: The dolphin's sonic stun works only on creatures within 1m range and with a MAS of 2 or less, which are knocked out.

SKILLS: Athletics/Swim 500%, Astronomy/Astrodynamics 62%, Astronomy/Galactography 45%, Astronomy/Navigation 45%, Computers/Software 35%, Ground Vehicle/Walker Suit 39%, Mathematics/Topology 66%, Fine Arts/Holography 78%

LANGUAGES: Dolphin 65%, Interworld 24%

PSIONICS: Skreet has the ability to mentally manipulate pre-existing tridee and holographic images within a number of meters equal to his POW. He may reform these images any way he pleases, within some limits — a black-and-white picture could not be given color, for example.

DEFECTS: Transplant Resistant

Skreet's walker stats

WEIGHT: 850 kg

VOLUME: 3 cubic meters

SPEED: maximum 12m/im, cruising 4m/im

ENERGY USED: 75/im cruising speed; 120/im maximum speed

POWER SUPPLY: fusion 2 generator

HIT POINTS: 50 - see hit location table

APPLICABLE SKILL: Ground Vehicle

location	*1D20*	*Armor/HP*
Right Tread	01-03	10/10
Left Tread	04-06	10/10
Pedestal	07-12	10/25
Right Arm	13	7/5
Left Arm	14	7/5
Bowl *	15-19	5/10
Auxiliary Equipment	20	per item &

* once the walker's bowl has been destroyed, hits on this location damage Skreet directly

& any extra equipment carried goes here, such as a comdisc, weaponry, or a stasis field generator. If more than one item is carried, roll randomly to determine which one is hit.

BRIAN MUNDO - We Made It human; ship's engineer

Brian was born to a poor Crashlander family. He did well in school, and was accepted into the Futurelander Academy in Crashlanding City on an engineering scholarship. When he graduated, Grian worked his way up to full-fledged Engineer on the *UNSS Monitor,* a starship based on Earth under the command of Gregor Lopez. He was honorably discharged 7 years before play, and was hired by his old commanding officer.

STR	11	Right Leg	0/6
MAS	8	Left Leg	0/6
CON	12	Abdomen	0/6
INT	13	Chest	0/7
POW	13	Right Arm	0/5
DEX	17	Left Arm	0/5
APP	10	Head	0/6
EDU	16	HIT POINTS: 20	
AGE	46	(36 chronological years)	

Speed: 3m/im Action Ranking: 3

weapon	*skill*	*damage/energy*
Hand Beamer	45%	1D4+6 / 10
Pneumorifle	68%	2D6 / 2

SKILLS: Athletics/Run 54%, Aquatic Vehicle/Marinex 48%, Atmospheric Craft/Flycycle 51%, Emergency Treatment/Human 34%, Engineering 125%, Handgun (Energy)/Hand Beamer 45%, Heavy Weapon (Projectile)/Pneumorifle 68%, Musicianship/Jaw Harp 62%, Repair 166%, Search 73%

LANGUAGES: Interworld 68%

CREDIT RATING: X

DEFECT: Hyperspace Phobia

EQUIPMENT: tool kit

ZOLA McFEE — Earth human; accountant and lawyer

In her youth, the attractive McFee aspired to be a tri-dee star. She made several commercials, but had to depend for a living upon dancing. During this time she was too poor to afford boosterspice, and began to age. She attended night school to study accounting. At school she met and married a young lawyer, finished her studies first, and worked to support his schooling. After graduation he skipped planet with a younger, prettier client. In revenge, Zola studied contract law, developing extraordinary grasp of its intricacies. She sued and beat her husband in court, representing herself. She is now single, happy, and well-off. She and Lopez carry on an irregular, friendly affair of convenience.

STR	9	Right Leg	0/8
MAS	11	Left Leg	0/8
CON	14	Abdomen	0/8
INT	17	Chest	0/9
POW	12	Right Arm	0/7
DEX	10	Left Arm	0/7
APP	16	Head	0/8
EDU	20	HIT POINTS: 25	
AGE	171	(47 physiological years)	

Speed: 3m/im Action Ranking: 5

weapon	*skill*	*damage/energy*
Pneumopistol	64%	1 D8+1 / 1

SKILLS: Athletics/Run 65%, Bargain 55%, Debate 78%, Law/Contract 123%, Law/Interplanetary 74%, Perform 40%, Orate 78%, Unarmed Combat 35%,

LANGUAGE: Interworld 83%

DEFECTS: none

GUARDIAN-OF-THE-WEAK - Kzin; security officer

Guardian-of-the-Weak is the temperamental younger son of a minor Kzin noble (who has a partial-name). He will inherit nothing from his father. At majority, as with all Kzinti, he joined the military. His career was undistinguished and, when he was discharged, he returned home. He was forced to leave Kzin for Human Space when he told the superior of an agent for the Patriarchy of an indiscretion the agent had committed. Sadly, the agent had connections high up in the patriarchal bureaucracy, and Guardian had to flee or be killed. Since his exile, Guardian has taken to drink. Guardian and Lopez went a few rounds in a bar on the Belt, beginning a rocky friendship. When sober, Guardian is a fierce warrior. Lopez tries to keep the Kzin off the bottle.

Guardian seeks to earn his full Kzin name, which is unlikely for a fugitive. His current appellation was assumed by him when he entered Human Space. Guardian-of-the-Weak hopes to return to Known Space from Ringworld with enough prestige to go back to the Patriarchy, exonerate himself, gain a name, and kill the agent of his exile with his own fangs and claws.

STR	25	Right Leg	0/14
MAS	30	Left Leg	0/14
CON	14	Abdomen	0/14
INT	12	Chest	0/16
POW	11	Right Arm	0/11
DEX	22	Left Arm	0/11
APP	14	Head	0/14
EDU	12	HIT POINTS: 44	
AGE	51	(51 physiological years)	

Speed: 5m/im Action Ranking: 2

weapon	*skill*	*damage/energy*
Claw	120%	1D8+2 + 3D6
Bite	120%	1D6+ 3D6
Laser Pistol	90%	1D10+15/25
Variable Sword	89%	1D20 + 5 / varies

SKILLS: Athletics/Acrobatics 105%, Athletics/Run 80%, Fast Talk 54%, Emergency Treatment/Kzinti 76%, Emergency Treatment/Human 40%, Handgun (Energy)/Laser Pistol 90%, Hide 34%, History/Kzinti 65%, Personal Flyer/Kzinti Lift Belt 67%, Observation 56%, Sneak 25%, Unarmed Combat 126%, Variable Sword 155%

LANGUAGES: Interworld 65%, Hero's Tongue 89%

Gamemaster Synopsis

Gregor Lopez is one of the most successful starship captains in Known Space, and his name and fame will be at least vaguely familiar to any explorer that has spent much time in the spacelanes. In the 1 5 years before the beginning of the scenario, he has spent several million stars on two projects. The first, his pride and joy, is the Catseye, a starship fashioned within a General Products hull. The second is his expeditionary business, which has financed several exploratory ventures for private clients. Patents gained from these trips have greatly added to his family's fortune.

Captain Lopez is now organizing another hazardous expedition and seeks 6-8 explorers to accompany him. He will not take hoodlums, ne'er-do-wells, or similarly worthless fellows, but is looking for respectable, adventurous scientists and pioneers. The reward could be fame and an incredible fortune for each participant.

This scenario should begin on a major Human Space world, determined by the gamemaster. Lopez maintains a sizable estate on Earth and would naturally seek scientists there, but could just as well be recruiting on the Belt, Jinx, or elsewhere.

Each of the explorers will be individually contacted by Captain Lopez. Possibly they and the Captain are already acquainted — perhaps the explorer requested a grant from the Lopez family; perhaps the explorer already works for one of the many institutes funded by the family, etc.

The Scenario

A courier appears at the door of each explorer one morning and asks if they might be interested in participating in a major scientific research expedition. Presumably all explorers contacted will have some motive for wanting to leave their current situation — the lure of fame and fantastic wealth if nothing else. The courier knows few details, but states that the explorer is invited to dinner aboard the Catseye, a starship docked at a major starport of the planet chosen by the gamemaster.

Several other people are on-board when the explorers arrive — all of whom seem to be familiar with the Captain. The explorers should be impressed by the surroundings and the food they are served. They dine in a brightly-lit chamber (the Common Room) measuring about 4x1 5x30m long (about 50 by 100 feet with 13 feet headroom), and a carpet of real grass, a small pond, a multitude of flowerboxes, vines creeping strategically up the walls, and a sweeping window displaying a panoramic view of the spaceport. Tables have been set up on the grass, filled with excellent chef-cooked real food. No lobster cubes or trufroot wedgies are found here.

Once everyone has eaten, Captain Lopez informs the explorers that each will receive a 500 Star consulting fee simply for meeting with him. For that generous sum, he requests complete confidentiality and four hours of their time. Each explorer must agree to these terms before Lopez continues. Their agreements are recorded in the ship's log, and are legally binding; the explorers will know this. If they do not agree, the Captain will thank them for their company and politely ask them to leave.

Captain Lopez continues the meeting by introducing the crew of the *Catseye.* These include Calvin Degel, ship's pilot; Brian Mundo, ship's engineer; Zola McFee, the ship's paralegal advisor; and Guardian-of-the-Weak, a fearsomely capable security chief. (Skreet, the ship's Dolphin navigator, is sporting himself outside in a nearby swimming pool.)

The Captain explains his expedition at length. Recently, a huge structure has been discovered orbiting a star far beyond Known Space. The existence of this structure is known to only a few humans and Kzin. It has a surface area millions of times greater than that of Earth, and is inhabited by human-like creatures, some of whom have developed a longevity drug reputedly far more powerful than boosterspice. A client of the Captain's is allergic to boosterspice (almost everyone knows of someone in a similar condition). The client is very rich, and very old. The rumor of this new antiagathic drug has given the client hope for a much longer life. The discovery of a boosterspice alternative would certainly benefit the entire human species. Captain Lopez intends to mount an expedition to find this longevity drug, secure a patent on its manufacture, and thereby step ahead of his boosterspice-making competitors.

The Captain is aware of the difficulties and dangers of this journey, and of the fortune due any party that finds such a drug. The search may cover an immense amount of territory inhabited by presumably hostile aliens. There is no guarantee of success, but he believes that the explorers have the skills necessary to achieve the goal. He offers a fee of 5000 Stars each plus a 25,000 Star bonus to be shared between the explorers if the drug is actually recovered. Each explorer will also receive a free 20 year boosterspice injection (or an injection of the longevity drug once it has been synthesized).

If the explorers want to quibble over price and their players succeed in bargain rolls, he can be talked up to a 1 5,000 Star fee plus a 50,000 Star bonus, plus the injection. If any explorer succeeds in a Law/Contract skill roll, he will realize that, though the Captain's offer may be fair, most of the wealth to be gained will come upon return to Known Space — the royalties that the party could gain from this drug could be immense. Should this point be raised, the Captain will knowingly smile, and admit that this is true. If any explorer is willing to forego the fee and bonus, he will instead offer that explorer a 0.001%, 100-year royalty arrangement for every explorer that accompanies him and returns to Known Space; assuming that the drug is found. (Consider this: at least 100,000,000 boosterspice allergies at an injection price of 50 stars every 10 years — assuming that the drug works in such a manner — yields 50 million Stars per explorer over the life of the agreement! And if the drug replaces boosterspice, the royalties will be inconceivable.)

Captain Lopez plans to complete the expedition within five years. Everyone who accompanies him should plan to be away for at least that length of time. He will not discuss his specific plans for the trip; the location of Ringworld; the capabilities, characteristics, or specifications of his spacecraft; nor the source of his information. He will swear that all of his information is reliable. Explorers successfully using the Psychology skill will be reasonably sure that Lopez is not deceiving them.

He will then conclude the meeting by asking the explorers to carefully consider his proposal, the opportunity that awaits them, and the money to be made. If the explorers accept his offer, then he will formally sign a comprehensive contract with each. If the explorers review the contract in detail, they will find that all is in order.

He instructs the explorers to resolve unfinished business and return to the ship within one UNS week after the meeting. Captain Lopez will supply most of the equipment that the explorers will need, but he encourages them to furnish their own personal possessions, room decorations, etc. to make the journey more pleasant.

If any explorer declines his offer, he will pay him 500 Stars and remind him of his oath of confidentiality before he leaves.

The Catseye

Six years before the onset of the scenario, Lopez obtained a 40-meter Pierin variant of the GP No. 1 hull, sans disk, from a small bankrupt interstellar hauling firm. Lopez remodeled the interior and the ship's equipment. Since that time the ship has been tested thoroughly and successfully.

Throughout the text, this craft is referred to as the *Catseye,* which is a common name for this model of craft: when viewed from a distance and before the interior decks and other equipment have been added, an illuminated No. 4 hull equipped with a hyperdrive shunt somewhat resembles the eye of a cat. We suggest that the gamemaster or the players rename the spacecraft to personalize it for their particular campaign.

Photocopy and give the deck plan copies to the players for orientation

Tour of the Catseye

When the explorers arrive (one week after the initial contact), Captain Lopez will guide them through the ship, as he explains the rules maintained aboard ship. Decks Five, Six, and Seven are off-limits to explorers, unless they have specific permission from the Captain or a senior crew member (Degel, Mundo, McFee, Guardian, or Skreet) to enter that deck. Deck One is off-limits except to those explorers assigned berths there.

Deck Two contains lab facilities which will be placed under the supervision of the appropriate scientist-explorer(s).

Deck Three contains passenger quarters and some of the ship's recreational facilities. Assign or have the explorers choose their individual cabins.

Deck Four contains swimming and jogging tracks, and a storage area mostly filled with ship's machinery, but with a small space available for the passenger's equipment. Captain Lopez will caution the group to be careful entering Deck Four, for the orientation of the gravity generators on that deck deviates from ship normal.

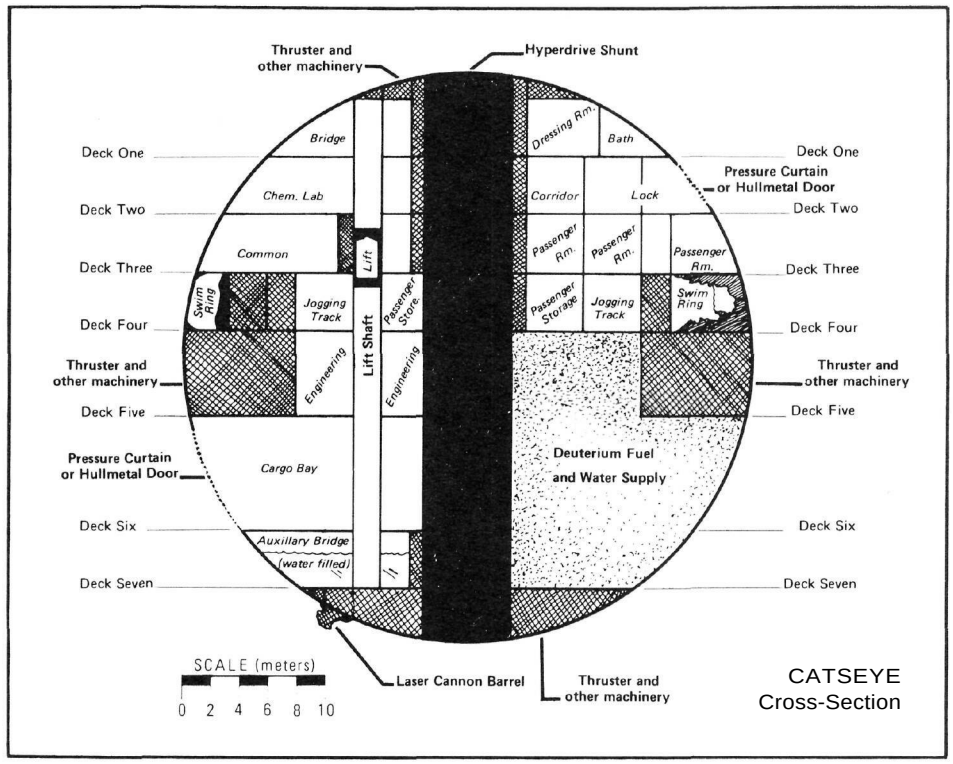
Gamemaster Notes

The following information is not explicitly given to the explorers, but is necessary for the

gamemaster to know. The explorers will learn some of this information as the journey progresses.

Though not equipped as a warship, the *Catseye* does carry an externally-mounted laser cannon — explorers knowledgeable in the ways of warships or weapons systems will recognize this for what it is when they see the ship's exterior. The only other weapons carried aboard are hand beamers and laser rifles carried in the ship's lockers for use while on Ringworld.

The computer aboard the *Catseye* is typical of a first-line Known Space system manufactured and installed by Donovan's Starship Systems (Earth). The model is a DsBs Crew, and it has the standard fixed subsystems of autopilot, communications, engineering, life-system, and security. In addition, this model has been customized so that there are additional fixed subsystems: emergency, sensor, and a unique ringworld subsystem. The ringworld subsystem has been specially installed to accumulate all information that the expedition acquires about that world.



DsBs **Crew Model Computer**

subsystems: 8 fixed, 12 optional
functions per subsystem: 20
speed: 5

FIXED SUBSYSTEMS (8 total): autopilot, communications, emergency, engineering, life system, ringworld, security, sensor

OPTIONAL SUBSYSTEMS (12 total, usually only the Lab subsystems are rotated): administration, autodoc, autochef, library (including a set of 30 memory bubbles covering the common sciences), probe control, recreation, ship's defense, simweb, stasis field operator, translation, tri-dee imager, weapons (laser cannon)

Subsystem Availability

BRIDGE: administration, autopilot, communications, life system, sensors, weapons, library, and all open systems.

CAPTAIN'S CABIN: master terminal, access to all subsystems including security

ENGINEERING: limited access to administration, full access to emergency, engineering, library, tridee imaging

LAB: limited access to administration, full access to library, tridee imaging

The *Catseye* has two major defensive systems to protect it from attack. The first is the General Products hull. This is adequate defense against most types of energy. The major weaknesses of this ship are the lock and hangar doors. The hangar and lock doors, when open, are protected only by pressure curtains (entirely adequate as long as the ship is not brought into combat), with hullmetal covers used when they are closed, such as when in hyperspace.

The second defense is the ship's quantum 3 stasis field generator. If the ship is attacked with a weapon capable of killing the occupants (even though no known weapon can breach the hull), the computer will automatically raise the stasis field, rendering the ship totally immune to danger for 6 hours. At the end of that time, the field will be dropped for several nanoseconds while the computer checks to see that the vessel is no longer under fire — if it is, it will raise the field for 6 additional hours. This cycle continues until the computer determines that all danger has passed.

Any ship with the ability to accelerate at 30 gees requires artificial gravity to avoid injury to the passengers. The *Catseye* has been specially modified, at great expense, beyond normal starship standards.

The individual gravity of several areas aboard the ship can be adjusted from 0 to 3 gees. The Cargo Deck, for example, is normally kept at 0 gees, allowing easier storage and manipulation of its contents. Guardian-of-the-Weak keeps his cabin at 1.5 gees as part of his physical conditioning program. The Deck Two Simweb room is kept at 0 gees. If a room contains the proper controls, an explorer may set the gravity of that room at any desired setting. The common areas all have a standard setting of 1 gee.

The ship is propelled by a Quantum I hyperdrive shunt and X/Y/Z axis thrusters for omnidirectional movement with a maximum acceleration of 30g.

Ship Layout

The *Catseye* is divided into eight decks. The hyperdrive shunt runs through the center of the ship, from top to bottom in a 6-meter-diameter core. The next two pages are a deck-by-deck description of the *Catseye* with scaled plans for each deck.

The Outward Journey

Roleplaying Introductions

By thruster the *Catseye* purrs forth from the planet. For two leisurely weeks the ship travels out of the solar system and the solar gravity well. During this time the crew and the explorers should take every opportunity to become acquainted with each other and with the ship.

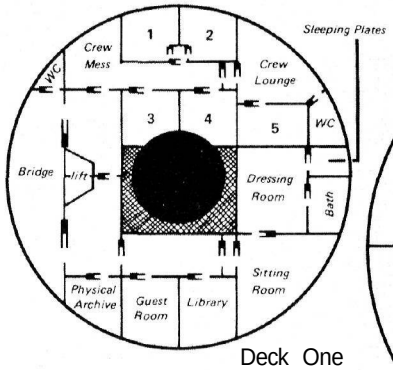
The gamemaster should use this interval to introduce roleplaying to new players. Urge the explorers to meet and to interact. Ask the players to state how their explorers feel about each other, about the ship and its officers, and about the mission. As the players verbalize their explorers' responses, the game situation and all of the characters will come into focus.

The Captain meets with the explorers singly and in small groups. He is friendly and open. For the first time, he fully explains the capabilities of the *Catseye* and takes the explorers on an extended tour. He explains the various sections of the ship in detail, giving special attention to the particular responsibilities of the individual explorers to whom he is talking. Though he shows the restricted decks (to satisfy natural curiosity), he repeats his restrictions. He does not want explorers on these decks because he does not want his crew distracted. In an emergency, such distraction could be fatal.

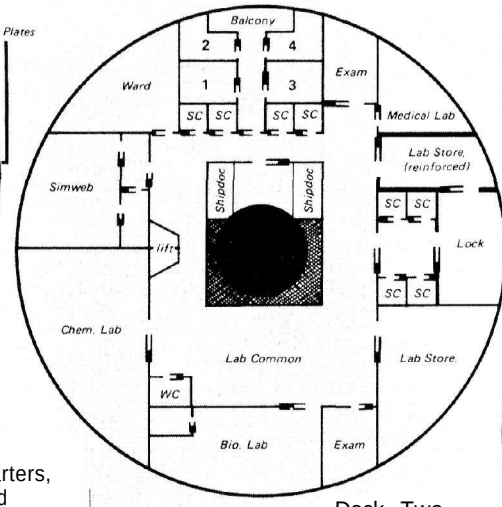
Explorers suffering from blindspot phobia should carefully examine the layout. Many areas of the hull have been left clear, to expose the spectacular view of space — particularly in the Deck 3 commons, rec rooms, and passenger lounge, and on the Deck 4 swimming ring. These sections of the hull are opaquable at the flick of one or more switches. Engineer Mundo and his assistant will opaque the Deck 3 common before entering hyperspace. They will also opaque one of the saunas, the rec rooms, and rooms of any explorers requesting it. Opaquing the swimming ring is difficult and may be refused.

Then the ship will enter hyperspace. Calvin Degel, the pilot, will announce impending hyperdrive, and all explorers suffering from hyperspace blindspot phobia should retreat to a protected area — possibly the Lab Commons (which also lies near the 'docs).

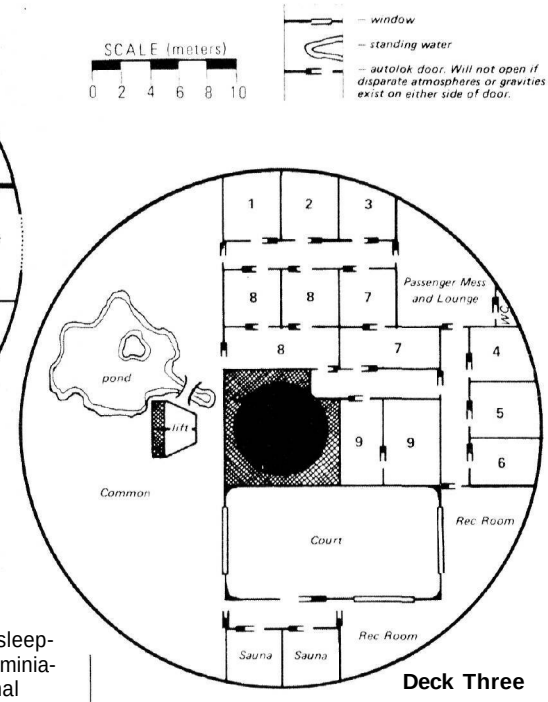
Regardless of the planet on which the Captain meets the explorers, the journey to Ringworld takes the same amount of time — about two years. Every few weeks the Captain drops out of hyperspace and travels for a few days in normal space, ordering the scientists to take full-spectrum sensor readings and star plots (any explorers among them will certainly know the route of the *Catseye).* Blindspot phobia sufferers can then make use of the ship's facilities. Explorers who *(cont. p. 38)*



Deck One



Deck Two



Deck Three

Deck One

Deck One contains the bridge; crew quarters, mess, and lounge; Physical Archives; and Captain Lopez' suite, including a guest room, library and main computer terminal, dressing room, sitting room, and sleeping room. The average ceiling height on this deck is about 3 meters. This deck is off-limits to all but necessary personnel.

THE LIFTS: these hydrolifts connect all of the ship's decks and are used for general transport when in flight. They also function as gravlocks. On Deck One the lifts are separated by an automatic hatch. When the *Catseye* is docked, this hatch is closed to provide the Captain with a private means of entering and exiting the ship. The crew usually use the starboard lift.

THE BRIDGE: the bridge is situated forward on the deck, against the hull. On the bridge are stations for the captain, pilot, and copilot, a navigator (though Skreet actually does his work below, in the auxiliary bridge), and a ship's systems monitoring station. The bridge is well-insulated against laser fire. The GP hull here is externally reflective; projectors cast holo-images collected by the ship's sensors on the interior, blackened side of the hull. Convenient cabinets contain emergency survival packs, food and water, and a minidoc. Bridge gravity is set at 1 gee. The bridge is equipped with an auxiliary life-support system, and an auxiliary fusion 3 generator.

PHYSICAL ARCHIVES: this room contains an array of navigational equipment and reference material from many ages. Skreet often requests that portions of this material be brought down to him or, if unavoidable, he dons his walker suit and trundles up here.

CREW QUARTERS: these rooms are used by the senior crewmembers and their assistants.

Room 1 is occupied by Calvin Degel, the pilot. It is equipped with gravcontrol, sleeping plates, and a computer terminal.

Room 2 is occupied by Guardian-of-the-Weak, security chief. It contains a variable bed, gravcontrol, computer terminal, and a display of assorted archaic weapons. Guardian normally keeps the gravity set at 1.5 gee.

Room 3 is occupied by the copilot, who will probably be an explorer. It contains a variable bed and terminal.

Room 4 is occupied by the engineer's mate, also likely to be an explorer. It contains a variable bed and terminal.

Room 5 is occupied by Brian Mundo. The gravcontrol in the crew lounge also controls the gravity in his room, though he doesn't normally change it from 1 gee and gets angry if he is surprised by a sudden change in the lounge gravity (one of Calvin Degel's favorite practical jokes). His room also contains sleeping plates, an enhanced terminal, and a miniature working model of an ancient internal combustion engine.

The lounge is available for use by any crew member, and, in addition to the usual terminals, formseats, and bric-a-brac, it contains an autobartender.

The bath can be used by up to four people at once. Zero-gee baths, while interesting, are not recommended. If an explorer must indulge in one, he or she is advised to take at least minimal breathing gear.

The crew mess contains an autochef available for quick snacks or fine meals. Zola McFee sometimes cooks meals from scratch for the ship's company.

CAPTAIN LOPEZ' QUARTERS: the Captain resides in a six-room suite. The hatch between the two lifts is always closed when the ship is docked to permit the Captain private entrance and exit. The sitting, dressing, bath, and sleeping rooms all operate under the same gravity.

The guest room contains a variable bed and terminal, and it operates under standard ship gravity. It is currently empty and likely to remain that way.

The library contains an amazing variety of antique bound texts, tape recordings, microfilms, videos, and bubble memories written by an abundance of favorite authors (including multiple texts of Lopez' favorite author — Alexander Dumas). Several old machines fill the shelf and desk space. These are used to read or display the information available here in an array of formats. This room also contains the main computer terminal (with access to the Security subsystem). This terminal is locked in a hullmetal, stasis-protected cabinet.

The sitting room is well-appointed. A fine leather couch and chair, an animal skin of a Gummidgy furgnasher, and a fireplace round out the room. Lopez burns pseudowood manufactured by the food processor. The smoke and ash is recycled. One wall contains an audio system worth over 5000 Stars and a great variety of recorded music in an array of formats, including records, tapes, and memory bubbles.

The dressing room contains two long closets, a dressing table, and a large mirror. Captain Lopez scorns the shoddy, faddish work of clothing processors.

The bath is very large, with shower heads all about. This room also serves as a sauna, a small pool, and has several other functions.

In the sleeping room, both long walls hide sleeping plates. The room is equipped with excellent speakers, variable lighting, an intercom, autobartender, etc.

Deck Two — Laboratory Facilities

This deck contains lab space, sick bay, some storage bays, examination rooms, stasis cells, the simweb chamber, and the 'docroom, as indicated on the diagram. Each lab has a computer terminal. Ceiling height is 4 meters.

LABS: each lab is well-equipped with the appropriate paraphernalia. The Biolab has a climate-controlled specimen storage room. Each lab is equipped with a terminal.

SIMWEB BAY: The simweb bay contains six cocoons, an observation room with simweb control terminals, and variable gravity.

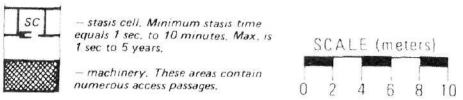
SICK BAY: the sick bay includes two shipdocs. One is programmed (at enormous cost)

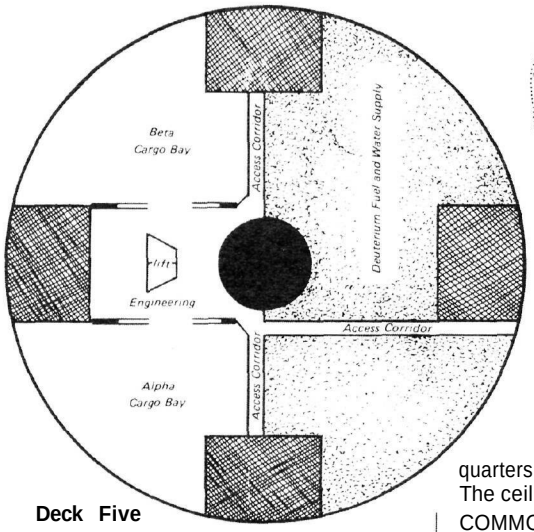
Deck Three — Passenger Facilities

This deck includes the common room, two saunas, two rec rooms, a court, passenger

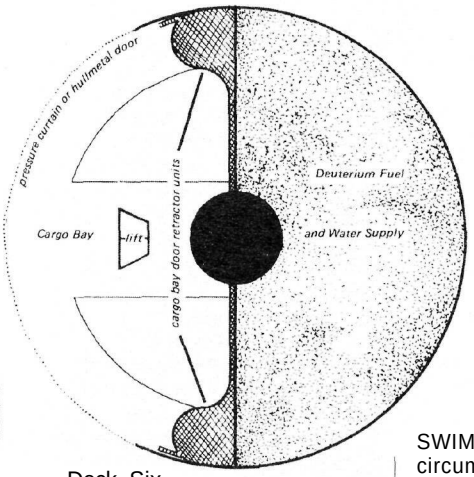
Modified Pierin-Variant GP Hull Starship

diagrams by Charlie Krank

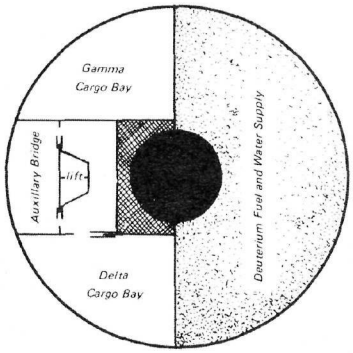




Deck Five



Deck Six



Deck Seven

to repair both Kzinti and human patients, while the other repairs only humans. Also included is a four-patient ward, four recovery/examination rooms, and four stasis cells. If Skreet were hurt so badly as to need the autodoc or die, he would be put into a stasis cell. There is a balcony at the end of the corridor between the recovery rooms.

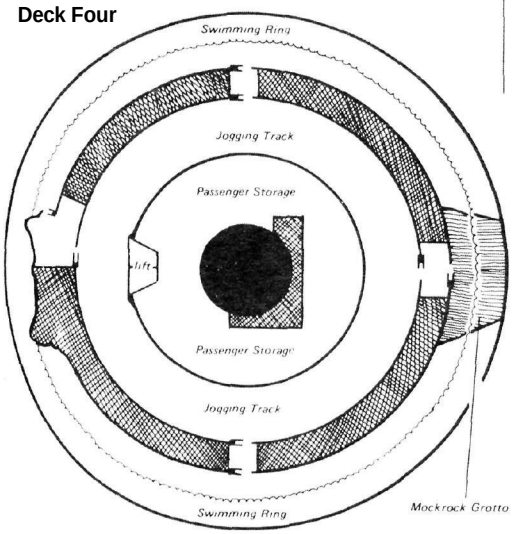
MAIN AIRLOCK: behind the main pressure curtain is a fully operational airlock, an intercom, gravcontrol, four easily accessible stasis cells, and deep space. If no danger is anticipated, the air lock is normally left open — only the pressure curtain interceding between the ship's atmosphere and space.

STORAGE BAYS: there are two lab storage bays. The starboard bay accesses directly to the main airlock and functions as a gravlock and as a temporary holding bay. It is particularly sturdy and can be used to store dangerous materials or creatures.

EXAM ROOM: these serve a variety of purposes — extra patient rooms, storage bays, brig, etc.

LAB COMMONS: the lab commons is provided for relaxation and discussion. It contains an autobartender, food processor, bathroom, and similar amenities.

Deck Four



quarters, and the passenger mess and lounge. The ceiling height is 4 meters.

COMMON ROOM: the common room is brightly lit. The floor is dirt-filled and covered with a lush carpet of real Kentucky Bluegrass. The hull has been left unpainted to provide a striking, panoramic view, but can be opaqued while in hyperspace. To starboard is a small, 8 meter-diameter pond with a water depth of 2 meters. This pool is heated, and it also contains bubblers and water jets. A footbridge spans a small portion of the pond near the starboard lift. Special controls inside the starboard lift can be set so that the doors open below the pond's water level provided that the lift is also filled with water. This is used by Skreet to get to the swimming ring and to interact with humans in the common room. Near the small island is a hatch into the gravlock for Deck Four.

SAUNAS/SHOWERS: these mechanisms are all-purpose devices. They can be filled with steaming water for hot-tubbing, they are equipped with bubblers and jets, and they have sun lamps and variable gravity. The opaquable hull has been left bare here.

REC ROOMS: these are equipped with two computer terminals apiece, and comfortable tables and chairs. Passengers in these rooms can leisurely watch any games in progress in the court.

THE COURT: a small variable-gravity arena for playing various sorts of team games. There are viewing windows on three walls.

PASSENGER QUARTERS: eleven rooms can be assigned to the explorers and other passengers. Zola McFee occupies the suite of rooms labeled 8. The gravity in these rooms can be varied in many configurations, as long as there is a gravlock or autolok door between rooms with disparate gravities.

Deck Four — Recreation & Storage
Passengers must be careful on this deck, for the gravity generators are oriented differently on different parts of the deck. This deck serves two purposes: it contains swimming and jogging facilities, and storage space for passenger gear. There are five ways of getting onto this deck: through the four gravlocks from Deck Three or using the lift. In the Swim Ring the ceiling lies about 3 meters over the water's surface. Ceiling height in the jogging ring is 4m and the passenger equipment storage bay has a ceiling of only 2 meters.

SWIMMING RING: running about this deck's circumference is the swimming ring. Gravity in the swimming ring is oriented, with 'down' being toward the hyperdrive shunt. When swimming, the hull of the *Catseye* lies overhead, and the stars are visible through the transparent hull. The swimming ring is 4m wide and the average water depth is 3m.

At the forward part of the ring (in the direction the ship normally travels) is an artificial island 4m wide and about 10m long. This can be used for resting and for sunning under sunlamps. Eight meters of the aft part of the ring are covered with mockrock to simulate a small grotto. Ledges have been built into the side of the grotto for resting, but swimming through the grotto is unimpeded.

THE JOGGING RING: concentric with the swimming ring and a machinery corridor lies the jogging ring. Here, gravity is oriented with 'down' being towards the ship's hull, and the ring is equipped with gravcontrol. Holographic projectors have been inset into the 'ceiling' which can be used to fill the ring with a variety of images, from virgin forest scenes to city streets with people, delivery vehicles, and buildings.

PASSENGER STORAGE: generally, gravity in this area is set at zero, and the area is easily reached using the lift.

Deck Five — Engineering & Cargo
ENGINEERING: this area contains machinery and engineering supplies. Its large repair area can hold even the marinex. This deck includes access to the hyperdrive and thruster machinery, and the helical deuterium condenser. The ceiling here is 6m high.

HOLD: forward of and straddling the engineering section are two portions of the cargo hold, Alpha and Beta cargo bays. Large autolok bay doors allow easy access to the hold from engineering. Three access catwalks lead to the machinery of the ship's thrusters. The aft catwalk leads to a door opening into the fuel bay.

Deck Six - Cargo Hold & Fuel Bay
This deck contains much of the hold space and the main fuel tank. Here the marinex aquatic vehicle is kept; Lopez has brought it with the understanding that the plant from which longevity drug is produced is aquatic or deep-sea in habitat.

Deck Seven — Cargo & Aux. Bridge
This deck contains the Delta and Gamma cargo bays and the auxiliary bridge. This bridge is as fully equipped as the main bridge, but it has only three crew stations. Of its 4m floor-to-ceiling height, 3 meters are filled with water: Skreet the Dolphin uses the area as his living and working quarters.

are too bored can crawl into a stasis field; to them, the trip will take about one second.

Simweb Training

During the two years of travel time, the explorers will have plenty of free time. Most of it will be spent reading, playing games, exercising, and sitting idly about.

New players can be introduced to the game system using the simweb. Two situations are included in this scenario, and the gamemaster can create more so that explorers can learn whatever skills they desire. The simweb is described in the technology book; simweb training mechanics are presented in the Game System chapter of the explorer book.

The Captain will open the simwebs to the crew and explorers for training and recreational use. Each explorer is entitled to a maximum of 100 simweb hours per month; 2400 hours for the entire outward voyage. Captain Lopez forbids more simweb use than this, saying that the simweb can be insidiously addicting. If any explorer circumvents the Captain's wishes, the simweb will be made off-limits to him (a simple autopilot command will do the job). Once the explorers return to Human Space, they'll be free to spend the rest of their lives as they wish, but there will be no addicts aboard the *Catseye.*

Sample Simweb Sessions

Here are two simple simweb programs. Feel free to expand on these or create your own.

SESSION ONE: during this session, the explorers will test their exploration techniques. One explorer per player should participate.

Programmed Skills: any Handgun (explorer's choice), Personal Flyer/Lift Belt

Session Duration: consult the skills of each player. Add the percentiles for that explorer's Personal Flyer/Lift Belt and the handgun chosen. The number of hours required by the session equals the most proficient explorer's total percentiles.

Situation: the explorers are all in lift belts, dropping out of dark, glowering clouds. They seek a place to land before the onrushing storm overtakes them. The land below is rugged and mountainous, extremely rugged, mountainous terrain. It seems like hours before one of the explorers espies a small valley in which they might find shelter — maybe behind a rock grouping or in a small cave. In the increasingly blustery winds, each explorer must receive a Personal Flyer/Lift Belt skill roll. Success indicates that the explorer landed safely and gained an experience check. Failure indicates that the explorer lands badly, suffering 3D6 damage to a random melee hit location, and gets no experience check. A fumble indicates that the victim crashed and suffered a simweb death.

Again, what seems like hours pass while the explorers seek shelter. Finally, someone finds a dark opening beneath a towering precipice. The explorers scramble inside just as the clouds burst, pounding the area with hailstones the size of basketballs.

Inside the cave, someone flips out a lume. Suddenly everyone spins about as a huge shadow in a deep recess in the cave lumbers forward. In the dim light each explorer can make out the fangs and beady eyes of a bear. Randomly determine the bear's target, and have each player state his explorer's intent. The bear has an action ranking of 5, and will attack as soon as it can. Each explorer should attempt once to shoot at the bear before it mauls anyone.

HUGE BEAR

		location	*1D20*	*points*
STR	30	right hindleg	01-02	3/12
MAS	34	left hindleg	03-04	3/12
CON	13	hindquarters	05-09	3/17
POW	14	forequarters	10-14	3/17
DEX	10	right foreleg	15-16	3/12
hit pts:	47	left foreleg	17-18	3/12
AR:	5	head	19-20	3/15

weapon	*skill*	*damage*
Claw	45%	1D6 + 4D6

NOTE: the bear can start an action ranking for each claw, separated by two impulses. The second claw will strike two impulses after the first.

If the bear manages to kill any of the explorers, that character suffers a simweb death, and the simulation immediately ends. All those explorers who manage to hit the bear with their handguns (and who do not die) receive an experience check for that handgun.

SESSION TWO: here the explorers portray local heroes coming to the aid of unfortunates trapped in a wrecked ground car. As many explorers as wish to can participate in the session, but they will not interact — each explorer here must act for himself.

Programmed Skills: Repair, Emergency Treatment (human)

Situation: the explorer is standing in a twilight landscape in a barren expanse of scrub. Before him, a cloud of dense smoke billows from the wreck of what was only recently a sleek new car. The air is acrid, his or her throat burns. As the explorer nears the car, he can see its interior roiling with the dense, rank smoke of smoldering insulation. When internal combustion engines were eliminated, the massive explosions of yore were no longer a problem, but other dangers still exist — such as suffocation.

The explorer must succeed in a Repair roll to spring the canopy and free the victims, apparently a mother and two young children. The mother is unconscious, bleeding from a gash on her head. The two children are crying as they cough and wheeze.

If the explorer frees the canopy on the first try, he gets an experience check. He can try up to five times, but success after the initial attempt gains no experience. If the explorer cannot free the people after trying five times, the session ends with the explorer feeling empty, with a sense of loss.

If the explorer does manage to free the woman and children, he can attempt Emergency Treatment on all three. After one attempt on each victim, an ambulance arrives from somewhere and takes them away. If the treatment succeeded, the crash victims sincerely thank their rescuer, who awakens from the simweb feelinghappyandself-satisfied.

Arriving at Ringworld

Captain Lopez calls a meeting for the explorers and off-duty crew members in the Common Room. The hull has been cleared, and behind the Captain floats a portion of the immense Ringworld. The ship has dropped out of hyperspace for the last time. Everyone scans the heavens. All can tell that the structure is indeed huge and, as they travel closer, its truly unbelievable scale will become overwhelmingly apparent.

Lopez speaks, "Behind me you see the object of our flight; an immense, artificial world. On it, I believe we can find the drug we seek.

"As I implied before we left, there have been expeditions to this world before. Information I have obtained concerning the earlier expeditions is scanty. I do know that they discovered a particularly huge mountain that they said was unique on the whole ring. They also discovered signs of civilization near this mountain.

"I propose to begin our search in that vicinity. We will pass over the side of the ring and orient ourselves to this world. We will then travel to this mountain and begin our search."

The Captain pauses dramatically, "Friends, we are upon the edge of the greatest wonder yet discovered by humanity. Let us make the best of it!"

The *Catseye* slowly passes over the rim wall, and the explorers and crew gain their first glimpses of the world. Note the Arch, and the huge expanse of terrain without a horizon line, and the rim wall.

Your first description of Ringworld should be dramatic. Read aloud portions of the first impressions handout. Provoke the players to speak for their explorers. Play the scene for all it's worth. At this time, pass out the autopilot printout of Ringworld physical characteristics. Players can read the attached first impressions now, or wait until they actually set foot on Ringworld.

After the players read the material, their explorers each get 01% in the Ringworld skill. Instruct the players to write it onto their explorer sheets.

Gamemaster Notes on Arrival

Players will likely know more about Ringworld than their explorers at this stage. Remind them that their explorers are much more naive. Work to emphasize the fact that the characters are astounded by the structure. Stress two particularly incredible facts over and over to the players — size and manufacture.

Ringworld is huge. Even with super-rapid modern transport the characters can spend days in empty travel. Occasionally remind the players how far they have gone by making comparisons with familiar distances. For instance, later in the scenario the characters will travel in their marinex at a cruise rate of 550 kph. In one leisurely day of ten hours touring, they will travel a distance equivalent to crossing the entire United States. In the scenario, their distant objective is about 75 hours of continuous travel in the marinex — the equivalent of circumnavigating the Earth. The crash to be described later occurs about a

minute after crossing the rim wall, and the remnant of the ship crashes about 500,000 km from the rim, much further than the mean distance of the Earth to the Moon. Other equivalent sizes are scattered throughout the game. Use them during play to keep everyone awestruck.

Ringworld was made. It is not a natural structure. The whole world was artificially created to simulate natural conditions. It was constructed using technology which is awesome even by Known Space standards. Seemingly impossible metals were created. Machines as complex as planets were created. Ecosystems interrelating literally millions of species were devised. The technological knowledge required to create Ringworld should awe and probably frighten every explorer.

A Note on Time Measurement

In this scenario, all references to time are expressed in Ringworld days, falans, and years, unless specifically accompanied by the UNS abbreviation.

Landing on Ringworld

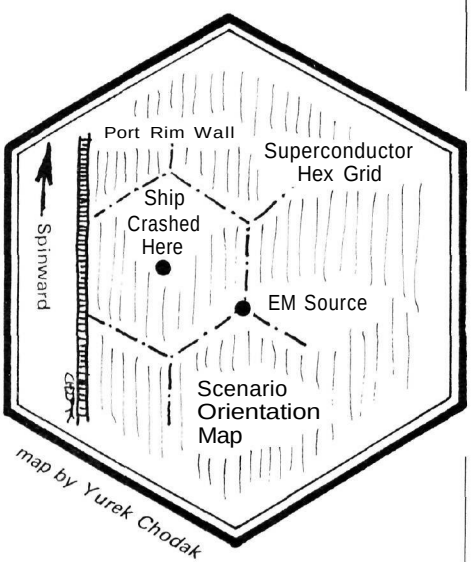
The Approach

Once safely over the rim wall, Captain Lopez will order a slow cruising speed of 500 km per hour. He orders the crew to use the ship's sensors to locate the giant mountain which will mark the beginning of the search.

Shortly the Captain announces over the ship's intercom that the mountain (Fist-of-God) has been located approximately 350 million kilometers antispinward of the ship's present location, He announces that he will increase speed and cut across the ring to get them there in three or four days.

"Science teams should prepare to depart in three days. Submit preliminary rosters and reports to me in 48 hours." states the Captain.

Zola McFee summons everyone to the observation deck to view the ring and speculate on its origin. The gamemaster should ensure that all explorers respond, since the next phase of the scenario works better if everyone begins from one place.



The Event

Suddenly, the ship lights blink off. Gravity shifts, and everyone falls. Each player must attempt to make a luck roll for his or her explorer.

Success with the luck roll indicates that the explorer took no damage. Failing the roll means that the explorer suffers 1 D6 damage to general hit points from falling, and from cascading debris. A special failure on the luck roll means that the explorer was taken totally by surprise and was violently thrown, taking 3D6 damage.

The bridge was hit hardest, and characters on the bridge will, with a successful luck roll take 3D6 damage anyway — and will take 6D6 damage if the luck roll fails and 1 2D6 if their luck roll results in a special failure.

Everything stops moving. The wounded groan or cry out. A dim blue glow flickers on — the emergency power system still functions. Apparently the life support system works as well.

The explorers will have to examine the ship to understand the damage. First give an overall impression, then pertinent details of each room searched. Locate the other non-player-characters and decide whether they are strewn around the wreckage or will actively lead the search. Emphasize that it is difficult to get around inside the ship. Manual hatches must be used because the lifts are not functioning. Loose wreckage lies everywhere. The blue emergency lights are dim. Doors and hatches are on the wrong surfaces, and the gravity is all wrong.

Some of the explorers or remaining crew are likely to be hurt, some seriously so. Have the survivors attempt Emergency Treatment on injured characters or remaining crew members. It will be found, later on, that Captain Lopez, Brian Mundo, and Calvin Degel have all died. The other non-player-characters are still alive, though possibly slightly injured. If any player-character has died, assign one of the remaining crew members to that player permanently, or entice them with the prospect of generating a Ringworld native as an explorer when the first opportunity arises.

The autodocs are bolted to the deck, and did not slide across the room upon impact, and nothing heavy seems to have struck them. Their operational lights seem to be in order, so (fortunately) they are still in working order. The things that could happen to a person in a malfunctioning autodoc would give a Kzin nightmares. As things stand, though, the most critically injured explorers should be put in the shipdocs, or at least treated by a minidoc.

Each player should describe the condition of his or her explorer. The gamemaster will explain the condition of the other crew members. Organization will eventually have to be resolved. When Lopez, Degel, and Mundo are found, the co-pilot will have to take over Degel's place, and the engineer's mate Mundo's job. Guardian-of-the-Weak will naturally assume command to replace Lopez, unless a strong-willed explorer is willing to challenge the Kzin. Resolve who is now the nominal leader, and then have him or her command the inspection of the ship's remains.

Although their curiosity must be piqued, the explorers have no way to learn why they crashed at this stage.

Investigating the Damage

Describe the results of the crash and let the characters gradually deduce their condition. Here are some useful facts to reveal when appropriate.

The ship is lying on its side. The former port-side of the ship has now become the ship's floor. Unless strapped-in or bolted-on (like the autodocs), anything movable fell that direction when the ship's stasis field went off. Obviously, the gravity generators are not functioning.

Looking out of any of the transparent surfaces reveals a dark crystalline substance which is opaque to light.

Descriptions of most rooms will be left to the gamemaster. Remember that the displaced water from the pond in the Common Room, the swim ring, and the fuel tanks has drained to one side, possibly presenting a hazard.

Some details of destruction are important to the scenario — be sure to include these in the description:

CARGO HOLD: the entire cargo bay door has melted to slag, engulfing much of the equipment — and a man, as well. The slag is still red-hot, but cools gradually as the explorers watch. The body is burned and unrecognizable. Deduction proves it to be Brian Mundo, who apparently was checking equipment when the ship went down. No gear, including all the flying vehicles, can be immediately extracted from the slag of the melted cargo door. Through the cargo door can be seen more of the smooth, darkly-crystalline material in which the ship seems to be caught.

BRIDGE: almost totally destroyed. Many of the instruments have burned out, and the pilot and captain sit stiffly, grim and blackened, where they worked — like Brian Mundo, they are far beyond the help of autodocs. Any explorer who was on the bridge at the time of the crash and who escaped is assumed to have been elsewhere on that deck just then — perhaps in the bathroom or some other protected place.

AUXILIARY BRIDGE: also fused, but some parts appear to be functional. Its sensors are not working correctly, and have a range of less than a meter. Still, they reveal that the ship is imbedded in rock, except to one side where hot gasses cool at a rate which will result in a breathable atmosphere in five hours. Explorers may speculate (correctly) that they at the end of a tunnel.

The status of the memory banks cannot be checked until the main computers are running again, but memory bubbles are notoriously sturdy.

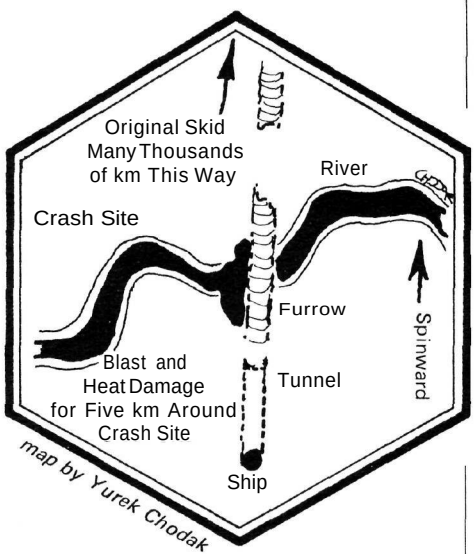
Someone will eventually leave the ship to view the ship's position and verify that they are in a tunnel. The tunnel is dark, but there is a point of light visible in the distance, like a star. It is the daylit tunnel mouth, ten kilometers distant.

Walking toward the light corroborates any guesses that the ship is in a tunnel which its impregnable hull and high velocity bored rock and soil. The walls are fused into glass, still hot and sagging slightly; unprotected

hands or feet will be burnt slightly by the heat. At the gamemaster's choice, any explorers braving the tunnel without helmets, breathing masks, etc., will become asphyxiated as per the Game System mechanics — air circulation in such a lateral, closed tunnel is not good. The tunnel is perfectly round, and slightly larger than 40 meters in diameter — very nearly the diameter of the ship. Compressed matter and gases made up the differences. Occasionally on the floor strange bumps of grayish, translucent matter can be seen; they are extremely slick, and anyone stepping on one will automatically fall.

After 10+ kilometers, the tunnel opens into *a* straight furrow plowed across the surface. Fires rage or smolder in every direction; everything is blackened or cinderized. Ponds, lakes, and rivers have evaporated; nearby forests have literally exploded from heat; the wastelands stretch in every direction as far as the eye can see.

If the explorers inspect the disaster further, humanize what they find. Artifacts, towns, farms, playthings, the bodies of children, etc., are entirely likely: if your players are sentimental, play upon the destruction; if your players are cynical, play upon their fears about retaliation — somewhere, someone is not going to like what has happened. If the players are practical and matter-of-fact, emphasize the difficulties of negotiation after such a disaster. Calculate the effect, and bring up what the players would least like to hear.



Analysis of the Ship's Condition

After several hours of excruciating work, the survivors inspecting the *Catseye* know the ship's damage. It cannot fly; it needs extensive engineering and rewiring. The two hullmetal hatches have been burnt off. The ship lays on its side, so that both the cargo bay hatch and the personnel airlock are about 20m above the tunnel floor. The cargo door is against the end of the tunnel; the smaller airlock faces the tunnel mouth. The ship is buried in 217.2 meters of Ringworld soil, at the end of a 12.5km tunnel. River water turned aside by the furrow will reach the ship in about ten hours; the low end of the tunnel will be filled with water in 12 hours. The ship cannot move on its own, nor easily be moved.

If the players do not feel a need to salvage the ship, then the Kzin and other crew members will urge their explorers to do so. It must be saved — not only to provide a safe base for future operations, but to provide a way home. Everyone should agree.

The gamemaster should state to the players the six projects outlined below. Let the explorers propose solutions. The suggestions given can be provided by surviving non-player-characters, and should be implemented only if nothing better is proposed by the players themselves.

Repairing the Catseye

Six steps are necessary to completely salvage the ship. Several need quick resolution in order either to protect the ship or to make the rest of the repairs easier. The projects are 1) waterproof the hull or stop the water, 2) unearth the ship, 3) repair the cargo hatch doors, airlock, and fuel tank, 4) restore power and central gravity, 5) replace electrical system and instrumentation as needed, and 6) repair the thrusters.

Treat each problem as a research project. If enough explorers are available with the appropriate skills, these projects can be performed simultaneously.

Give each project a leader; have the player for that explorer make a Strategy roll before work begins: if it succeeds, his project is completed in 10% less time than stated; if it is a special success, the repair is completed in 25% less time.

A seventh research project should be of low priority, but probably will be of great interest to the explorers — what happened? The answer must wait till later.

Project 1

GOAL: waterproof the ship

ACTIVE SKILLS: Engineering and Repair

STEPS: 6

Step 1: investigate the hull thoroughly from the inside. This requires one successful Engineering roll. As many as desired can assist. The results will show five places which require work. It will take one man 4 hours to get one attempt at a skill roll.

Steps 2 through 6: apply plastifoam to doors and outlets. This requires five successive Engineering or Repair rolls, each of which requires 5 man-hours of labor.

Project 2

GOAL: unearth the ship without causing a general collapse of the surrounding terrain.

ACTIVE SKILL: Engineering, Planetology

STEPS: 3

Step 1: the explorers must examine the surrounding terrain for stress, chemical composition, etc. This will take 15 hours and a successful Planetology/Geology (or similar skill) roll.

Step 2: the researchers must sit back and, on their own, come up with a viable plan to unearth the ship. Let them be as creative as they wish. This will take 100 hours and requires an Engineering skill roll.

If the explorers cannot think of a good enough plan, Guardian-of-the-Weak will suggest using disintegrators to cut a tube directly above the ship leading to the surface. When the water comes in, the ship will be able to float up this tube to the water level, assuming flotation devices are attached.

Step 3: the explorers must implement their plan in play. The time required is up to the gamemaster, and depends on the plan.

Guardian's plan involves the removal of approximately 290,000 cubic meters of rock and soil, and requires a jury-rigged vacuum device to draw off disintegrator dust. Since the ship has two hand-held disintegrators, it will take about 1200 hours to do this, assuming the vacuum tubes work perfectly. Since this will take 40 Ringworld days, obviously the ship will need to be waterproofed first, and some of the work carried out underwater.

Project 3

GOAL: repair cargo bay hatch, airlock, and fuel tank

SKILLS: Engineering and Repair

STEPS: 4

Step 1: look up the systems in the ship's library. This takes a successful Engineering roll to gain all pertinent data: 20 hours.

Step 2: this involves repair the slagged cargo doors with clever use of plastics and other ship's stores. The hullmetal slag will be difficult to remove, and may involve dangerous variable knife work to literally hack away the stuff from the deck. Remember that until the ship is brought into the open, the heat build-up from indiscriminate use of lasers and disintegrators can be dangerous in itself, and probably generate explosive gases. This step takes 60 hours, and takes both successful Engineering and Repair rolls to complete. A Physics roll can warn of dangers as well.

Step 3: perform a complete check of the airlock, manually checking all systems: this takes a successful Engineering or Repair roll, and requires 1 hour. The airlock is undamaged.

Step 4: determine if the water remaining in the fuel tank has been contaminated; it has been, of course, and cleaning the tank, refiltering some water (10% of capacity), and checking the system takes a successful Engineering roll and 20 hours. At the end of that time the ship will have enough fuel to move it a very long way; more can be gotten by pumping in water, cleaning it, and automatically extracting the deuterium as needed. Skreet especially will be glad to get his swim ring back — at the moment he is confined to the auxiliary bridge and to his walker suit.

Project 4

GOAL: restore full power and artificial gravity

ACTIVE SKILLS: Engineering, Physics, Repair

STEPS: 5

Step 1: Almost all of the ship's power went off-line for safety reasons; inspection of the lines and re-acquisition of obviously safe connections restores power generally in four hours: any successful roll of an applicable skill here turns on the juice.

Step 2: complete restoration of ship's power takes 30 hours and two successful Repair rolls.

Step 3: jury-rig a gravity net connection around the cargo bay and reestablish general ship gravity oriented to its center. Takes three Engineering or Repair rolls, and 60 hours, once power is restored.

Step 4: complete a survey of all independent gravity fields within the general field. Takes 10 hours and a successful Engineering, Physics, or Repair roll.

Step 5: repair any nets broken from the damage on the upper decks; takes 200 hours but anyone can do it: they must methodically remove every panel, inspect the gravity net, and make memory-plastic seals of any broken

strands. Visual inspection is confirmed by a simple meter test device.

Project 5

GOAL: replace the electrical systems and instrumentation

ACTIVE SKILL: Repair

STEPS: 6

Step 1: the researchers must become familiar with the ship's electrical system. This information is available only from the library files in the engineering section of the ship. It will take 40 hours for an explorer to be familiarized with the ship's systems, and takes as well a successful Repair roll.

Step 2: acquire conductors and superconductors from ship's stores. There will not be nearly enough; 100 hours must be spent sorting through the wrecked equipment in the hold, salvaging parts from ruined instruments, and rummaging through the wrecked bridge. A successful Repair roll is needed.

Step 3: a food processor can be jury-rigged to produce simple materials needed for these jobs. Takes a Repair roll and 10 hours.

Step 4: though the processors are unharmed, all of the autopilot subsystems must be completely recalibrated — this disasterously-altered version of the ship must be reintroduced to the autopilot before it can make much sense of the situation. This takes 100 hours and three successful Computer rolls.

Steps 5-6: implement systematic repairs. These need not be played out — two successful Repair rolls and 240 hours are needed.

Project 6

GOAL: repair thruster drive

ACTIVE SKILL: Engineering, Computer

STEPS: 3

Step 1: the researchers must look through the ship's engineering library to familiarize themselves with the drive system, receive a successful Computer skill roll, and spend 115 hours doing this.

Step 2: the extent of damage must be determined. This takes an Engineering skill roll and 15 hours.

Step 3: materials must be located for the necessary repairs. This takes a Computer skill roll. The administrative subsystem locates only logable items, not their constituent materials. After 25 hours of seeking, the computer says 'task impossible without further data.' In the meantime, improvisational linkage of several attitudinal thrusters now allows them to just lift the ship off the ground, to hover, or to move slowly (about 100kph) in any direction. A successful Reactionless Drive roll indicates, however, that the ship will not handle well, that the small thrusters may burn out, and that the *Catseye* should simply be parked until sound repairs can be made.

After another 25 hours and another successful Computer skill roll, the explorer knows that at least two parts are neither aboard nor can be synthesized from goods on hand. They must come from outside sources. These items are Starsea Enterprises No. 756M-B-J-LL37(63284) and No. 753M-B-YY147836-(63261) - commonly called a helical torsion converter and a beryllium condenser, respectively. The project must stop here, until the parts can be obtained.

The hyperdrive does not seem to test out satisfactorily, either, but parts for it seem to be either on hand or manufacturable from other items in stock. However, the hyperdrive cannot even be started up until removed from the Ringworld star's gravity well; fixing the thrusters is the immediate necessity.

"Project 7"

GOAL: to determine the cause of the crash

ACTIVE SKILL: Computer Analysis

STEPS: 2

Step 1: collect all relevant data recorded by sensors and maintained by memory banks before the event. This takes a successful Computer Software skill roll and takes 2 hours.

Step 2: analyze the information.

Final analysis shows that the ship was downed by a titanic gas laser bolt and associated energies. Enough visible light passed through the GP hull to cook much of the upper portion of the ship, especially the bridge. The stasis shield fortunately activated within a few nanoseconds, blocking further destruction and protecting the interior while it smashed into Ringworld. Unfortunately, when the ship came to rest, it was without gravity generator power, and inclined some 90 degrees to port: some people experienced falls of more than 20 meters when the stasis field snapped off.

The gamemaster, and probably the players know that the ship was hit by a solar laser bolt from Ringworld's meteor defense system. However, the explorers have no way to know that, nor will they probably imagine that the Arm, unable to fully suppress the rumors of Ringworld, concentrated on destroying any mention of the meteor-defense laser.

Going Overland

After the explorers have made their ship secure, they can be more leisurely in their questionings. Since the thruster parts they need can be found only in *a* civilization of fairly high technology, a replay of sensor readings from before the crash can be made. It will show a source of radio and microwave transmissions (and an unfamiliar combination of high-frequency EM activity) about 40,000 kilometers distant spinward. Rather oddly, the sensors showed only a blank area from which the energy radiated.

Whether or not this source also has something to do with the crash of the ship remains to be seen.

The power source will take about 75 hours of travel time in a marinex. Either an explorer or non-player-character should suggest that an expedition be sent there on the slim chance that they have one of the missing parts, a reasonable substitute, or the longevity drug.

The leaders of the expedition (as previously determined) will determine who goes, and will choose the explorers and, if useful, some other crew members. But before anything begins, the equipment must be salvaged and prepared.

After the ship is brought to the surface, the cargo hatch can be cleared away and the remains of the equipment brought out and inventoried.

When the party has fliers of any type, they can scout the surrounding land. A forest fire has burned out everything for several miles, and no sort of habitation is visible. The gamemaster can describe animals as necessary.

Available Equipment

MARINEX: this is the all-purpose small exploration vehicle carried aboard the *Catseye* and it suffered in the crash. To get this vehicle operable will take four solid days of work, an Engineering skill roll, and a Repair roll.

The marinex is fully described in the technology book. It can carry most of the party's equipment. Lopez's marinex carries a stun cannon and a searchlight which can reach up to 40 kilometers in air.

Someone must pilot the marinex, which must be the main craft for the foreseeable future. The expedition leader should choose him, probably the one with the best Atmospheric Pilot skill. Whoever repaired the marinex should be told that he or she knows that the job is not perfect, and that the drive will need constant maintenance to function properly. The party will have to land the craft at periodic intervals throughout the rest of the scenario.

FLYCYCLES: four flycycles were carried. One is a total loss. Two can be made serviceable by sacrificing the third; one Repair roll is needed to repair each flycycle. See the technology book for flycycle details.

LIFT BELTS: six are available and in working order.

ARMAMENT: seven stunners, two stun cannons (one mounted on the marinex), six pneumopistols, three pneumorifles, four laser rifles, four hand beamers, two snare-nets, and the variable sword owned by Guardian-of-the-Weak. The explorers may have weapons of their own; depending on their reputations, Lopez either locked up everybody's weapons or ignored the subject.

SNARE-NET
(Wunderland-Buck Co.)

WEIGHT: 2kg
VOLUME: 10x30cm cylinder
RANGE: 10/20/40 meters
MAXIMUM TARGET: 30 MAS
ENERGY SOURCE: reusable memory-plastic spring
APPLICABLE SKILL: Heavy Weapon
HIT POINTS: 10
ARMOR: 1 point

The snare-net is hip-fired or remote-fired from a second location. It is used to capture zoological of up to 30 MAS (bigger nets can be specially ordered). A tiny proximity fuse causes the fine-mesh (1cm) net to spread out just before reaching the target; then the memory-plastic elements remember to close to a preset gentle firmness around the target, leaving no room for struggle or maneuver. The net strands each have STR 20 resistance. The net can be reloaded and reused by anyone with 15% skill in the weapon, or by anyone who receives a successful reasoning roll. The snare-net is absolute silent, except for the panicky cries of its target.

Targets within 10m of the firing location have their DEX x1 chance to dodge the net; targets at longer ranges do not get a dodge chance.

PROTECTIVE EQUIPMENT: 6 flaksuits (human-sized), 3 seasuits, 10 vacuum suits (including 1 Dolphin and 1 Kzinti model), 1 diffusion-field generator, 6 cans of anti-laser aerosol.

WALKER SUIT: Skreet's suit is damaged, but repairable with a single Repair roll.

MISC. EQUIPMENT: flashlights, one autokitchen, extra clothing, 6 comdiscs, full array of drugs to completely replace the supplies in the shipdocs twice, survival packs, 6 lensmen,

78 kg-weight prepared packages of trade goods (28 designed for preindustrial, 25 early industrial, 11 atomic era, 14 spacetech).

TYPICAL GIFT BOXES and TRADE GOODS PACKETS

Each of the following is a 1-kilo pre-sealed packet within a 10x10x25cm deluxe plastic box. A protective wrapper lists the contents of each box.

PREINDUSTRIAL ERA: Quicklites (10 waterproof 100-match sets, with friction surface and a 20-hour no-blow candle), Knife Set (1 20cm-bladed, 4 17cm-bladed, and 16 13cm-bladed duralloy molded-handled knives, all polished to high glitter), Cloth Bolt (1 1x50m bolt of printed-pattern, reversible cloth of good quality; various colors and patterns), Toys (a round-bottomed cone which always stands on its point; a string top; a pinwheel; 7 jumping furry caltrops, a sphere with many mirroring facets).

EARLY INDUSTRIAL ERA: Gears (contains 200+ precision gears, levers, pins, bolts, and screws), Clock (contains plastic cuckoo clock parts and assembly instructions in pictographs), Revolver (glittering revolver and six silver bullets; revolver can be taken apart), Constructive (toy construction set with beams, blocks, wheels, windows, etc., which all fit together).

ATOMIC ERA: Circuitscriber (contains a device which draws usable electronic circuits on any suitable medium), Medals (a panoply of military honoraria from the war ages; about 60 medals, ribbons, badges, and swashes), Monacle (held to the eye and twisting the rim, the wearer can peer into the infrared or ultraviolet spectrum, or pass visible light), Lucasphere (sealed unit which automatically dodges any red object passing within 1cm of it; includes red and white wands; unit may be preset to ground or to hover 1m above the ground).

RINGWORLD ERA: Crafts (variable knife, automold box, six sheets of assorted water tools), Bureaucrat (presentation-quality pen which automatically writes owner's legal signature if waved over paper), Decorative (assorted precious stones in a variety of cuttings), Molder (malleable column which may be pressed into any contiguous shape; then snaps back to original shape by activating attached electrical circuit.

EXPLORER POSSESSIONS: each explorer should have a luck roll attempted. If the roll is successful, his particular luggage survived the crash. If the roll fails, the equipment was destroyed.

Planning the expedition will require considerable discussion. This is another chance to engage in roleplaying the explorers' personalities. Indulge the players; encourage them to speak in character. Intrude with crew member opinions, both useful and colorful. Bring up these questions:

Will they fly straight in, and how fast? Will they land close to the source, but arrive there on foot? How will they explain their presence and their purpose, not to mention their (presumably) superior technology? Should they try to land in a rural area and question natives before entering a populated place?

The map provided has two routes listed, and can be obtained from the computer memory. Let the players choose which route to use. Neither is especially advantageous to the gamemaster, since the same encounters should be used with either one.

Two Encounters

A pair of meetings with Ringworld natives are explained below. Use them to introduce the players to the world in preparation for the final encounter with the Valley People.

Translating alien languages must be done by patching through the marinex to the ship's computer.

The Whistling Ruins

THE LANDING: the marinex, trembling and ominously whirring, reveals that it is time to adjust the drive. Nearby, a broken patch of land shows ruins of round-walled buildings. Someone asks to land nearby to investigate while the repairs are made.

The remaining daylight allows only a cursory investigation, as dinner is waiting, and everyone is tired. The quick search shows that something might live here, but certainly no-one with any significant material civilization. The amount of destruction and age of the ruins prevents any significant observations. Everyone receiving a successful Anthropology/Archaeology roll know that they've never seen structures of such design. The walls seem to have been made of some cast material which once bore markings.

A sensordisc set for a range of 50m or more will reveal the presence of approximately 15-20 warm-blooded creatures with an average MAS of 11. These creatures are from 25 to 80 meters off. If the explorers attempt to initiate contact, these beings will flee into the night. However, sometime between midnight and dawn, a small band of ghouls will approach the explorer camp. They will walk right up to the marinex, though acting a little nervous, and begin to try to haul away the refuse being cleared from the marinex.

MEETING THE GHOULS: if the explorers challenge the ghouls, they will slink away, to return in greater numbers (over a hundred) in a few hours. If again challenged, the ghouls will make a show of force, maybe even ganging up on some explorers while their companions make off with the refuse. The ghouls will probably not be able to seriously harm the explorers, and do not really want to. These night creatures merely want what is their due: the refuse of the day-people.

One elderly scarred female, Mikirrik, is obviously the leader. She is always surrounded by a half-dozen attentive young male ghouls. She has a long history of dealing with other species, and will be cautious at first, but friendly (if reserved) afterwards.

TRANSLATING THE GHOUL LANGUAGE: the ghouls speak a tongue called Farabbdian, derivatives of which are spoken by the grass giants for "hundreds of day walks" in all directions. If and when the explorers begin to use their translation computer, the ghouls will immediately begin to talk at great length, one at a time, and always pointing to or acting out what they are talking about. It should be obvious that the ghouls have encountered translation computers before and know how to act around them. In half the usual time, the computer will be able to translate their language fairly well.

These creatures call themselves "huranni", not "ghouls", and the translator will say that they also refer to themselves as "the people." They do not call their neighbors "grass giants," but "ufarabbd," which translates into "giants with wheels." For the same reason, the terms "City Dwellers," "Valley People," and so on do not appear anyplace among the peoples mentioned below. The gamemaster need not inform the players what Ringworld species these or any other creatures are — remember that the explorers have never read *Ringworld* — either the game or the book!

Louis Wu?

If the players want to use the knowledge they've gained in reading the *Ringworld* novels, one rationale is to have had those explorers meet Louis in Known Space and to have talked with him. Of course, Second Expedition information would still be unexplained. Perhaps the explorers could come across some record or archive, or perhaps meet a creature who knew of the previous expeditions.

If the characters manage to overcome moral disgust at these creatures (some are overtly carrying pieces of dead hominids to eat), they will find that the "huranni" are one of the greatest sources of information on Ringworld. They maintain an eons-long tradition of oral history, and are fabulous story-tellers. Included is a list of some of the facts, rumors, or legends which the ghouls might relate to friendly, cooperative explorers.

Encourage the players to cultivate explorers' friendships with the ghouls. They can become valuable friends and sources of information in future scenarios. Failing that, perhaps the ghouls will become bitter enemies, which can lead to many interesting scenarios and adventures as well.

Information Gained From Ghouls

OTHER LIFE FORMS: this group of ghouls can report, in varying detail, on most of the life forms contained in the rules. Let the players spend as much time as they wish conversing with the ghouls (it will help explain why the explorers know so much, if their players have read the creatures book). The ghouls' knowledge is amazingly broad for an apparently foot-bound folk, and extends for tens of thousands of kilometers.

THE LONGEVITY DRUG: the ghouls have heard that a people called the "four-fingers from high" have discovered a drug which reportedly will expand the lifespan of any hominid. They know two stories, whose details they will not divulge, of hominids who attempted to get the secret or the drug, but failed. The ghouls state that the four-fingers-from-high keep the process of manufacturing the drug a tight secret.

THE POWER SOURCE: this structure has existed for longer than anyone can remember, even the oldest ghoul storytellers. The place is called "the Castle." A powerful king lives there and rules the whole surrounding terri-

tory. The Castle boasts a formidable weapon which has a range of many kilometers. The ghouls do not like the Castle Grazers.

THE BLANK SPOT: the ghouls call this "hot food place" and it is a virtual Eden for ghouls if they can manage to get there and back quickly. Many mysteriously-killed birds are found there, with flesh cooked by strange forces. Sometimes ghouls are killed as well, if they enter the area too often or stay there too long.

LAY OF THE LAND: the ghouls can give the explorers a fairly good idea of the land, which species live where, where danger might be, and so on. See the enclosed gamemaster's map and fill in the names of the peoples on the players' map.

Grass Giant Clan

This encounter should be used during the day, as the explorers stop to repair the marinex while traveling over a broad, flat plain. They will come across scouts for a clan of approximately 250 Grass Giants. They are typical of the peoples surrounding the Castle.

DESCRIPTION OF THE CLAN: the clan looks as if it has been traveling across the plain, but is temporarily stopped beneath a small stand of trees. Grouped nearby are a dozen huge wagons. There are no animals, merely long pull-ropes with loops at the ends. Several large blankets have been spread about with green grass bundles, nuts, and assorted tubers and roots on them. About 650 meters from the copse, a small group of giants is milling about a huge, but crude, motorized ground vehicle. The hood of the vehicle is up and a dozen of the giants are laboring over the engine.

MEETING THE GIANTS: scouting should make it clear that the explorers should not even consider opening hostilities with the Grass Giants. They are fierce warriors, massively built, and apparently armed with at least some technology. It will quickly become apparent that they have dealt with strange aliens before, possibly even with folk with higher technology.

The giants will be cautiously friendly, as long as the explorers do not threaten the wagons. This group of people call themselves the "Blue-Eyes of the Home Folk." Their leader, called Bull of the Arch, is apparently middle-aged and highly respected. Everyone treats him with superstitious deference. No follower ever looks in his eyes, stands erect near him, nor speaks to him unless addressed. Both men and women wear similar clothing, woven from natural fibers, but also wear many leather belts, pouches, and packs. Metal balls and jewelry decorate the leaders. Any gifts given to Bull of the Arch, or to anyone else, will be handed back to the rear of the crowd, where old women hustle them out of sight and into the wagons.

Bull of the Arch will invite the explorers to join him for a meal. The meal is a dozen or so types of plants served in various ways, mostly steamed with insects. The giants won't expect the humans to eat grass stems and leaves, but the tubers, nuts, and fruit will be edible enough. Bull of the Arch seems quite insistent that the explorers eat a particular type of stew made from a "Karesh," and all the other leaders will fall silent when he raises his voice to urge the explorers to eat. If they do, then the grass giants will break into laughter, and continue as if nothing had occurred. The giants will refuse, totally, to speak of what occurred. This will also be the reaction if the explorers refuse to eat.

If the explorers manage to repair the giants' truck, the grass giants will offer them a night with one of their women in gratitude. Fixing the truck will take two Repair rolls.

Though friendly while in camp, the grass giants grow uncomfortable when they begin preparations to leave. Bull of the Arch will explain that their gods do not allow strangers to travel with them. Good-mannered explorers will depart.

Information from the Grass Giants

THE CASTLE: before the arch was raised, the current inhabitant of the Castle landed, riding on a rainbow-colored vehicle which shone as bright as the sun. The inhabitants are called the "Great Ones" and they are devourers of other hominids. They enslaved a whole land, translated as "the Realm" with the help of a terrible engine of destruction, and the people there are slowly turning into ghouls.

THE LAY OF THE LAND: sketch appropriate details on the map. The grass giants are especially careful to warn the explorers of *sarkbestes,* which are reputedly demon-possessed.

Interim

The characters are not close enough to reach the Castle within a single day. Urge them to discuss their precise plans of approach. Review the list of questions above.

If they approach airborne, go to the entry called The Radio Signal. If they land first, go to the entry called Valley People.

The Valley People

DESCRIPTION OF THE FARM: the explorers have landed near a great farm. This first view should stun the explorers. Never have they seen such a vast array of colorful flowers, mazes of shrubbery, vine-enclosed walkways, and other botanical wonders. Various valley people can be seen at work about the farm, digging with bare hands, quietly pruning the plants without the use of tools, hauling dirt away, and so on.

All about the farm grows a weird variety of grass. It is pale yellow in color, and stands as high as 5 meters. The roots are shallow and entangled, often growing above the surface of the ground. This makes it difficult to walk among the grass.

The huts evident among the array of plants appear crude from a distance. However, the organic artistry from which the hut-builders wove the living-straw and vines and the ingenuity with which they constructed woven, hinged shutters and doors raises them to a level of elegance.

In one corner of the farm a large area is devoted to compost. An array of hollow vines lead from a large entanglement near the compost heap to the various huts. These vines carry methane used for cooking and lighting. In the center of a group of huts hop a small herd of domesticated animals.

Around the perimeter of the farm are large mud mounds. These mounds house the insectally of the Valley People — razor-wasps. Each of these hives houses over a thousand wasps. They are best left undisturbed. If the Valley People become aroused or afraid, the wasps will begin to swarm and slash. Individual wasps can be seen crawling laxly over the surface of the mound.

Razor-Wasp

Hit Points: 3 Speed: 1m/im (crawl)
Action Ranking: 2 9m/im (fly)

location	*1D20*	*Armor/HP*
body	01-20	1/3

weapon	*attack%*	*damage*
slash	40%	1D6

NOTE: a special success with the slash permits the wasp to do 2D6 damage instead of 1 D6. Usually the wasps attack in groups of at least 20, which zoom in simultaneously, then zoom away, then return the next action ranking for another slash.

SKILLS: Athletics/Fly 400%, Observe 90%

MEETING THE FARMERS: the Valley People at first may be reluctant to meet the explorers. As they talk, the Valley People will gradually begin to lose even the little interest they had at the start. Communication skills will not help, nor will demonstrations of force on the part of the explorers (which will draw the razor-wasps). The only possible way to interest the Valley People enough to gain the time needed for the comdisc to translate the language will be for one of the explorers to succeed in both an Anthropology/Cultural skill roll and a Bargaining skill roll, as he offers the Valley People one or more of their trade good items.

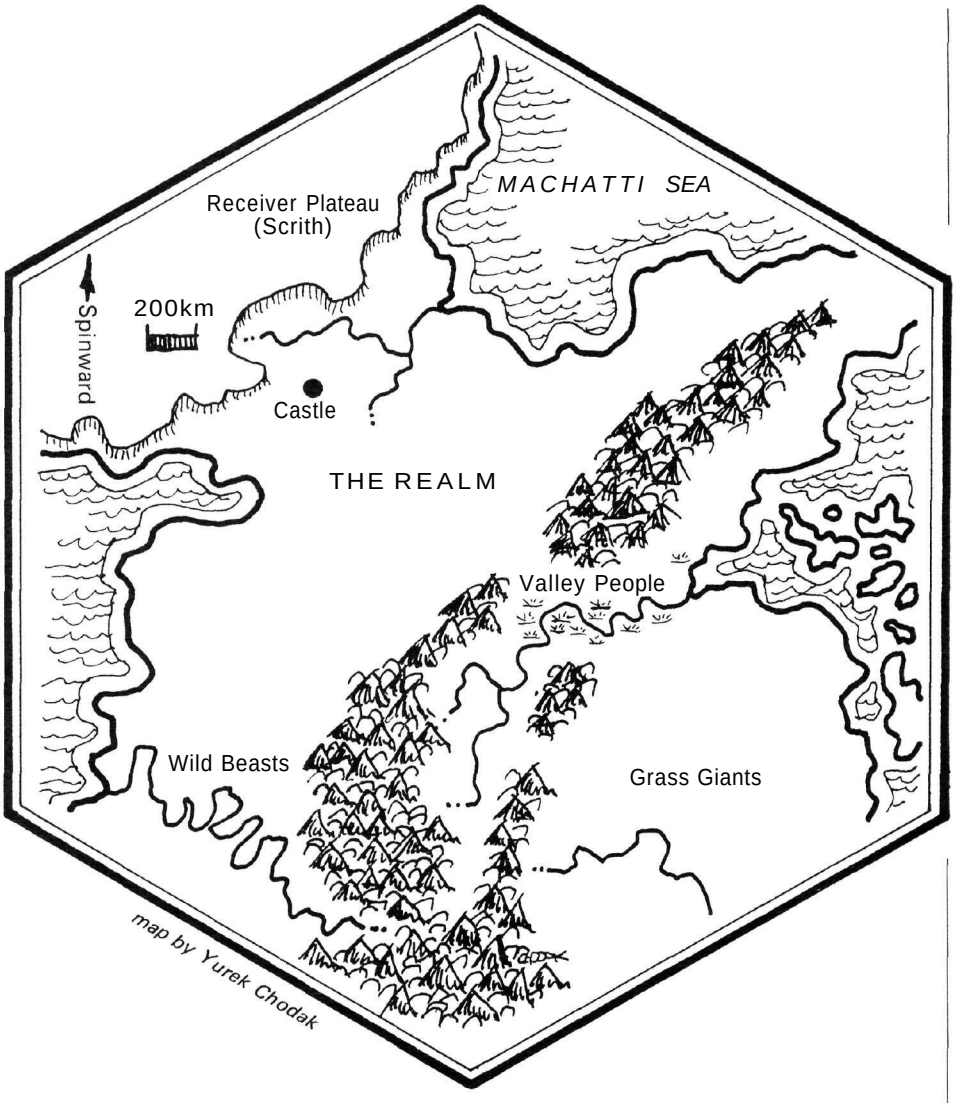
If the attempt to communicate is a failure, then all but one of the Valley People will saunter off, while the remaining one gestures to the explorers to depart. If they don't go, he will begin to gesture more forcefully. Eventually he will get angry and occasional wasps will begin to drift over towards him.

INTERPRETING THE LANGUAGE: if the Valley People's interest is held, the computer will try to translate. This will take much longer than usual. After twice the normal time, the computer will still be confused. When asked, the computer will say that these people seem to have more than one language regularly used in normal speech. The computer believes itself to have synthesized one of them, but it may not be the "right one" since it deals only with farming matters. It can say no more.

When the comdisc manages to decipher the Farming language, the farmers will become interested in and amused with the device and the explorers, for a short time. If conversation is attempted with the Farming language, the Valley People will break into laughter and mock the explorers. Anyone succeeding in an Anthropology/Cultural or a Psychology roll realize that they are the object of some good-natured fun, and a little contempt.

After another hour, the comdisc will have deciphered the Adult Male Social language of the Valley People, and normal discussion and bargaining can begin.

NEGOTIATIONS: the explorers will find that the Valley People's farm is self-sufficient and non-aggressive, and neutral to strangers. They are reluctant to deal with the explorers. They are totally unresponsive to trade goods and grow increasingly uninterested in sharing their knowledge of the Castle. At last, only a small



group remains with any interest; apparently followers of an individual named Haroug.

Haroug differs in attitude only that he wants a demonstration of the explorers' capabilities and technology. Should the explorers question their need for such a display, Haroug will simply shrug and begin to amble away. Weapon displays will hold his quivering attention, and he will start to speak freely.

Once convinced of the explorers' firepower, Haroug will offer the explorers all the information he has about the Castle and the Realm if they will rid his riverside fields of a menace. He will divulge no information till they take care of the menace, and will give no details until the explorers agree to the task. If they agree, he still has few details except that it is a large monster unlike anything ever seen before. They call it H'wumgish, and it lives in a nearby marsh, raiding the farm weekly for meat, carrying off young herd animals and an occasional child. It does not seem to fear the razor-wasps.

If the explorers search using the marinex, they will never find H'wumgish. The creature will enjoy hiding from the explorers. It will wait until it can attack one or two of the explorers alone. If that chance never comes, just as well, it will think.

If the explorers split up and go in on foot, one of their groups (numbering no more than two, and not including the Kzin) will be ambushed by H'wumgish, who will suddenly rise from the muck and make a grab for the character with the largest weapon. If the explorers by some miracle manage to talk to H'wumgish and translate his language via computer, he will agree to let the explorers' marinex take him away from the Valley People, to some other marsh, if the explorers give him something useful, such as a hand beamer. He is smart, and alert to tricks. He will be impossible to fool. He must either be dealt fairly with, or killed. He has no compunction toward killing the explorers, and will use their weaponry if he can salvage it and figure out how it works.

H'WUMGISH

STR	20	Right Leg	6/18
MAS	39	Left Leg	6/18
CON	21	Abdomen	6/18
INT	19	Chest	6/21
POW	11	Right Arm	6/15
DEX	6	Left Arm	6/15
APP	3	Head	6/18
EDU	0	HIT POINTS:	60
AGE	62		

Speed: 1m/im land; 4m/im water
Action Ranking: 6

weapon	*attack*	*damage*
Claw	90%	1D6 + 3D6

SKILLS: Athletics/Swim 100%, Hide 160%, Listen 75%, Mathematics/Applied Geometry 70%, Observe 45%, Ringworld 45%, Search 1 20%, Sneak 80%, Track 80%

HAROUG'S INFORMATION: Haroug has no direct knowledge of the Castle or the Realm, only vague rumors spread by occasional travelers. He never leaves his plots of land. He knows the general lay of the land around the farm, but next to nothing about the inhabitants of the Castle, except that from time to time giant armed men come through and seize great quantities of food as taxes. No resistance has ever been offered to these men, and Haroug knows of no story or rumor of any trouble.

The Valley People do not know what the immense empty place is, though often they have witnessed birds flying through the area only to fall to the earth dead, killed, they say, by the hand of the Earth Killer.

The Radio Signal

Flying the marinex close to the castle is the easiest way to scout the structure. As the craft closes to within 500 km of the energy source, the sensors will detect a strong radio signal emanating from the source of the power. This signal carries information, but the language is unintelligible. The message is 14 seconds long, and repeats once every 57.8 seconds, and will continue to do so until the marinex lands, flies beyond 500 km, or flies closer than 200 km. There is not enough information for the computer to decipher the message, but it can tell that the same message is being repeated, and surmises that it is a warning, a guide signal, a message identifying the transmitter, or a request for information. How will the explorers respond?

If the marinex closes to within 200km of the radio beacon, the signal will change. The new signal is more insistent, lasting 16 seconds and repeating every 20.1 seconds. It is still incomprehensible.

If the marinex closes to within 100 km, all signals cease broadcasting, and the Castle opens fire at the explorers with its large laser.

THE ATTACK: the Castle's laser will suddenly start to fire on the marinex. (The explorers have, understandably, failed to provide proper identification.) Although the automatic firing of the Castle is fairly effective, it is not perfect. It fires once per 10 impulses, with a base chance of hitting equal to 100% minus the range in kilometers to the target in percentiles. A target resting on or near the ground, behind a rise, or a hill, is invulnerable to the laser fire. The laser does 1 D20+80 points of damage.

If the marinex is hit, the pilot must receive a successful skill roll to land in a semi-controlled manner. It can then serve as a base of operations. Though it cannot fly, it can be repaired. There is a 60% chance for each piece of equipment aboard that it has been broken.

If the pilot's player fails the skill roll to land the marinex safely, it then crashes, and all aboard receive 3D6 damage — except those who received a failed luck roll get 6D6 damage.

They may radio for help or try to enlist the aid of natives. There will be 2D6 nearby shortish, furred hominids (Hairy Ones) who run over to see what was hit by the laser. They will help the explorers, if they can. They will also send a runner to the Castle to inform them what has happened. These natives are basically a nuisance, and only slightly helpful.

REPAIRING THE MARINEX: the marinex can be fixed. Determining the extent of the damage will take 1 D6+6 hours and a successful Engineering skill roll.

CONTINUING VIA FLYCYCLE: the castle laser will also try to destroy individuals riding flycycles, but not those using lift belts (the sensors are set to ignore large birds). Subtract 50% from the laser's normal chance of hitting if it fires at a dodging flycycle, adding normal modifiers for distance.

WALKING: walking back to the ***Catseye*** involves 40,000 km of distance — approximately the circumference of Earth. Even if no obstacles were encountered, it would take 800 days at 50 km daily to get back to the ship. If walking is necessary, the explorers more likely will head toward the Castle.

The Warriors

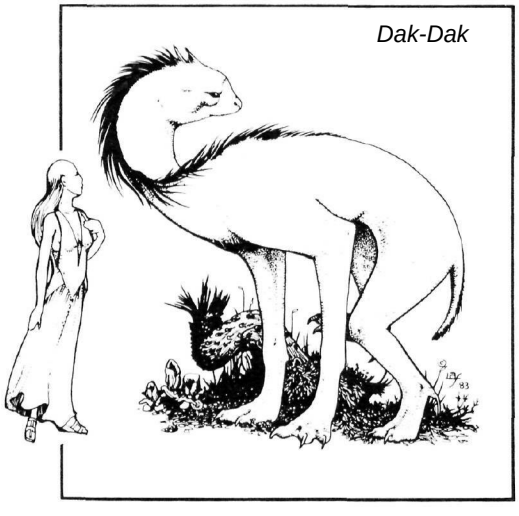
Whether the explorers stop to speak with the Valley People, or are shot down, they will eventually be approached by a band of armed warriors from the Castle. The band consists of 24 warriors plus 4 knights — one of many patrols regularly roaming the Realm. They ride huge domesticated creatures called dak-daks (see the creatures book). They will try to capture the explorers, first by appearing friendly, later by being ruthless. A larger band of 50 warriors will arrive 3 days after the first.

The approaches to the Castle are all crowded with lush farms of the Valley People. Abruptly, the area surrounding the Castle for a distance of about 4 km is flat open grassland, the grass as short and smooth as a golf course — there is no cover.

Whether already accompanied by warriors or not, the explorers will now be greeted by a band of 50 warriors who will surround them close to the castle. The commander will inquire about the purpose and intentions of either the explorers or the group leader who first contacted them. The language used is the language in which the radio transmissions were broadcast. If the explorers are polite and cooperative, he will escort them into the Castle and present them to his superiors. Otherwise, he will order his men to seize the explorers. If the explorers were accompanied by the first band of warriors, their translators will by now have comprehended the language.

In no case will the leader allow the explorers into the castle until he has confiscated their equipment and weapons. If the explorers refuse to relinquish their gear, they will be refused admittance to the Castle, and will be asked to depart immediately or be arrested.

If the explorers resist, the warriors will fight fiercely. If the warriors begin to lose, the Castle laser will come into action, firing at the



HAIRY ONE WARRIORS

STR 9	MAS 9	CON 11
INT 11	POW 10	DEX 12
APP 10	EDU 3	

weapon	*skill*	*damage*	*HP*
Sword	70%	1D8 + 1	10
Shield	60%	used for parrying	14

SKILLS: Archaic Weapon/Sword 70%, Archaic Weapon/Shield 60%, Athletics/Ride Dak-Dak 80%, Athletics/Run 65%

LANGUAGE: Castletongue 60%

DAK-DAK WARRIOR MOUNTS

STR 40	MAS 40	CON 20
POW 7	DEX 10	

weapon	*skill*	*damage*
Kick	60%	2D6 + 5D6

WARRIOR ONE

	location	*melee*	*missile*	*points*
Speed: 3m	R LEG	01-04	01-03	4/6
AR: 5	L LEG	05-08	04-06	4/6
HP: 20	ABDOMEN	09-11	07-10	4/6
Shield: 14	CHEST	12	11-15	4/7
Sword: 10	R ARM	13-15	16-17	4/5
	L ARM	16-18	18-19	4/5
	HEAD	19-20	20	4/6

DAK-DAK MOUNT OF WARRIOR ONE

	location	*1D20*	*points*
Speed: 9m	RH LEG	01-02	6/15
AR: 5	LH LEG	03-04	6/15
HP: 60	HIND Q	05-09	6/21
	FORE Q	10-14	6/21
	RF LEG	15-16	6/15
	LF LEG	17-18	6/15
	HEAD	19-20	6/18

WARRIOR TWO

	location	*melee*	*missile*	*points*
Speed: 3m	R LEG	01-04	01-03	4/6
AR: 5	L LEG	05-08	04-06	4/6
HP- 20	ABDOMEN	09-11	07-10	4/6
Shield: 14	CHEST	12	11-15	4/7
Sword: 10	R ARM	13-15	16-17	4/5
	L ARM	16-18	18-19	4/5
	HEAD	19-20	20	4/6

DAK-DAK MOUNT OF WARRIOR TWO

	location	*1D20*	*points*
Speed: 9m	RH LEG	01-02	6/15
AR: 5	LH LEG	03-04	6/15
HP: 60	HIND Q	05-09	6/21
	FORE Q	10-14	6/21
	RF LEG	15-16	6/15
	LF LEG	17-18	6/15
	HEAD	19-20	6/18

WARRIOR THREE

	location	*melee*	*missile*	*points*
Speed: 3m	R LEG	01-04	01-03	4/6
AR: 5	L LEG	05-08	04-06	4/6
HP: 20	ABDOMEN	09-11	07-10	4/6
Shield: 14	CHEST	12	11-15	4/7
Sword: 10	R ARM	13-15	16-17	4/5
	L ARM	16-18	18-19	4/5
	HEAD	1920	20	4/6

DAK-DAK MOUNT OF WARRIOR THREE

	location	*1D20*	*points*
Speed: 9m	RH LEG	01-02	6/15
AR: 5	LH LEG	03-04	6/15
HP: 60	HIND Q	05-09	6/21
	FORE Q	10-14	6/21
	RF LEG	15-16	6/15
	LF LEG	17-18	6/15
	HEAD	19-20	6/18

WARRIOR FOUR

	location	*melee*	*missile*	*point:*
Speed: 3m	R LEG	01-04	01-03	4/6
AR: 5	L LEG	0508	04-06	4/6
HP: 20	ABDOMEN	09-11	07-10	4/6
Shield: 14	CHEST	12	11-15	4/7
Sword: 10	R ARM	13-15	16-17	4/5
	L ARM	16-18	18-19	4/5
	HEAD	19-20	20	4/6

DAK-DAK MOUNT OF WARRIOR FOUR

	location	*1D20*	*points*
Speed: 9m	RH LEG	01-02	6/15
AR: 5	LH LEG	03-04	6/15
HP 60	HIND Q	05-09	6/21
	FORE Q	10-14	6/21
	RF LEG	15-16	6/15
	LF LEG	17-18	6/15
	HEAD	19-20	6/18

WARRIOR FIVE

	location	*melee*	*missile*	*points*
Speed: 3m	R LEG	01-04	01-03	4/6
AR: 5	L LEG	05-08	04-06	4/6
HP: 20	ABDOMEN	09-11	07-10	4/6
Shield: 14	CHEST	12	11-15	4/7
Sword: 10	R ARM	13-15	16-17	4/5
	L ARM	16-18	18-19	4/5
	HEAD	19-20	20	4/6

DAK-DAK MOUNT OF WARRIOR FIVE

	location	*1D20*	*points*
Speed: 9m	RH LEG	01-02	6/15
AR: 5	LH LEG	03-04	6/15
HP: 60	HIND Q	05-09	6/21
	FORE Q	10-14	6/21
	RF LEG	15-16	6/15
	LF LEG	17-18	6/15
	HEAD	19-20	6/18

WARRIOR SIX

	location	*melee*	*missile*	*points*
Speed: 3m	R LEG	01-04	01-03	4/6
AR: 5	L LEG	05-08	04-06	4/6
HP: 20	ABDOMEN	09-11	07-10	4/6
Shield: 14	CHEST	12	11-15	4/7
Sword: 10	R ARM	13-15	16-17	4/5
	L ARM	16-18	18-19	4/5
	HEAD	19-20	20	4/6

DAK-DAK MOUNT OF WARRIOR SIX

	location	*1D20*	*points*
Speed: 9m	RH LEG	01-02	6/15
AR: 5	LH LEG	03-04	6/15
HP: 60	HIND Q	05-09	6/21
	FORE Q	10-14	6/21
	RF LEG	15-16	6/15
	LF LEG	17-18	6/15
	HEAD	19-20	6/18

HAIRY ONE KNIGHTS

STR 13	MAS 10	CON 12
INT 11	POW 9	DEX 12
APP 10	EDU 5	

weapon	*skill*	*damage*	*HP*
Laser	65%	1D10+10	10
Sword	75%	1D8+1	10
Shield	65%	used for parrying	14

NOTE: these laser pistols have a S/M/L range of 25/50/1 00 and each hold a non-rechargable battery holding enough power for 10 shots.

SKILLS: Archaic Weapon/Sword 75%, Archaic Weapon/Shield 65%, Athletics/Ride 90%, Athletics/Run 90%, Emergency Treatment/Human 25%, Handgun (Energy)/Castle Hand Laser 65%, History/Realm 55%, Listen 45%, Observe 65%, Search 50%, Unarmed Combat 55%

LANGUAGE: Castletongue 75%

EQUIPMENT: metal armor, hand laser, and device allowing radio communication with the Castle

DAK-DAK MOUNTS OF KNIGHTS

STR 45	MAS 45	CON 23
POW 7	DEX 13	

weapon	*skill*	*damage*
Kick	60%	2D6 + 6D6

KNIGHT ONE

	location	*melee*	*missile*	*points*
Speed: 3m	R LEG	01-04	01-03	7/7
AR: 5	L LEG	05-08	04-06	7/7
HP: 22	ABDOMEN	09-11	07-10	7/7
Shield: 14	CHEST	12	11-15	7/8
Sword: 10	R ARM	13-15	16-17	7/6
Laser Shots	L ARM	16-18	18-19	7/6
Fired:	HEAD	19-20	20	7/7

DAK DAK MOUNT TO KNIGHT ONE

	location	*1D20*	*points*
Speed: 9m	RH LEG	01-02	6/17
AR: 4	LH LEG	03-04	6/17
HP: 68	HIND Q	05-09	6/24
	FORE Q	10-14	6/24
	RF LEG	15-16	6/17
	LF LEG	17-18	6/17
	HEAD	19-20	6/21

KNIGHT TWO

	location	*melee*	*missile*	*points*
Speed: 3m	R LEG	01-04	01-03	7/7
AR: 5	L LEG	05-08	04-06	7/7
HP: 22	ABDOMEN	09-11	07-10	7/7
Shield: 14	CHEST	12	11-15	7/8
Sword: 10	R ARM	13-15	16-17	7/6
Laser Shots	L ARM	16-18	18-19	7/6
Fired:	HEAD	19-20	20	7/7

DAK-DAK MOUNT TO KNIGHT TWO

	location	*1D20*	*points*
Speed: 9m	RH LEG	01-02	6/17
AR: 4	LH LEG	03-04	6/17
HP: 68	HIND Q	05-09	6/24
	FORE Q	10-14	6/24
	RF LEG	15-16	6/17
	LF LEG	17-18	6/17
	HEAD	19-20	6/21

most exposed explorers. The laser gunners will try to avoid injuring their own men, but this may not always be possible. Warriors can be expended to keep the Castle safe.

Note the stats of the warriors and their knights. Each knight is equipped with a walkie-talkie and a hand-laser. Each is competent with the gun, though they are not marksmen. Each knight wears thickly-lacquered leather hides and thin plates of shiny metal as armor. The common warriors wear the lacquered leather, but have no metal. All are armed with rather well-made swords and shields in addition to the knights' lasers. The Hairy Ones in this area have no taboo against fighting with light.

The Realm

The Realm of the Castle boasts a population of approximately 250,000 folk, mostly Valley People with a ruling population of Hairy Ones. The current ruler is King Arruprul. All these Hairy Ones commonly pluck or shave their pates bald.

Valley People peasants work great farms and pay taxes to the Castle in return for protection from the Grass Giants. Except for the Castle and its marvels, the Realm is Iron Age in technology. They use water power, but cannot produce portable engines. They have no guns, but do possess the repeating crossbow. Castle artisans can work metal, but metal is scarce: the only local source is a City Builder ruin nearby.

If the explorers ask any warrior about the Castle, they will be told that the grandfather of the current king built it with the aid of sky demons. In general, the warriors are reluctant to converse with the explorers.

Literacy is uncommon, though many members of the Hairy One ruling class can count to at least 10 and read their name. The few written documents use a corrupt form of the ancient Healer language. There is no written form of the present Hairy One tongue, called "Castletongue."

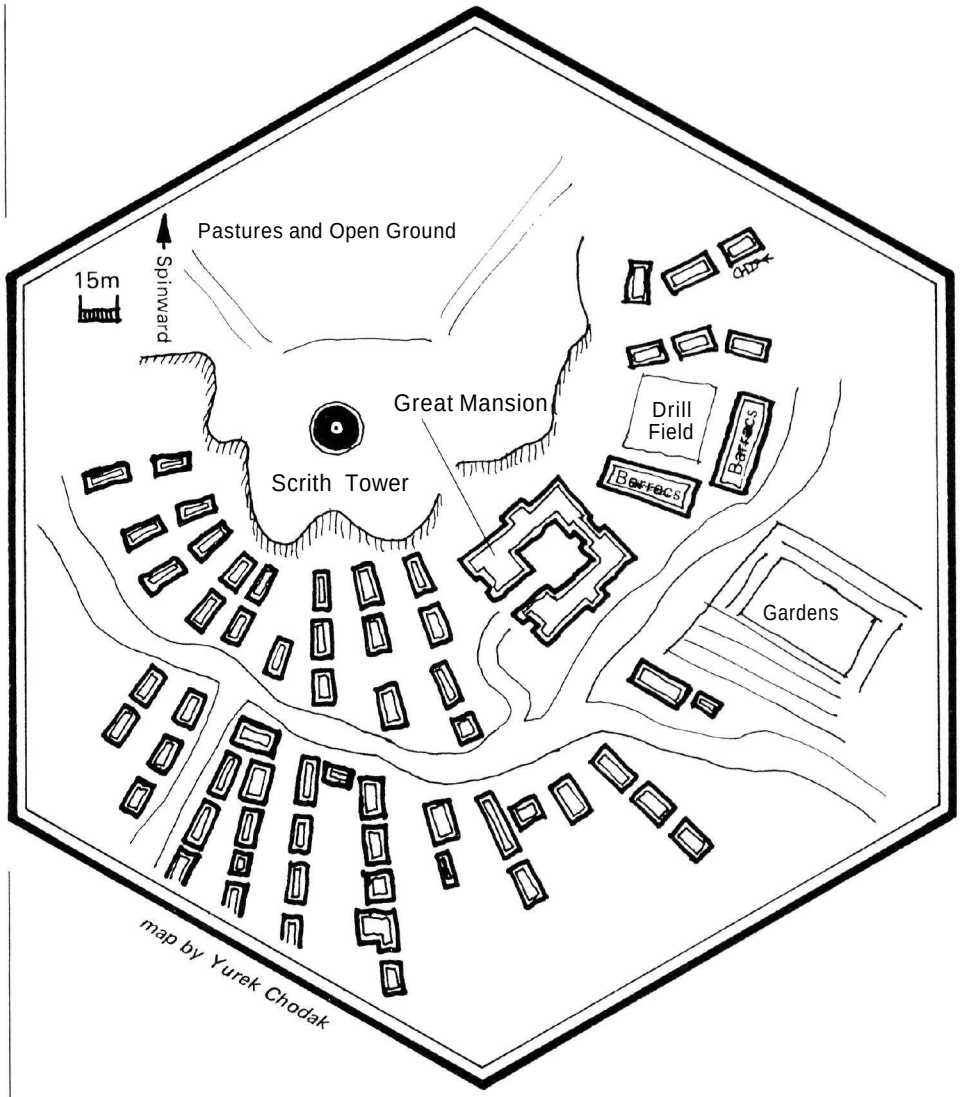
The Hairy Ones get along fairly well with many of the nomadic hominids. Ghouls are allowed free passage so long as they keep their eating private. An occasional Healer travels the countryside.

Bordering on the lands of the Hairy Ones and stretching to the Port of the Realm are the broad, grassy range of the roving Grass Giants. The Grass Giants find a ready market for their animals and leatherware in the Realm, and the warriors of the Realm keep a wary eye on the giants.

Across the Machatti Sea lies a nation of Valley People. The sailors of the Realm have recently opened communication and trade with the reluctant Valley People.

Politically, the Realm has two regions: the Castle Reaches and the Outlands. The Castle Reaches comprise the area immediately surrounding the Castle to a distance of 100km (roughly the range of the Castle laser). The Reaches are inhabited by about 100,000 Valley People and 30,000 Hairy Ones loyal to Arruprul. Most of the warriors are recruited from this region.

The Outlands are far more independent of the King. They are less pleased with his rule than the Reachlanders, but there is little danger of revolt. The Castle protects them from the occasional Grass Giant raid, and from other random threats. Most of the Outlanders are Valley People, with only a small sprinkling of Hairy One villages.



The Castle is a functioning, technically-advanced fortress of ancient origin, probably constructed during the first rise of the Healer civilization. It easily predates the City Builder civilization by ten thousand years.

A formed scrith tower on a hill, standing invulnerable to all attacks, the Castle has a laser cannon, fluorescent lights, surveillance cameras, and food processors, all powered by the superconductor grid. Its owners do not understand the devices, but can use them. The Realm has been a stable kingdom for 200 UNS years.

The Castle itself is a simple structure, of three 8m-high rooms stacked atop one another. A single wide column occupies the center of each room, and a stairway winds around the column. Atop the 27m tower is a hemispherical laser cannon turret, whose field of fire can reach overhead or directly to the base of the tower (a prism can direct fire downward). The turret is of scrith, completely smooth, and occupies the entire top of the tower.

There are no windows in the tower, and no ways inside from the turret. Only a single door at the base allows entrance or exit; it is guarded by soldiers and by a secret punch-code which unlocks the door from inside and out. Despite its prestige, the tower is not a very interesting place to live. The present King uses the top floor as a dungeon, the middle floor for his treasury and miscellaneous loot, and the bottom floor sometimes as an armory and sometimes as a granary, depending on which items are in shorter supply at the time. Each room is 10m across. Each room is scalable from the next by a scrith door and a code lock. The entire building is air-conditioned.

The King and his family and court live just downhill, in the Great Mansion, a late-medieval-style palace-fortress. Nearby stand lesser palaces of major nobles, barracks for the palace guards, barns, outbuildings, gardens, and so on. The entire complex implies stability, continuity, and considerable wealth. The King is most pleased with the whole arrangement, and loves to show it off to awestruck barbarians.

Court

The explorers will be brought before King Arruprul and his advisors, who will first mistake them for City Builders, a species mistrusted by the Realm's folk.

The King is very knowledgeable, and wiser than would be expected for a man of his apparent age (40 UNS years or so). Has he taken the drug?

Though tolerant, the Hairy Ones are also suspicious of strangers. The King wants to know why the explorers are there, where they get their devices, how the devices work, and what the explorers want.

If the explorers do not tell him what he wants to know, the King will have them sent away and locked up for the night. The next

day he will summon them to his court again, and again ask them about their equipment. This will continue day after day, until the King gets what he wants.

If the explorers tell him that they seek the secret to the longevity drug, the King will react with merriment, much as a 20th century Terran would react if a stranger told him he was looking for the Fountain of Youth. The king will say that he has heard rumors of this drug, but that he doesn't know where to find it. He will then conclude the audience, and send the explorers back to their cell.

The next day, the explorers are called back to the king. He tells them that he has given the matter much thought, and has met with his counselors at length. He asks what the explorers would trade for either information about the drug or a new machine part. He will state that the equipment that the explorers gave up when they entered the castle, in addition to any equipment the Castle's warriors found at the marinex's crash site, is now his property and cannot be bargained with. The King will drive a hard bargain, and will try to get as many more items of technology as he can. If need be, he will lock the explorers up again and again, until they consider his offer.

If the explorers mention the *Catseye,* he will ask them about its location, and will pursue this topic unless the explorers are adamant about not revealing it.

Once the King is satisfied with the bargain, he will let the explorers contact their friends, and ask them to tell the people in the ship to bring the items to the field in front of the Castle. One of the King's advisors, wearing a comdisc (confiscated from the explorers), and insisting that the computer translate the conversation, will listen in.

Once the details have been suitably arranged, the King will become very cheery. He will order meat and wine and proceed into a long discussion with the explorers. He will gladly communicate with them, and perhaps get careless as he gets drunk. Details are left to the gamemaster who will continue the scenarios.

Escape?

The explorers may try to escape this fellow. The most obvious time to attempt escape is when the explorers are being transferred from one location to another. They could try to jump one of the guards to gain weapons. Use the soldier and knight stats provided.

What Next?

The gamemaster must now assume control of the explorers' adventures on Ringworld. Certainly there is plenty of territory to cover. Once befriended, the King may or may not have the promised information on a useful thruster part or longevity drug. It is up to the gamemaster. Perhaps he knows of a lost City Builder ruin that might hold such an item.

If the explorers battled and conquered the knights of the Realm, they may well become rulers for a time, but that will not get their starship repaired. The various books in the game — particularly the Mysteries of Ringworld section of the gamemaster book — may suggest many possible adventures.

GM GLOSSARY

ALIEN — In these rules, any and all intelligent non-hominids are called aliens. For example, Grogs, Kzinti, Puppeteers, and Martians are aliens.

ANIMALS — In these rules, all creatures which neither are intelligent nor are hominids are animals. For example, owls, cats, and the Gummidgy Destroyer are animals.

ANTISPINWARD - The direction opposite to Ringworld's direction of spin. One of the four primary directions on Ringworld as defined by its rotation.

ARCH - Some Ringworld natives believe their world to be a very large flat surface surmounted by a narrow, luminous, parabolic arch. In reality, the Arch is the rest of Ringworld as it appears in the sky when viewed from any interior part of the Ring.

ARCHAIC WEAPONS - All weapons relying primarily on muscle power are archaic weapons — including swords, clubs, darts, rocks, spears, and bows-and-arrows. Such weapons may be used by many Ringworld natives, but only hobbyists normally use these arms in Known Space.

ATTITUDE JETS - Bussard ramjets mounted on outer rim walls to keep Ringworld stable in the plane of its orbit; also, small reaction motors for adjusting a spacecraft's orientation.

BREEDERS - The second stage in the life cycle of Pak and other hominid species. Human beings normally spend their adult lives arrested in this phase of development, since Tree-of-life, the biological agent which triggers third-stage growth, is unavailable.

CHMEEE — Kzinti ambassador to humanity who earned his full name as a member of the first Ringworld expedition; Chmee participated in the second expedition as well.

CITY BUILDER - Any member of the sophisticated hominid species who built Ringworld's floating cities and who traveled to the stars; also, the City Builder language.

CONTROL CENTER - See Repair Center.

CREATURE — In these rules, all living beings are creatures if they are controlled by the gamemaster rather than by players. Therefore, creatures may be humans, animals, aliens, or hominids, which see.

CZILTANG BRONE [s'ZIL-tang brone] - A Ringworld device which projects a beam rendering scrith semi-permeable, thereby enabling solid objects to penetrate it.

DAY - A Ringworld day is 30 UNS hours long. Of these hours, 21 are daylight and 7.5 are night. The remainder consists of 45-minute dawn and dusk periods. The UNS 24-hour day is standard throughout Human Space. It is based on the length of Earth's day. Each colony, though, has its individual length of day, based on that particular planet's rotation.

DIRECTION - Since Ringworld has no north or south magnetic pole, there is no uniform system of compass headings. The four Ringworld cardinal directions are spinward, antispinward, port, and starboard, defined with respect to the rotation of the Ring.

EC-1752 — The Puppeteer star catalog number for Ringworld's sun.

ELBOW ROOT - Ringworld plant grown as natural fencing.

ENGINEER — Reverent Ringworld native term for City Builders or others with seemingly god-like powers.

EYESTORM - A major storm on Ringworld, resembling a vertical, rolling hurricane. Occasionally a puncture through the Ringworld floor generates a massive eyestorm above it. From a distance, such a storm may look like a gigantic, disembodied hominideye.

FALAN — A major Ringworld unit of time. A falan is 75 Ringworld days long, equaling ten turns of Ringworld. The Ringworld equivalent of three UNS months.

FALL-OF-CITIES - The disaster which ended City Builder civilization. Caused by the Puppeteer-induced superconductor plague, its name refers to its most dramatic manifestation, the fall and destruction of most of the floating cities.

FIRST RINGWORLD EXPEDITION -The first trip to Ringworld by inhabitants of Known Space; the novel *Ringworld* describes it.

FIST-OF-GOD — An enormous mountain located spinward of the Great Oval Ocean. It may have been formed by a massive meteor strike.

FLEET-OF-WORLDS - The five Puppeteer planets journeying toward the Magellanic Clouds to escape the radiation created by the cataclysm at the galactic core.

FLUP — The water-logged soil which dredges scrape from the bottom of Ringworld oceans. Flup is recycled through a system of vast scrith pipes to the surface of Ringworld; much processed flup re-enters the ecosystem via the Spill Mountains. Also, seabottom ooze.

GHOST FLAME — Ringworld native name for attitude jet exhaust; visible only when the Ring attitude jets fire at night.

GREAT OCEANS - The two vast salt seas located on opposite sides of Ringworld are the Great Oceans. They are so huge that each contains numerous 1:1 Maps of entire planets dotted across its surface as isolated islands. One ocean is roughly oval; the other is shaped like a four-pointed star.

HOME — An Earthlike human colony world in the Epsilon Indi system, 11.4 light years from Earth. In the 24th century, its inhabitants were wiped out by disease — but it since has been re-populated. The war with the Pak scout fleet is unknown to Ringworld-era flatlanders.

HOMINID — All creatures directly or indirectly evolved from Pak breeders. Humans are hominids, as are most Ringworld natives.

HOT NEEDLE OF INQUIRY - The space-

craft used by the second Ringworld expedition; also, a Kzinti instrument of torture.

HUMAN PROTECTOR - Human equivalent of the Pak protector: smarter, but less agile, less strong, and less predictable.

INFINITY HORIZON - A band of surreal, blurred abstraction and chaos, an illusion created by the blending of distant features, on Ringworld's vast Euclidean landscapes; can cause hypnotic disorientation.

LONGEVITY DRUG - A general term for any substance which extends the natural lifespan. Boosterspice is a human-specific longevity drug.

Longevity (or immortality) drug is also the actual name of a rare substance made from Tree-of-life found on Ringworld. Longevity drug is of great value on Ringworld and of potentially greater value elsewhere, because longevity drug may be usable by humans allergic to boosterspice.

LONG SHOT - The first quantum II hyperdrive starship, piloted by Beowulf Shaeffer to the galactic core, and by Louis Wu to the Puppeteer Fleet-of-Worlds.

LYING BASTARD - The spacecraft used by the first Ringworld expedition, which crashlanded near Fist-of-God.

MAP — A cartographic aid. Also, on Ringworld, Maps are 1:1 relief-sculpted polar projections of entire planets, stocked with appropriate flora and fauna, found as islands in the Great Oceans.

MAP ROOM - Holographic projection room in which detailed images of the Ringworld's surface may be viewed.

MARS — The fourth planet from Sol. In the Known Space universe, Mars is UN property — ceded to Earth by the Belt. Much of Mars is covered by a thick layer of chemically-reactive dust. At one time the planet was inhabited by primitive, intelligent aliens (the Martians), but they are believed extinct on Mars in the Ringworld era. There are Martian-related creatures on the Ringworld Map of Mars.

MEDIAN LINE — That imaginary line equidistant from the rim walls of Ringworld; the Ringworld equivalent of an equator.

METEOR DEFENSE SYSTEM - Solar-flare-powered gas laser capable of vaporizing any object that might impact the surface of Ringworld.

METRICS - The rules frequently use metric system measurements. A kilometer (abbreviated km) equals about 5/8ths of a mile. A liter of fluid is about 0.95 quarts. A meter equals a bit more than 39 inches.

NESSUS - The mad Puppeteer who led the first Ringworld expedition, in 2850.

PAK — A race of warlike, xenophobic hominids native to an Earthlike world in the galactic core. Their lifecycle has three stages: childhood, breeder, and protector. All Ringworld hominids as well as humanity evolved from Pak breeders.

PHSSTHPOK - The only Pak protector directly known to humanity. His mummified remains still may be viewed at the Smithsonian Institute on Earth.

PROTECTOR - The third stage in the lifecycle of the Pak, triggered by eating Tree-of-life root. Protectors are very strong and very smart. Their central motivation is to protect the lives of their blood descendants. Pak Protectors probably built Ringworld. See also Human Protector.

PUPPETEERS — An advanced alien species of two-headed, tripedal herbivores, the Puppeteers once dominated interstellar trade in Known Space and beyond. Most humans think of them as extraordinary cowards. In the Ringworld era, nearly all the Puppeteers have disappeared from Human Space, fleeing the radiation front of the galactic core cataclysm. Their influence upon human affairs, nonetheless, is still keenly felt. Puppeteers organized the two expeditions to Ringworld chronicled in *Ringworld* and *Ringworld Engineers.*

QUANTUM II HYPERDRIVE-Developed by the Puppeteers, a hyperdrive enormously faster than the quantum I hyperdrive commonly used in Known Space at the beginning of the Ringworld era. The *Long Shot* was the prototype spacecraft, the first to visit the galactic core.

The quantum II hyperdrive is enormous, barely fitting within a GP No. 4 hull. It achieves the second quantum rate of travel, 1.25 minutes per light year.

REPAIR CENTER - Huge, Pak-habitable volume beneath the Map of Mars, a major maintenance and control center for Ringworld systems.

RIM MOUNTAINS - Range of high mountains along the Ringworld rims, restricting access to the rim walls; also, features sculptured on the inner surfaces of the rim walls giving the impression of unclimbable mountains when seen from the Ring floor.

RIM TRANSPORT SYSTEM - Partially-completed electromagnetic shuttle system along the top edge of the rim walls.

RIM WALLS - The parallel 1600-km-high walls rising all the way around both interior edges of Ringworld, preventing the escape of Ringworld's atmosphere.

RINGYEAR - A traditional Ringworld measure of time, 1725 Ringworld days, or nearly six UNS years.

RISHATHRA [ri-SHAH-thruh] - A City-Builder-derived custom on Ringworld of sealing contracts and treaties with ritual sexual intercourse between different hominid species. Rishathra sometimes is recreationally performed.

SCRITH — The extremely dense, impenetrable, ultra-solid material used in the major construction of Ringworld. Scrith underlies all of the terraformed and contoured inner surface of the Ring. The rim walls are also of scrith. The substance has a tensile strength on the order of the force that holds together atomic nuclei.

SCRITH REPULSER - Any MAGLEV material, motor, or vehicle held aloft by electromagnetic force directed against structural scrith.

SECOND RINGWORLD EXPEDITION - The second group of Known Space explorers to visit Ringworld; described in the novel *Ringworld Engineers.*

SHADOW SQUARES - A linked loop of enormous, thin rectangular panels circling between Ringworld and its sun. They cast shadows on the surface of Ringworld to simulate night and to regulate temperature.

SOLAR FLARE — A tremendous stellar outburst of charged particles and wave radiation, which erupts with the power of billions of nuclear bombs; a phenomenon highly-dangerous to unprotected living creatures. Most stars flare unpredictably — but Ringworld's sun can be made to flare upon command, to power its meteor defense system.

SPACECRAFT LANDING SYSTEM - Any of six gargantuan linear accelerators on the outer rim of Ringworld, used to match ramship velocity with Ringworld's rotation.

SPACEPORT LEDGE - Any of six 134-kilometer-wide landing shelves for Ringworld ramships, located at the antispinward ends of the Spacecraft Landing Systems.

SPAGHETTI PLANT - Ringworld plant, description obvious. Edible.

SPEAKER-TO-ANIMALS - See Chmeee.

SPILL MOUNTAINS - These mountains, roughly 50-65 km high, stand against the base of the rim walls of Ringworld, spaced at roughly 40,000 km intervals all the way around it. They are important for the recirculation of flup. Spill Mountains have their own unique ecology.

SPINWARD - In the direction of rotation of Ringworld; one of the four primary directions used on Ringworld.

SUNFLOWERS - Slaver sunflowers are a Tnuctipun-engineered plant. Their highly-reflective petals focus sunlight on their photosynthetic nodes, and the blossoms turn to track the sun. The plants can direct enough concentrated solar energy at moving targets to fry them. Large patches of sunflowers are a major menace in some regions of Ringworld, and are difficult to eradicate.

THALLIUM OXIDE - A black, toxic, water-soluble powder which, as a soil additive, is necessary to the growth of symbiotic virus in Tree-of-life plants.

TREE-OF-LIFE - The plant whose root triggers the transformation of hominid breeders into protectors. It has a strong smell which younger hominids find unpleasant, but which any hominid over the age of 40 finds nearly irresistible. A symbiotic virus in the root is the specific genetic vector involved in the change.

TURN — The time it takes any one location on Ringworld to revolve once around its sun. One turn equals 7.5 Ringworld days, or 8.75 Earth days. A turn is the Ringworld equivalent to the UNS week and, like the week, is a traditional measure of time.

UNS - United Nations Standard. All UNS time measurements are Earth-relative: the 365-day year, 24-hour day, and so on.

ULTRASOLID - General term for any superdense material, natural or artificial — neutronium, for instance, or scrith.

WEENIE **PLANT** - Ringworld plant similar to melons or cucumbers, but growing in links. Clusters of roots spring from the nodes. Grows in damp areas. Edible. Also called sausage plant.

WU, LOUIS - Member of the first and the second Ringworld expeditions; first human to establish informal contact with Trinocs.

ed works set in the "Ringworld era." Explorers may be influenced, however, by any locale or previous event in Known Space history. For more Known Space lore, the following novels and story collections are at the core of the mythos: *World of Ptavvs, Protector, The Long ARM of Gil Hamilton, A Gift From Earth, Neutron Star,* and *Tales of Known Space.* Additional insights will be found in *A Hole in Space, Convergent Series, A World Out of Time, The Mote in God's Eye* (with Jerry Pournelle), *Dream Park* (with Stephen Barnes), and other works not strictly in the Known Space series. Poul Anderson's *Tales of the Flying Mountains* is recommended reading for anyone interested in a parallel history of the Belt.

Ideally, *Ringworld* should be playable in any era, not just the Known Space "Ringworld era." Scenarios set in the past would be fascinating, perhaps involving only inhabitants of the Ring exploring their own universe. The cover painting on the game box, we note, depicts an arbitrary time and place on the Ring, not the pieced-together floating city from *Ringworld Engineers.* Probably the scene is prior to the Fall-of-Cities.

We believe there are endless possibilities for great Ringworld scenarios. There is a lot of Known Space lore around, and the dedicated gamemaster will have little difficulty finding it — or creating more. Potential Ringworld players need have little more than an appreciation of 'hard' science-fiction adventure — but we hope they too will familiarize themselves with all of Larry Niven's Known Space universe, eventually.

A (final) cautionary note: Larry Niven often says he will write no more Known Space stories. (He said this first at least a decade ago.) Nonetheless, anything is possible. Major Human Space worlds, alien species, and interstellar events exist which have not yet been used in Known Space fiction. *Ringworld* gamemasters should not necessarily presume that their own adventures, however dramatic or grandiose, will forever color the resilient, enduring fabric of the original author's Known Space universe.

Acknowledgements

This work could not have been completed without the encouragement and advice of Larry Niven. Special Thanks also to Ralph McQuarrie for his interest in the project and the beautiful cover painting!

Lisa Free, Larry Todd, Dan Alderson, Don Simpson, Matt Eyre, Pat Ortega, Bonnie Dalzell, Rick Sternbach, W. D. Barlowe, David Wingrove, and Wes Ives (among others) deserve credit for significant contributions to Known Space lore — as well as Lynn Willis and the entire Chaosium staff. For many helpful comments, criticisms, calculations, and some proofreading, thanks to Andrew Shebanow, Mike Shebanow, and Walter Harris. For interesting bits of arcane astronomical data, I am indebted to Kingsley Wightman of Chabot Observatory, the NASA Ames Research Center, Sherwood Harrington of the Astronomical Society of the Pacific, Edwin C. Krupp of Griffith Observatory, Mark A. Gingerich, Terry Mast, Sandra Faber, Robert Burnahm,Jr., *Sky and Telescope, Astronomy,* and *Scientific American* magazines, and certain University of California graduate students who wish to protect their anonymity lest their future professional reputations suffer. For his speculations on cold biogenesis and other matters at Berkeley in 1982, thanks to Freeman J. Dyson.

Attorney Thomas Singman provided invaluable legal assistance; and for early contract guidance, Tracy Blackston Zimmer deserves special thanks. I am also grateful to Ray Faraday Nelson, Marta Randall, Norman Spinrad, the Science Fiction Writers of America, John M. Ford, Mike Stackpole, Albert C. Heppe, Diana Paxson, Debbie Notkin, Donald Brody, Harris Zimmerman, Paul Reiche, John Stanley, Jim Funaro, Mark Bridges, Dave Snook, Janet Smith, Ed Lynch, Adrienne Pitts, Carole A. Hewitt, and others, for good advice. For typing early hominid drafts, thanks to Mrs. Edith F. Hewitt. For the preservation of ancient flatlander groundcars, thanks to Milt Neely, Jack Little, James McClymonds, and Norm Nielsen. For inspiration, thanks to Simone Simon, Faith Domergue, and the Control Voice. Finally, thanks to Big Cat Books, Dark Carnival, Other Change of Hobbit, and Pellucidar for being terrific SF bookstores. Acknowledgement of wonderful written works by Reginald Bretnor, Poul Anderson, Loren Eiseley, Stephen Dole, Carl Sagan, George O. Abell, Terry Carr, Gregory Bateson, John C. Lilley, L. Sprague de Camp, Roger Zelazny, Hal Clement, Arthur C. Clarke, George Gamow.and Fred Hoyle must be made specifically.

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The *Ringworld* game system is the property of Chaosium Inc., of which I am not an employee. Please address correspondence regarding the game system to Sherman Kahn, c/o Chaosium Inc., P.O. Box 6302, Albany, Calif., 94706. All mistakes are also the property of Chaosium!

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Ringworld: AUTOPILOT PRINT-OUT

RINGWORLD

- ☐ Orientation In Space: Parallel to galactic plane. Ring does not occlude star as seen from any Known Space world.
- ☐ Mass: 2.1 x 10^{30}g
- ☐ Radius (distance of surface from star): 152,883,500km
- ☐ Circumference: 960,752,100 km
- ☐ Width: 1,604,000 km (125.8 Earth diameters)
- ☐ Surface Area: 9.66 x 10^{14} sq km (approx. 3 million times the total surface area of Earth).
- ☐ Biosphere: Inner surface layered with soil, oceans, atmosphere breathable by humans.
- ☐ Rim Walls: Approx. 1,600 km high, facing sunward.
- ☐ Spin: Direction of rotation — same as galactic disk, appears anticlockwise from Known Space (i.e. from 'below').
  Length of rotation — 7.2 Ringworld days (9 UNS days).
  Rate - 1239 kps (4,460,979.6 kph)
  Surface gravity induced by spin —.992 gee
- ☐ Average Temperature: Habitable surface — 290 Absolute (62.3 F).
  Outer (darkside) - 174 Absolute (-146 F).
- ☐ Atmospheric Composition: Nitrogen 74% Oxygen 22%, Argon 2%, Helium 1%, H2O, C02 and other gases less than 1%.
- ☐ Day/Night Cycle: induced by Shadow Squares - 30 UNS hours (av.)
  Average length of Full Daylight — 21 hrs.
  Average length of Eclipse Twilight — 45 min.
  Average length of Full Night — 7.5 hrs.
  Speed of terminator shadows with respect to Ring surface — 1.6 million kph.
- ☐ Oceans: Hydrosphere covers approx. 53% of habitable surface.
  Shallow Seas — range in size from 15,000 to 36 million sq. km. with an average depth of 6-9 m; composed of fresh water.
  Great Oceans — Numbering two: the Great Oval Ocean and the Great Star Ocean, counterbalanced 180 degrees apart on the Ring. Each has a surface area of approx. 2000 Earths, and an approx. volume of 20 Earths, Maximum depth of each is over 35 km. Minimum total length of the shoreline is 32,000,000 km. Each ocean is composed of salt-water.

RINGWORLD SUN

- ☐ Distance From Mean Galactic Plane: 248 light years.
- ☐ Distance From Solar System: 201 light years.
- ☐ Direction: Near north galactic pole.
- ☐ NGP Celestial Coordinates (epoch 2000):
  R.A. 12h51m.5; DEC'07'7m.7
- ☐ Catalog No./Name: 3027 Coma Berenices (UN).
- ☐ Summary: Normal solar-type main sequence early G isolated star, barely smaller and cooler than Sol. Nonvariable. Magnetic flare star; Zeeman line splitting, semi-periodic and irregular.
- ☐ Spectrum: dG3e verging on dG2e. Transient magnetic and H-emission anomalies. Infrared line broadening.
- ☐ Color: Yellow-white.
- ☐ Surface Temperature: 5,600 Absolute (10,000 F).
- ☐ Stellar Type: Population I (galactic disk).
- ☐ Luminosity Class: V (main sequence dwarf)
- ☐ Mass: 1.93x 10^{33}g
  0.97 Sol; 323,000 Earth masses
- ☐ Diameter: 1,359,858.5 km.
- ☐ Absolute Luminosity (energy output):
  3.6 x 10^{33} ergs/sec
  4.8 x 10^{23} horsepower
  3.6 x 10^{26} watts
- ☐ Absolute Magnitude: +5.0
- ☐ Apparent Magnitude Seen From Earth: +8.7
- ☐ Gravitational Acceleration At Photosphere: 27 gee
- ☐ Escape Velocity From System (near the Ring): 38.6 kps
- ☐ Companion Objects: Ringworld. No planets, moons, asteroids or short period comets. Nothing but the Ring itself — which is not detectable from Known Space by standard low-resolution remote survey techniques.

SHADOW SQUARES

- ☐ Number: 20.
- ☐ Shape: Rectangular.
- ☐ Dimensions: 1.6 million x 4.18 million km.
- ☐ Average Spacing: 9.66 million km
- ☐ Solar Energy Falling on Shadow Squares: 2.0 x 10^{31} ergs/sec (5.5% of sun's output).
- ☐ Rotation Period of Shadow Square Ring: 11.4 Ringworld days (14.2 UNS days).

FLOOR MATERIAL

- ☐ Average Thickness of Ring Floor: 30 m.
- ☐ Material Type: Ultrasolid, artificial.
- ☐ Manufacturing Technique: Unknown.
- ☐ Minimum Tensile Strength: Approx. 7.1 x 10^{14} kg per sq. cm.
- ☐ General Properties: blocks deep radar and hyperwave; absorbs 40% of neutrinos; absorbs nearly 100% of all other radiation and subatomic particles; rapidly dissipates heat; appears translucent, grayish in sunlight.

RINGWORLD FROM SPACE

"I remember how the Ring looked from deep space, like a thread of blue Christmas ribbon . . . ."

The Ringworld sun is a solar-type star, a shade less intense than Earth's own. From anywhere in Known Space it is several magnitudes too faint to see with the unaided eye. Through a telescope it looks like a perfectly ordinary example of the thousands of yellow dwarf stars within several hundred light years of Sol. Careful spectroscopic studies might reveal periodic magnetic anomalies and occasional intense flare activity; and extremely precise astrometric measurements might suggest the absence of any major planetary family, but that is about all. The plane of the ring is face-on to Human Space, so the disk of the star cannot be even partially occluded. The Ringworld would never be detected, unless the searcher knew exactly where to look.

From the edge of the Ringworld system, the G3 sun is nothing more than a blazing white point — but with a difference: this star wears a barely-visible halo. At a distance comparable to the gulf separating Earth from Pluto, Ringworld is already a naked-eye object, a shallow pencil-line of arc-blue with its sun nestled serenely at the center. As you decelerate into the system at 30 gees, the Ring shifts its position gradually, too slowly — evidently its diameter is huge, though in proportion it is thin and narrow, not much wider across than its star at its axis. Ringworld is a band of solid material, clearly an artifact. Its near side is a dim dead-black line occulting a few stars, sharp-edged where it cuts across the solar disk. The further side is a pale blue ribbon across space, with long streaks of glowing baby-blue interrupted by shorter strips of deep midnight blue. The surface looks as if it has been laid out in a series of regular, rectangular dots and dashes. There are no other objects visible on the way in — no planets, no asteroids, no periodic comets or meteoroid swarms, no interplanetary craft or space stations.

Much closer to Ringworld, major details become discernible, first through telescopes and finally to the unaided eye as the structure looms near. The blue daylit rectangles of the Ring develop a complex, finely-etched, textured appearance at the limit of resolution, overlain with thin smudges of indistinct white cloud-cover. Faintly deeper-blue areas which might be land masses are intricately intertwined with patches of lighter blue which might be seas. Occasionally there is an unusual spot of brightness, like sunlight reflected from an ice field, a polished metal plate, or the surface of a calm ocean at just the right angle. The two Great Oceans can be picked out easily, if you look for them, 180° apart around the checkered surface of the Ring. One is oval in shape, the other a ragged four-pointed star. The shadowed regions are quite visible, blue-black with blurred straight edges for boundaries, containing a hint of differentiated shading. And a ring of 20 dark, rectangular outlines circle near to the Ringworld sun, like a swarm of huge black moths.

From a dim, sharply-defined line, the rim of Ringworld slowly grows by degrees, to a featureless straight black wall 1600km [1000 miles] high. The rotational velocity of the Ring is by now obtrusively apparent, requiring five gees acceleration to hold a constant curved path next to the wall. Close to the rim wall, or to the underside of the structure, half the sky seems a dark geometric abstraction, its edges converging to vanishing points at either end of the universe. From two of the points at infinity, narrow lines of baby-blue and midnight shoot straight upward. If you have picked the right spot on the rim, you may glimpse 160-km-diameter toroids, spaceport ledges (perhaps with intact craft), towers plainly for attitude jets, or (just as you maneuver over the top edge of the rim wall) the rectangular loops of a transport system. From this vantage point, 1600 kilometers above the Ring floor, no other signs of civilization are visible. Barely discernible are the curiously-regularly-spaced, half-conical bumps of nearly 50-km-high mountains far below, leaning against the base of the rim wall.

The panorama unfolds in breath-taking detail as you descend slowly toward the upper reaches of Ringworld's atmosphere. The Ring becomes a luminous parabolic arch above, and you lose all track of how the rim walls and Ring floor merge together as a single circular artifact. Below, rapidly expanding, all the surfaces of all the earthlike worlds in a dozen galaxies seem to be spread out flat for beholding. Swirled white cloud-decks resolve first, some bright enough to dazzle the eyes, in soft blankets and churning storms, in long parallel streamers, and in diminutive, dappled wooly fleece. Topography appears: continents and oceans, huge mountain chains, lakes, valleys, patterns of rivers and streams, endless flat plains, barren deserts, vast forests, snow fields, and odd patches of regularly textured land or dully gleaming spots that look disturbingly unnatural. The surface area is more than 50% water, with an endless sprinkling of small shallow seas and larger oceans, evenly distributed but scattered at seeming random. Their exotically convoluted shorelines display a striking variety of gulfs, bays, inlets, peninsulas, river deltas, natural harbors, and wide sandy beaches; while island archipelagos dot their faces. Sluggish, silt-laden rivers and extensive marshlands are visible, as well as colorful jungles and lush tropical rainforests. With a surface area three million times that of Earth, there is room enough for anything. It is easy for a traveler to lose perspective, to forget the scale of the artifact, and to habitually underestimate sizes and distances amid such a landscape. It is quite difficult to recall that the stunning variety and geographic splendor that is Ringworld did not evolve naturally — and even harder to understand that every topographic detail and major feature had to be carefully planned, meticulously designed, and molded in bas-relief in the ultrasolid foundation material.

THE INFINITY-HORIZON

Her eyes scanned the middle distance,
through a barrier of low hills . . .
They rose, and found infinity where they
had always before found limits ....

Ringworld has no horizon. From the viewpoint of a surface-dweller, there is only an endless abstract plain, a completely Euclidean landscape. On a normal spherical world, the horizon is seldom more than a few dozen kilometers distant. Even the tops of high mountain ranges are obscured from further off than a few hundred kilometers. On Ringworld, there is no line where land curves away from sky. Rather, land and sky merge into a uniform, hypnotic, horizontal band — a region where details the size of continents are mere points, where all colors blend gradually into the blue of sky. Mountain ranges or floating cities cannot drop below the horizon: as one travels further away, they merely recede and shrink. Details begin to smear, and are then lost. Huge landmarks become tiny, then vague, then indistinguishable and invisible in the disturbing blur of the "infinity horizon." It is a "vanishing-plane," made up of an infinite number of vanishing points in every horizontal direction. To look into the vanishing-plane is to step into another universe, one of true straight lines and impossible geometric distortions.

Ringworld's horizon, like the deeps of space, can grip the eye and mind. In space it is called "the far look." A sentient can lose his soul guiding a ship among the stars, while its mind travels in realms it cannot remember. On the great flat plateaus of Mt. Lookitthat (Plateau), a colonist may be found standing at the Void Edge, eyes fixed, looking down into the mist tracing the mountain's fluted side. Mt. Lookitthat is over 60 kilometers high, and a human eye finds infinity in the solid void of mist that stretches white and featureless and uniform to the world's horizon. There, the effect is called "Plateau trance." On Ringworld, the infinity-horizon seems to go on forever. The world is flat, and even the least suggestible human mind sometimes falls victim to "horizon hypnosis" while traveling for long periods. Kzinti claim to be immune to this effect. In darkness or at nightfall, the effect is no less unsettling. The missing horizon is a deep blackness born of night and chaos, beneath a navy sky in which the Arch glows spectrally.

Even in a landscape as flat and vast as that of Ringworld, a clear sense of the fundamental directions can be maintained. Spinward is the longitudinal reference, along the Ring, defined by the direction of rotation. Anti-spinward is 180 degrees opposite. The great Arch in the sky constantly reminds the visitor of these coordinates. The latitudinal directions are starboard and port (as on a ship) towards the rim walls. When facing spinward, starboard is to the right, port to the left. For comparison, "spinward" on the rotating spherical Earth would be east; "anti-spinward" west; "starboard" would be south, and "port" north.

RINGWORLD EXPLORER SHEET

Front

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . .

MAS . . . . . General Hit Points . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll. . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects. . . . . .

EDU . . . . . .

AGILITY Root Maximum . . . . %

Archaic Melee Weap. (05%)R . . . . % ☐

. . . . . % ☐

Archaic Ranged Weap. (03%)R . . . % ☐

. . . . . % ☐

Athletics (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hide (10%) . . . . % ☐

Sneak (05%) . . . . % ☐

Unarmed Combat (00%) . . . . % ☐

V. Sword, F. Laser (15%)R . . . . % ☐

COMMUNICATION Root Max. . . . . %

Bargain (10%) . . . . % ☐

Debate (05%) . . . . % ☐

Fast Talk (10%) . . . . % ☐

Fine Arts (05%)R . . . . % ☐

. . . . . % ☐

Musicianship (05%)R . . . . % ☐

. . . . . % ☐

Orate (05%) . . . . % ☐

Own Language (INTx5) . . . . % ☐

Perform (05%)R . . . . % ☐

. . . . . % ☐

Psychology (00%)R . . . . % ☐

. . . . . % ☐

KNOWLEDGE Root Max. . . . . %

Anthropology (00%)R . . . . %

. . . . . %

. . . . . %

Astronomy (00%)R . . . . %

. . . . . %

Biology (00%)R . . . . %

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Botany (00%)R . . . . %

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Chemistry (00%)R . . . . %

. . . . . %

. . . . . % %

Computers (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Emergency Treatment (01%)R . . . % ☐

. . . . . % ☐

Engineering (00%) . . . . %

Farming (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

History (05%)R . . . . %

. . . . . %

. . . . . %

Law (00%)R . . . . %

. . . . . %

. . . . . %

. . . . . %

Mathematics (00%)R . . . . %

. . . . . %

. . . . . %

Physics (00%)R . . . . %

. . . . . %

. . . . . %

Planetology (00%)R . . . . %

. . . . . %

Second Languages (00%)R . . . . % ☐

. . . . . % ☐

Strategy (00%) . . . . % ☐

Theology (00%)R . . . . %

. . . . . %

. . . . . %

. . . . . %

Zoology (00%)R . . . . %

. . . . . %

PERCEPTION Root Max. . . . . %

Handgun, energy (05%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Handgun, projectile (03%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, energy (05%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, projec. (03%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Listen (05%) . . . . % ☐

Observe (05%) . . . . % ☐

Scent (00%) . . . . % ☐

Search (05%) . . . . % ☐

Track (05%) . . . . % ☐

TECHNICAL Root Max. . . . . %

Aquatic Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Atmospheric Craft (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Ground Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hyperdrive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Personal Flyer (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reaction Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reactionless Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Repair (00%) . . . . % ☐

Ringworld (00%) . . . . %

Weapons System (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Other ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

RINGWORLD EXPLORER SHEET

Back

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . . Money . . . . . In Bank . . . . .

MAS . . . . . General Hit Points . . . . . Equipment (on body) . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects . . . . .

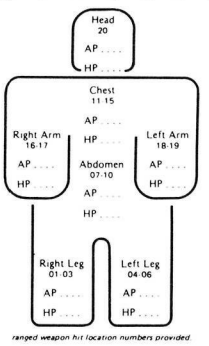
EDU . . . . . .

Pursuits Workspace	Years	Occ. Points/Wealth

Education	Years	Occ. Points

HIT POINT TALLY:

1	2	3	4	5	6	7				
8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29
31	32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50		



HIT POINTS BY LOCATION

r/leg . . . . .
l/leg . . . . .
abdomen . . .
chest . . . . .
l/arm . . . . .
r/arm . . . . .
head . . . . .

Unconsciousness Level . . . . .

WEAPONS

Weapon	Applic. Skill	Weight	Power Supply	Energy Draw	Damage	Range	ATT%

Action Ranking . . . .

Impulse of Completion

Movement rate . . . .

Psionic Ability: Yes ☐ No ☐

. . . . . .

. . . . . .

Equipment	Weight

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RINGWORLD EXPLORER SHEET

Front

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . .

MAS . . . . . General Hit Points . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll. . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects. . . . . .

EDU . . . . . .

AGILITY Root Maximum . . . . %

Archaic Melee Weap. (05%)R . . . . % ☐

. . . . . % ☐

Archaic Ranged Weap. (03%)R . . . % ☐

. . . . . % ☐

Athletics (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hide (10%) . . . . % ☐

Sneak (05%) . . . . % ☐

Unarmed Combat (00%) . . . . % ☐

V. Sword, F. Laser (15%)R . . . . % ☐

COMMUNICATION Root Max. . . . . %

Bargain (10%) . . . . % ☐

Debate (05%) . . . . % ☐

Fast Talk (10%) . . . . % ☐

Fine Arts (05%)R . . . . % ☐

. . . . . % ☐

Musicianship (05%)R . . . . % ☐

. . . . . % ☐

Orate (05%) . . . . % ☐

Own Language (INTx5) . . . . % ☐

Perform (05%)R . . . . % ☐

. . . . . % ☐

Psychology (00%)R . . . . % ☐

. . . . . % ☐

KNOWLEDGE Root Max. . . . . %

Anthropology (00%)R . . . . %

. . . . . %

. . . . . %

Astronomy (00%)R . . . . %

. . . . . %

Biology (00%)R . . . . %

. . . . . %

. . . . . %

Botany (00%)R . . . . %

. . . . . %

. . . . . %

Chemistry (00%)R . . . . %

. . . . . %

. . . . . % %

Computers (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Emergency Treatment (01%)R . . . % ☐

. . . . . % ☐

Engineering (00%) . . . . %

Farming (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

History (05%)R . . . . %

. . . . . %

. . . . . %

Law (00%)R . . . . %

. . . . . %

. . . . . %

. . . . . %

Mathematics (00%)R . . . . %

. . . . . %

. . . . . %

Physics (00%)R . . . . %

. . . . . %

. . . . . %

Planetology (00%)R . . . . %

. . . . . %

Second Languages (00%)R . . . . % ☐

. . . . . % ☐

Strategy (00%) . . . . % ☐

Theology (00%)R . . . . %

. . . . . %

. . . . . %

. . . . . %

Zoology (00%)R . . . . %

. . . . . %

PERCEPTION Root Max. . . . . %

Handgun, energy (05%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Handgun, projectile (03%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, energy (05%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, projec. (03%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Listen (05%) . . . . % ☐

Observe (05%) . . . . % ☐

Scent (00%) . . . . % ☐

Search (05%) . . . . % ☐

Track (05%) . . . . % ☐

TECHNICAL Root Max. . . . . %

Aquatic Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Atmospheric Craft (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Ground Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hyperdrive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Personal Flyer (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reaction Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reactionless Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Repair (00%) . . . . % ☐

Ringworld (00%) . . . . %

Weapons System (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Other ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

RINGWORLD EXPLORER SHEET

Back

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . . Money . . . . . In Bank . . . . .

MAS . . . . . General Hit Points . . . . . Equipment (on body) . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects . . . . .

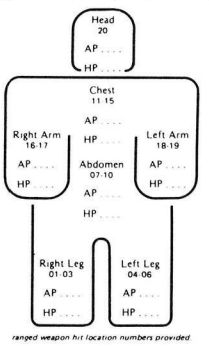
EDU . . . . . .

Pursuits Workspace	Years	Occ. Points/Wealth

Education	Years	Occ. Points

HIT POINT TALLY:

1	2	3	4	5	6	7				
8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29
31	32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50		



HIT POINTS BY LOCATION

r/leg . . . . .
l/leg . . . . .
abdomen . . .
chest . . . . .
l/arm . . . . .
r/arm . . . . .
head . . . . .

Unconsciousness Level . . . . .

WEAPONS

Weapon	Applic. Skill	Weight	Power Supply	Energy Draw	Damage	Range	ATT%

Action Ranking . . . .

Impulse of Completion

Movement rate . . . .

Psionic Ability: Yes ☐ No ☐

. . . . . .

. . . . . .

Equipment	Weight

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RINGWORLD EXPLORER SHEET

Front

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . .

MAS . . . . . General Hit Points . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll. . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects. . . . . .

EDU . . . . . .

AGILITY Root Maximum . . . . %

Archaic Melee Weap. (05%)R . . . . % ☐

. . . . . % ☐

Archaic Ranged Weap. (03%)R . . . % ☐

. . . . . % ☐

Athletics (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hide (10%) . . . . % ☐

Sneak (05%) . . . . % ☐

Unarmed Combat (00%) . . . . % ☐

V. Sword, F. Laser (15%)R . . . . % ☐

COMMUNICATION Root Max. . . . . %

Bargain (10%) . . . . % ☐

Debate (05%) . . . . % ☐

Fast Talk (10%) . . . . % ☐

Fine Arts (05%)R . . . . % ☐

. . . . . % ☐

Musicianship (05%)R . . . . % ☐

. . . . . % ☐

Orate (05%) . . . . % ☐

Own Language (INTx5) . . . . % ☐

Perform (05%)R . . . . % ☐

. . . . . % ☐

Psychology (00%)R . . . . % ☐

. . . . . % ☐

KNOWLEDGE Root Max. . . . . %

Anthropology (00%)R . . . . %

. . . . . %

. . . . . %

Astronomy (00%)R . . . . %

. . . . . %

Biology (00%)R . . . . %

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Botany (00%)R . . . . %

. . . . . %

. . . . . %

Chemistry (00%)R . . . . %

. . . . . %

. . . . . % %

Computers (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Emergency Treatment (01%)R . . . % ☐

. . . . . % ☐

Engineering (00%) . . . . %

Farming (00%)R . . . . % ☐

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. . . . . % ☐

History (05%)R . . . . %

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. . . . . %

Law (00%)R . . . . %

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Mathematics (00%)R . . . . %

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Physics (00%)R . . . . %

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Planetology (00%)R . . . . %

. . . . . %

Second Languages (00%)R . . . . % ☐

. . . . . % ☐

Strategy (00%) . . . . % ☐

Theology (00%)R . . . . %

. . . . . %

. . . . . %

. . . . . %

Zoology (00%)R . . . . %

. . . . . %

PERCEPTION Root Max. . . . . %

Handgun, energy (05%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Handgun, projectile (03%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, energy (05%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, projec. (03%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Listen (05%) . . . . % ☐

Observe (05%) . . . . % ☐

Scent (00%) . . . . % ☐

Search (05%) . . . . % ☐

Track (05%) . . . . % ☐

TECHNICAL Root Max. . . . . %

Aquatic Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Atmospheric Craft (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Ground Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hyperdrive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Personal Flyer (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reaction Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reactionless Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Repair (00%) . . . . % ☐

Ringworld (00%) . . . . %

Weapons System (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Other ☐

. . . . . % ☐

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. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

RINGWORLD EXPLORER SHEET

Back

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . . Money . . . . . In Bank . . . . .

MAS . . . . . General Hit Points . . . . . Equipment (on body) . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects . . . . .

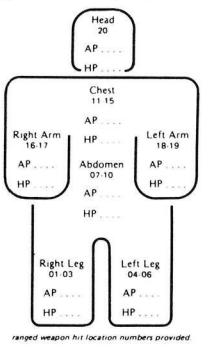
EDU . . . . . .

Pursuits Workspace	Years	Occ. Points/Wealth

Education	Years	Occ. Points

HIT POINT TALLY:

1	2	3	4	5	6	7				
8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29
31	32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50		



HIT POINTS BY LOCATION

r/leg . . . . .
l/leg . . . . .
abdomen . . .
chest . . . . .
l/arm . . . . .
r/arm . . . . .
head . . . . .

Unconsciousness Level . . . . .

WEAPONS

Weapon	Applic. Skill	Weight	Power Supply	Energy Draw	Damage	Range	ATT%

Action Ranking . . . .

Impulse of Completion

Movement rate . . . .

Psionic Ability: Yes ☐ No ☐

. . . . . .

. . . . . .

Equipment	Weight

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RINGWORLD EXPLORER SHEET

Front

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . .

MAS . . . . . General Hit Points . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll. . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects. . . . . .

EDU . . . . . .

AGILITY Root Maximum . . . . %

Archaic Melee Weap. (05%)R . . . . % ☐

. . . . . % ☐

Archaic Ranged Weap. (03%)R . . . % ☐

. . . . . % ☐

Athletics (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hide (10%) . . . . % ☐

Sneak (05%) . . . . % ☐

Unarmed Combat (00%) . . . . % ☐

V. Sword, F. Laser (15%)R . . . . % ☐

COMMUNICATION Root Max. . . . . %

Bargain (10%) . . . . % ☐

Debate (05%) . . . . % ☐

Fast Talk (10%) . . . . % ☐

Fine Arts (05%)R . . . . % ☐

. . . . . % ☐

Musicianship (05%)R . . . . % ☐

. . . . . % ☐

Orate (05%) . . . . % ☐

Own Language (INTx5) . . . . % ☐

Perform (05%)R . . . . % ☐

. . . . . % ☐

Psychology (00%)R . . . . % ☐

. . . . . % ☐

KNOWLEDGE Root Max. . . . . %

Anthropology (00%)R . . . . %

. . . . . %

. . . . . %

Astronomy (00%)R . . . . %

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Biology (00%)R . . . . %

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Botany (00%)R . . . . %

. . . . . %

. . . . . %

Chemistry (00%)R . . . . %

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. . . . . % %

Computers (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Emergency Treatment (01%)R . . . % ☐

. . . . . % ☐

Engineering (00%) . . . . %

Farming (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

History (05%)R . . . . %

. . . . . %

. . . . . %

Law (00%)R . . . . %

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. . . . . %

. . . . . %

Mathematics (00%)R . . . . %

. . . . . %

. . . . . %

Physics (00%)R . . . . %

. . . . . %

. . . . . %

Planetology (00%)R . . . . %

. . . . . %

Second Languages (00%)R . . . . % ☐

. . . . . % ☐

Strategy (00%) . . . . % ☐

Theology (00%)R . . . . %

. . . . . %

. . . . . %

. . . . . %

Zoology (00%)R . . . . %

. . . . . %

PERCEPTION Root Max. . . . . %

Handgun, energy (05%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Handgun, projectile (03%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, energy (05%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Heavy Weapon, projec. (03%)R . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Listen (05%) . . . . % ☐

Observe (05%) . . . . % ☐

Scent (00%) . . . . % ☐

Search (05%) . . . . % ☐

Track (05%) . . . . % ☐

TECHNICAL Root Max. . . . . %

Aquatic Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Atmospheric Craft (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Ground Vehicle (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Hyperdrive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Personal Flyer (15%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reaction Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Reactionless Drive (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Repair (00%) . . . . % ☐

Ringworld (00%) . . . . %

Weapons System (00%)R . . . . % ☐

. . . . . % ☐

. . . . . % ☐

Other ☐

. . . . . % ☐

. . . . . % ☐

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. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

. . . . . % ☐

RINGWORLD EXPLORER SHEET

Back

Explorer's Name . . . . . Player . . . . .

Gender . . . . . Chronological Age . . . . . Physiological Age . . . . . Species . . . . .

Homeworld . . . . . Gravity . . . . . Credit Rating . . . . .

STR . . . . . Damage Modifier . . . . . Money . . . . . In Bank . . . . .

MAS . . . . . General Hit Points . . . . . Equipment (on body) . . . . .

CON . . . . . Health Roll . . . . .

INT . . . . . Reasoning Roll . . . . .

POW . . . . . Luck Roll . . . . .

DEX . . . . . Dodge Roll . . . . .

APP . . . . . Defects . . . . .

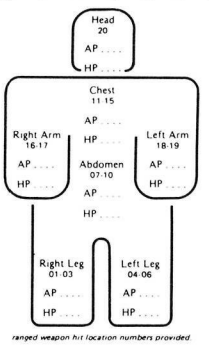
EDU . . . . . .

Pursuits Workspace	Years	Occ. Points/Wealth

Education	Years	Occ. Points

HIT POINT TALLY:

1	2	3	4	5	6	7				
8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29
31	32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50		



HIT POINTS BY LOCATION

r/leg . . . . .
l/leg . . . . .
abdomen . . .
chest . . . . .
l/arm . . . . .
r/arm . . . . .
head . . . . .

Unconsciousness Level . . . . .

WEAPONS

Weapon	Applic. Skill	Weight	Power Supply	Energy Draw	Damage	Range	ATT%

Action Ranking . . . .

Impulse of Completion

Movement rate . . . .

Psionic Ability: Yes ☐ No ☐

. . . . . .

. . . . . .

Equipment	Weight

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A DAY ON RINGWORLD

"And so I will live to see another sunset," the kzin said softly.

Dawn is different on the Ringworld. Some flatlanders find it so unsettling they can never get used to it. No gradual glow brightens along the eastern horizon to herald the coming daylight. In fact there is no eastern horizon at all. Night is just a measured interval of uniform and periodic darkness. There are no global season on Ringworld to make wintery nights longer or summer nights too brief. Bluish archlight paints the landscape in ghostly shadows; there is true darkness only when thick stormclouds obscure the sky. A ring of black rectangles swarms in the zenith, the one hiding the sun framed with pearly coronal glow. Over it all, bisecting the star-dotted sky is the slender broken line of the arch, blue-white.and luminous, a finely-etched parabolic band swirled with white cloud. A brighter glow along one edge of the central shadow square is the only hint that dawn is near, rushing toward you at over 1,300 kilometers per second (700 mph).

The line dividing day from night is called the terminator. On Earth this zone of twilight is visible from the Moon, or from orbit; but it cannot be seen from the Earth's surface. On Ringworld, though, the straight lines dividing light from dark on the arch are all terminators. As daybreak approaches, a terminator line sweeps toward you from spinward like destiny made visible, an onrushing wall too big to go around. From ground to sky it runs, from infinity-port to infinity-starboard. Overhead the corona brightens rapidly, then blazes, as the withdrawing shadow square exposes a piece of the edge of the solar disk. Suddenly the night is to your left (facing port), the darkness deepening with distance. To the right, to spinward, it is full day. The terminator shadow recedes rapidly across the endless, Euclidean landscape, exposing the sharp outlines of remote mountain peaks. It is "half daylight" now: a strange unnatural dawn. The shadows are peculiar, and somehow wrong. The light seems washed out and spectral, the colors weak. Overhead a tiny sliver of golden noonday sun squints down upon the wakening lands.

The sun never rises or sets on Ringworld. It is always straight overhead, high noon by day or eclipsed by night. There are no lengthening shadows to mark the passage of the hours during the long day. At night there is only the gradually changing elevation of the dark rectangles on the Arch, and the slowly shifting canopy of stars. Time seems frozen in the constant noon of full day. Morning and afternoon are identical. Sky and landscape are like two flat plates, infinitely wide, pressed together — and travelers are as microbes crawling forever between the plates. Decisions seem somehow less than permanent. Reality seems less than real. Like the instant of time spent in displacement between transfer booths, a day on Ringworld is a capricious, indefinite moment, stretched out forever. Some find themselves thinking of Dante's *Divine Comedy.* Dante's universe had been a complex artifact, with the souls of men and angels as precisely machined parts of the vast structure. The Ringworld is such an artifact, too, an obtrusively made thing. You cannot forget it even for an instant; with the handle of the Arch rising overhead, huge and blue and checkered.

At the end of each day on Ringworld there is another period of fading peculiar half-daylight. The on-rushing shadow of the terminator comes in from spinward like a black curtain. Just before nightfall there is a series of semi-regular fluctuations in the intensity of the weak illumination — the "shadow bands," caused by diffraction effects at the shadow squared edges (also seen at dawn). A patch of night swiftly envelopes the surrounding lands, and the great arch blazes in the heavens. Once again, the star sprinkled sky is filled with odd, unfamiliar constellations, above a dark band of chaos where any normal world would have put its horizon.

THE DARKSIDE OF RINGWORLD

"You can learn a lot about a world," thought Louis Wu, "by looking at its underside . . . . "

A visit to the dark outer surface of the Ring is instructive. It looks nothing at all like the exterior of a space colony, orbital station, or starship hull. One finds there no antennas, solar collector arrays, fuel tanks, storage pods, docking modules, giant airlocks, nor observation ports. Were such structures present, they would be invisibly small — built on any scale we are used to. From a distance of several hundred thousand kilometers, the underside of Ringworld seems featureless, a dim but sharply defined abstraction. Even large details are blurred by the fantastic rotational velocity. As one matches speeds for a closer approach, though, the black surface takes on a finely-etched appearance, and then looks almost organic. It is not smooth, except on the large scale. The surface dips and rises irregularly, with countless bulges and indentations interconnected by an incredibly intricate tracery of fine, slightly-raised ridges. The effect is more like a high-magnification, low-illumination tridee view of a cross-section of abnormal brain tissue than the outer shell of an engineered structure.

The darkside of Ringworld is like the mask of a planet — the reverse face of a thin plastiform topographical map painted flat black. Everything has been molded in. Every major positive contour of the habitable surface shows up in negative relief on the farside. Wherever one sees a bulge, there is a valley or sea on the sunlit side. Mountain ranges show as gullies, river systems look like veins in a weight lifter's arm. Ringworld imitates the topography of earthlike worlds, but there are no tectonic processes to do the carving: even the river deltas had to be sculpted into the structure.

Lit only by starlight, the darkside of Ringworld, with its chiseled indentations, anomalous flattened bulges, and raised, meandering rilles, is reminiscent of some dim, stark lunar surface. The finest details appear to be smoothed over by a 300-meter coating of spongy-looking foamed material which perhaps acts as meteor shielding. This material is very light absorptive. Apparently most meteoroids, even falling in from interstellar space, leave only minor wormholes or conical pits in the buffer layer before vaporizing completely. Rarely, an object seems to have driven all the way down to a foundation level, leaving a hole with a shiny bottom. Astoundingly, the foundation level seems to be only about 30-35 meters thick. But only a few asteroid-sized bodies have ever punctured the Ring floor, stretching the foundation material phenomenally to finally punch through the landscape above. Left unrepaired, such a puncture resembles a tiny dimple from the darkside, filled with bright fog. On the corresponding sunlit side, the shattered terrain is usually barren and inhospitable, beneath a vast, rolling eyestorm. Fortunately, there is relatively little debris between the stars at the location of Ringworld, 250 light years above the mean galactic plane. Natural punctures must be very rare.

The average temperature of the underside surface is minus 140° F, with wide variations. Infrared enhancement reveals a large-scale pattern of rectangular bands: the darkside of day glowing brighter than the night-shadowed lands. A variety of topographical features show different temperatures, too, with wide rivers and seas slightly darker by day, and lighter at night. Along the base of the rim walls are regular, triangular shadows of coolness with a darker line at the bottom — the outlines of regularly-spaced gigantic mountains, among the few features not molded into the foundation material. The brightest objects visible in infrared from the farside are perhaps the most bizarre. At the bottoms of the deep oceans (and in a few other locations), there are projecting black radiator fins, narrow and triangular with a myriad of adjustable horizontal flaps, silver above, black below. These may be designed to keep the ocean bottoms cold, to refrigerate simulated polar icelands and arctic tundra, and even to create "seasonal" temperature variations in certain limited regions.

THE STARRY NIGHT SKY OF RINGWORLD

Where the new constellations nightly rise,
Lustrous in the northern skies.

-OVID

To the casual observer, the starry night sky of Ringworld is utterly alien. All the constellations seem totally unfamiliar. There is no Pole Star, and the Big Dipper is gone. From spinward to anti-spinward the celestial sphere is bisected vertically by the luminous slender dashed line of the great Arch, dividing the sky-dome into exact halves. Near the Arch the stars glitter like a swarm of fireflies tangled in a silver braid. The stars of Known Space, very low in the starboard sky to galactic south, are mostly invisible. Of the constellations most prominent in the starboard sky, some are inverted, transposed versions of terrestrial asterisms — intermingled, compressed and grossly-distorted. In the port sky the suns of galactic north form mysterious new patterns whose names and legends are recognized only by Ringworld natives. The constellations shift position much too slowly. Moving nearly ten times less rapidly than in the starry sphere of Earth, they traverse less than six degrees in the course of a single night. The stars travel vertically, parallel to the Arch. Directly to starboard and port they describe tight semicircles above the infinity horizon, like Earth's polar stars viewed from its equator. Few faint stars, and no distant galaxies, are visible because of the glowing Archlight. There are no wandering planets to keep track of; and, of course, there is no Moon. Travelers to Ringworld might feel lost, without a considerable knowledge of astronomy, even as they behold the dazzling alien splendor above.

The distant bubble of Known Space stars covers a patch only fifteen degrees across in the sky of Ringworld, entered on the starboard horizon. It is always difficult to observe, Most of the stars which make up the familiar constellations in the night skies of Earth lie within a thirty-degree-radius circle of the same spot. The sun and other solar-type yellow dwarfs (such as Alpha Centauri or Tau Ceti) are eighth-magnitude objects, far below the level of naked-eye visibility. Binoculars are needed to see them at all! Considerably brighter Sirius-type suns (main sequence A stars) would be just barely detectable to unaided vision — if it weren't for the glowing Archlight and low angle of elevation. Sirius itself is 23 times brighter than Sol, Procyon 7.6 times, Altair 9 times, and Vega 58 times; but they are all dim, unexceptional stars in the sky of Ringworld. Clearly seen near the apparent center of Known Space stars, though, is the luminous bluish giant Achernar ("The Star at the End of the River"), actually 1 20 light years from Earth in roughly the opposite direction. At 650 times solar luminosity, it appears only two magnitudes fainter in Ringworld skies. The topaz star Arcturus ("The Guardian") is only 37 light years from Earth in the approximate direction of Ringworld. Since its true brightness is 115 times that of Sol, it is also a readily-visible object of third magnitude. Brilliant Canopus ("The Great Star of the South"), shines near the apparent border of the bubble of Known Space stars. Even though it is 125 light years distant from Earth it appears only slightly less intense, with an intrinsic luminosity 1,400 times greater than the Sun.

Most of the bright stars tracing the strange constellations of the Ringworld's sky are relatively local Sirius-type suns — with a sprinkling of smaller, closer neighbors. If we look carefully, though, we can identify some familiar celestial faces. The extremely remote, fabulously-luminous blue-white stars of Orion (B supergiants) are remarkably unchanged in apparent brightness. The outlines of the Giant Swordsman remain incongruously undistorted transposed from the sky of Earth, except for a disturbing shift in the position of Betelgeuse. Also called Borgil, Betelgeuse (pronounced "beetle juice") is a huge M supergiant, a red-orange sapphire star whose luminosity changes from 7,600 suns to over 14,000 in a six-UNS-year cycle. Six of the well-known stars in the Big Dipper (Ursa Major, the Great Bear) lie roughly between one-third and one-half the way to Ringworld. Only moderately changed in brightness, the asterism appears grotesquely reversed and deformed, though well-placed in the starboard sky. The seventh star of the Big Dipper, Alkaid, is one of the most brilliant in the heavens of Ringworld. Just 75 light years distant, the B3 V star (sometimes called Benetnasch) emits 630 times more radiation than the sun. Only two stars in the sky of Earth, Sirius and Canopus, outshine Alkaid as it is seen in Ringworld skies. The brilliant helium-type star Spica marks the constellation Virgo in the terrestrial zodiac, representing Isis, Ishtar, "the Queen of the Stars," or the "Mother Goddess of the Harvest," in various cultures. Several times closer to Ringworld than Earth, she is among the most conspicuous to Arch-dwellers, with her intrinsic output of 2300 suns. Also gleaming distinctly is Regulus ("The Heart of the Royal Lion"), a first-magnitude star projected into the Known Space patch. Seen in Leo on Earth, Regulus is 84 light years in the general direction of Ringworld, 160 times brighter than Sol.

Very distant extremely luminous stellar beacons such as Deneb and Antares look much the same as they do on Earth. Antares is a huge fiery vermilion star much like Betelgeuse, with an average brilliance of 9,000 suns. It is called "Heart of the Scorpion" or the "King of Lightning," and is also known as "The Fire Star of the Azure Dragon." Antares is located 520 light years from Ringworld, near the Arch in the starboard sky. Deneb is a blue-white supergiant, seen from Earth in the constellation Cygnus, or Northern Cross. In ancient times it represented "The Tail of the Roc" and was also referred to as "The Hindmost" in Arabic. At a distance of more than 1,600 light years along the galactic plane its luminosity of nearly 60,000 suns makes it a first-magnitude star in the stellar canopy of Ringworld, very near the starboard edge of the Arch. Rigel, in Orion, is similar to Deneb and also plainly visible.

Certain red giants are more conspicuous in Ringworld skies than Earth's, among them Ras Algethi and La Superba. Both stars have a deep crimson color and vary significantly in brightness. La Superba is a carbon star whose intensity changes by a factor of four over a period of 160 days. Also known as Y Canum, La Superba is half as far from Ringworld as from Earth. Ras Algethi (Alpha Herculis) is considerably more distant, but with a maximum luminosity of 850 suns it is easily seen from Ringworld. The star has been called "Throne of the Emperor" and "Head of the Kneeling Phantom," and was associated with Gilgamesh and Nimrod in terrestrial antiquity. One red giant well-known to most star-gazers, Mira, is two magnitudes fainter from Ringworld.

Polaris shines only moderately brighter than seen from Earth. Near the Arch in the starboard sky, it no longer marks any particularly-important direction. There are some interesting positional transpositions, though. Cor Caroli, for instance, is a beautiful twin-star system located roughly halfway between Ringworld and Known Space, almost along a direct line. Its remarkable lilac and copper suns appear equally bright in both skies, but their apparent position shifts nearly 1 80 degrees. Both of the familiar star-clusters the Hyades and the Pleiades are fainter and more compact seen from Ringworld. In fact many of the rich stellar associations along the galactic plane are distributed unevenly, compressed into the starboard sky, far below the Ring. The thin central band of the Milky Way is always hidden by the Arch, but the great star-clouds of Sagittarius and Scorpius spill around its edges several degrees to either side. Naturally, the remote globular clusters in our galaxy *appear* in the same directions from Ringworld as from Earth, though they are difficult to observe.

Astronomy is different on Ringworld. One revolution of the celestial sphere with respect to the sun takes just $7_{1/2}$ thirty-hour days instead of a UNS year. Parallax measurements, which give the distance of nearby stars are correspondingly easier. Tracking for long-exposure spectrography is easier, without the rapid sky-motion of a 24-hour rotation cycle. Solar astronomy is made very convenient, with night-long eclipses by the shadow-squares. Studies of distant regions of the Arch itself no doubt consume the energies of many Ring astronomers. The Ringworld's surface area of three million earthlike planets provides ample opportunity for specialization and endless cataloguing. On the theory that sentient life may have arisen elsewhere on the Arch, scientists have even attempted (and sometimes succeeded) establishing two-way communications using microwave telescopes and tight-beam optical links. Unfortunately, observations of faint stars and external galaxies are hampered by the Archlight, which changes only a little in any given direction over the course of a night. Studies of the very core of the Milky Way galaxy are not possible, since the Ring always occludes it. Tiny meteoroids naturally are ignored by the meteor defense system. They burn fiercely, often exploding in intense horizontal streaks far above the Ring floor, vaporizing high in the stratosphere. There are no periodic comets like Halley's but once in a great while a fresh rogue comet does fall into the inner Ringworld system from a distant Oort cloud. Then the heavens blaze, first with the growing splendor of the celestial visitor, and finally with its incandescent annihilation!

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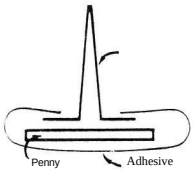
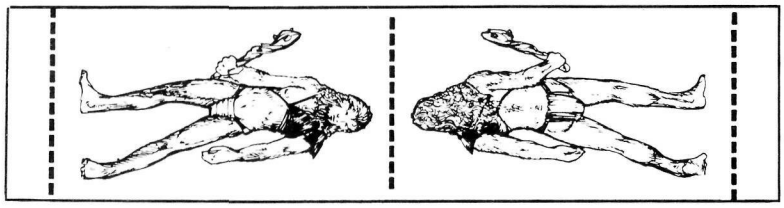
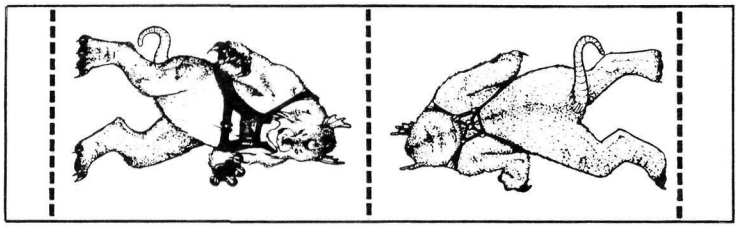
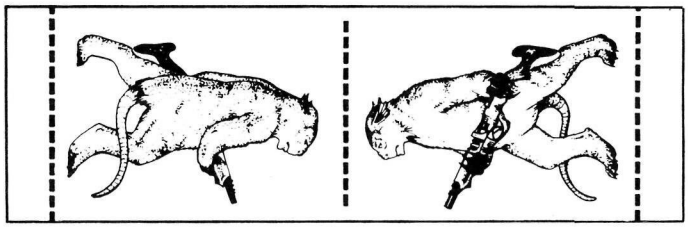
EXPLORER FIGURES

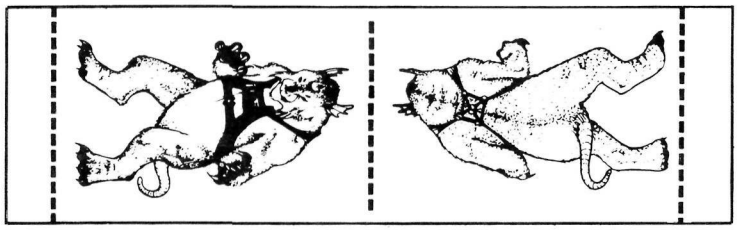


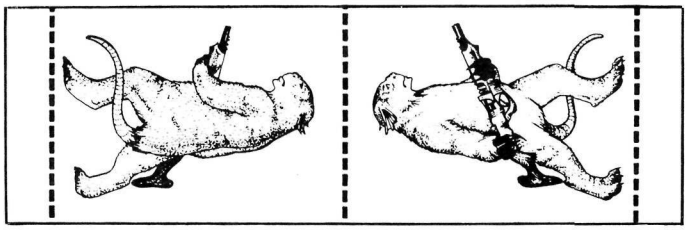
Cut out the figures on the solid lines, then fold each figure on the dotted lines according to the diagram. Tape each figure to a penny or a button for stability, as shown on the diagram. To differentiate otherwise identical figures, color them in with colored pencils.

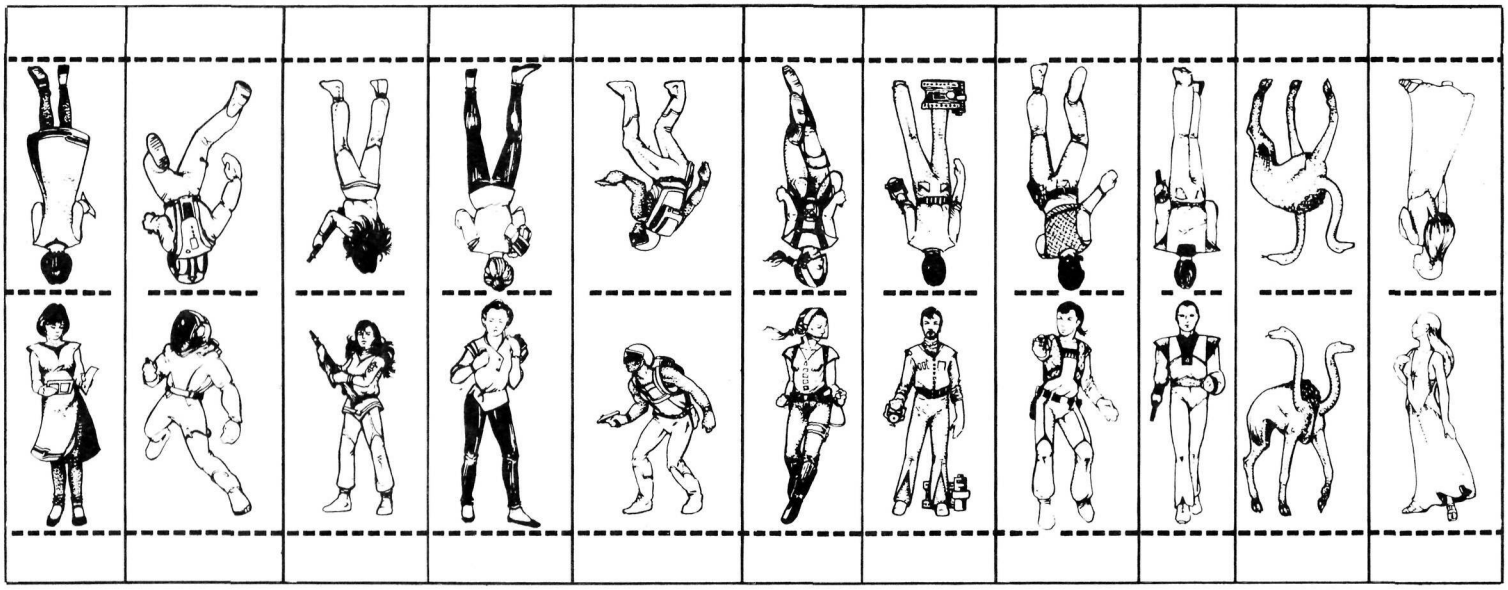


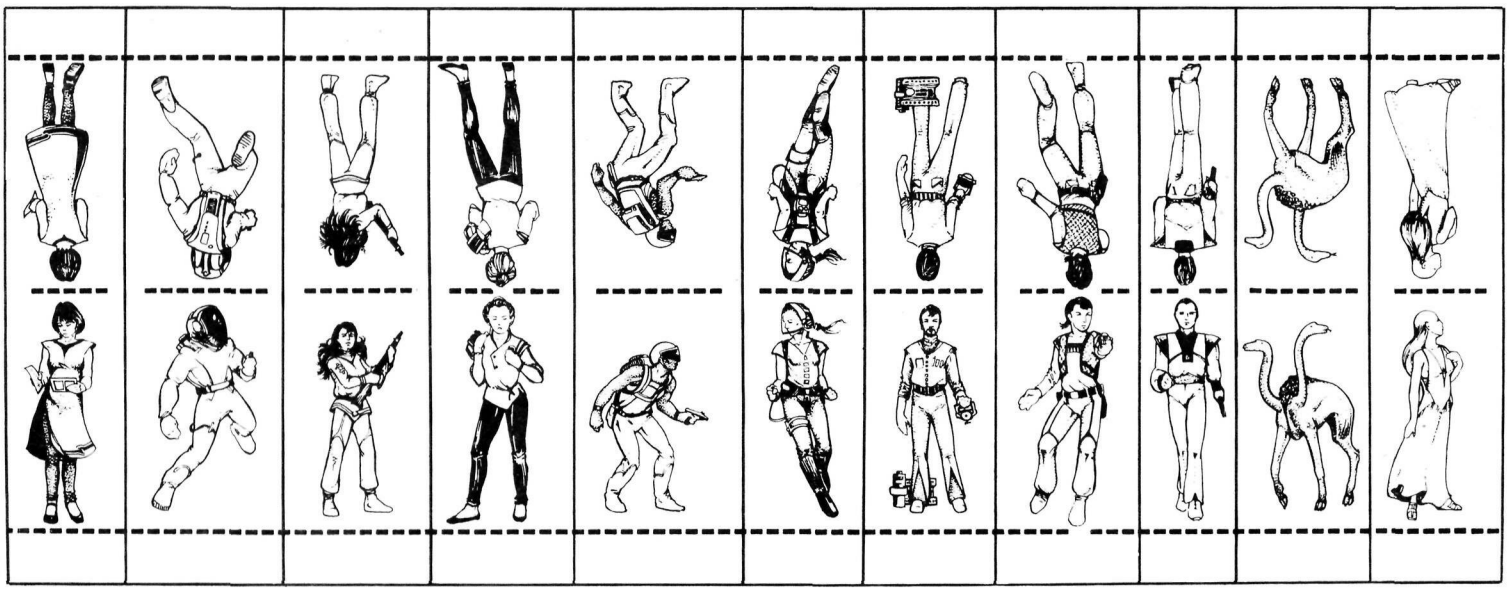












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A Ringworld Supplement;

JOHN HEWITT — *narrative portions for Boat People, Eaters, Forest Fishers, Grazers, Hill People, Night Hunters, Runners, Shell People, Spill Mountain Folk, Wind Walkers, Martians, Orcas, Pierin, Sperm Whales, Thrintun, and Tnuctipun; Archmasters; narrative portions for the Anx-aoma, Bloath, Bushcanker, Chiller, Daukoon, Dire, Dusk Devil, Goron, Greldik, Jibber, Loper, Munil, Onik, Pilk, Snorter, Stigfish, Trembler, Varmot, and all plants; Hyperspace Boundaries and Singularities; technical background and concept art for the Ringworld Schematic, Great Oval Ocean, Hyperspace Boundaries for Selected Stars, Distance-Time Comparison Table, Relative Positions of Selected Human Space Stars, Selected Human Systems and Governments; Evolution of Selected Species diagram; illustrations of Pierin, City Builder Ramship; Leaving for Ringworld; contributions to Human Space Technical Items and Ringworld Vehicles.*

LYNN WILLIS — *general editorial and coordination; Base Chances for New Hominids and Aliens; Ringworld Errata; Copter, Herocycle, Mapper Box, Beamer Caddy, Restraint Field, Rocket; additional description for UNSS Calatorie de Soare; expansion of Agamans description, Air Still, Voicebox, Heretical Saddle, Gansdedge, The Sand Eaters scenario; expansion of the Kaladians scenario; scenario maps; book cover; additional design, layout, and typesetting.*

GREG STAFFORD - *majority of the Kaladians scenario.*

SHERMAN KAHN — *additional editorial and coordination; Introduction;statistics for Ringworld hominids and aliens; Chemkit, Microcube Suit (with John Hewitt), Scanner, Searchbeam, Sleepset, Spy Beam, Stasis Shield, Tri-Dee Receiver, and Tri-Dee Transmitter; first draft of hyperspace article; Balloon Tram, Dirigible, Hydrofoil, Hydrogen-Jet Fighter, Scrith Repulser Lift Pack, Skysled, and Steam Yacht; most diagrams; majority of layout; additional typesetting.*

CHARLIE KRANK — *revised explorer sheet front and back; description and plan of the UNSS Calatorie de Soare; the 5040 Van.*

SANDY PETERSEN — *statistics for Ringworld animals, Text for Haemont, Rimspinner, Vindwight and contributions to several other animals; Original Agamans description, heavers, Agamans Heavy Gun, Bi-Runner, Fabron, Flywheel Power, Jet Rifle, Land-Ruler, and NAX Gun;helpful comments and insights.*

LISA FREE — *cover painting; illustrations on pages 10, 14, 15, 50, 55, and 66.*

MIKE BLUM - *Illustration on page 34.*

THERESA GRIFFIN SAVOY —*majority of typesetting; additional proofreading and editing.*

RUDY KRAFT — *contributions to Chiller, Daukoon, Dire, and several other animals.*

STEVE PERRIN -*proofreading, helpful comments.*

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Introduction

In this book are two full-length scenarios, eleven new hominids, six new aliens, twenty-one new animals, a page of plant descriptions, new Human Space and Ringworld technical items, game errata, and more.

For gamemasters who build their own scenarios, a new UN survey starship is provided, specially outfitted for long-range exploration. The dangers of hyperspace are further quantified, and a set of formulas by stellar class allow computation of any hyperspace boundary.

To aid players who create Ringworld natives as explorers, an entirely new explorer sheet is included with blanks in which base skills percentages can be entered to fit the species to be played. (The reorganized back incidentally allows explorers to have 30 general hit points.) Permission is of course granted to photocopy the explorer sheet front and back for personal use.

If all of its original material had been included, the cost of the *Ringworld* game would have been astronomical. We were forced to sift the text, choosing those entries most directly connected to Ringworld and those entries best explaining the relation of Known Space explorers to that fabulous structure. A lot got chopped. Most of it appears here: it is as authoritative as anything in the boxed game. View the *Companion* as a fifth book for *Ringworld,* the inclusion of which would have driven the game's price into hyperspace.

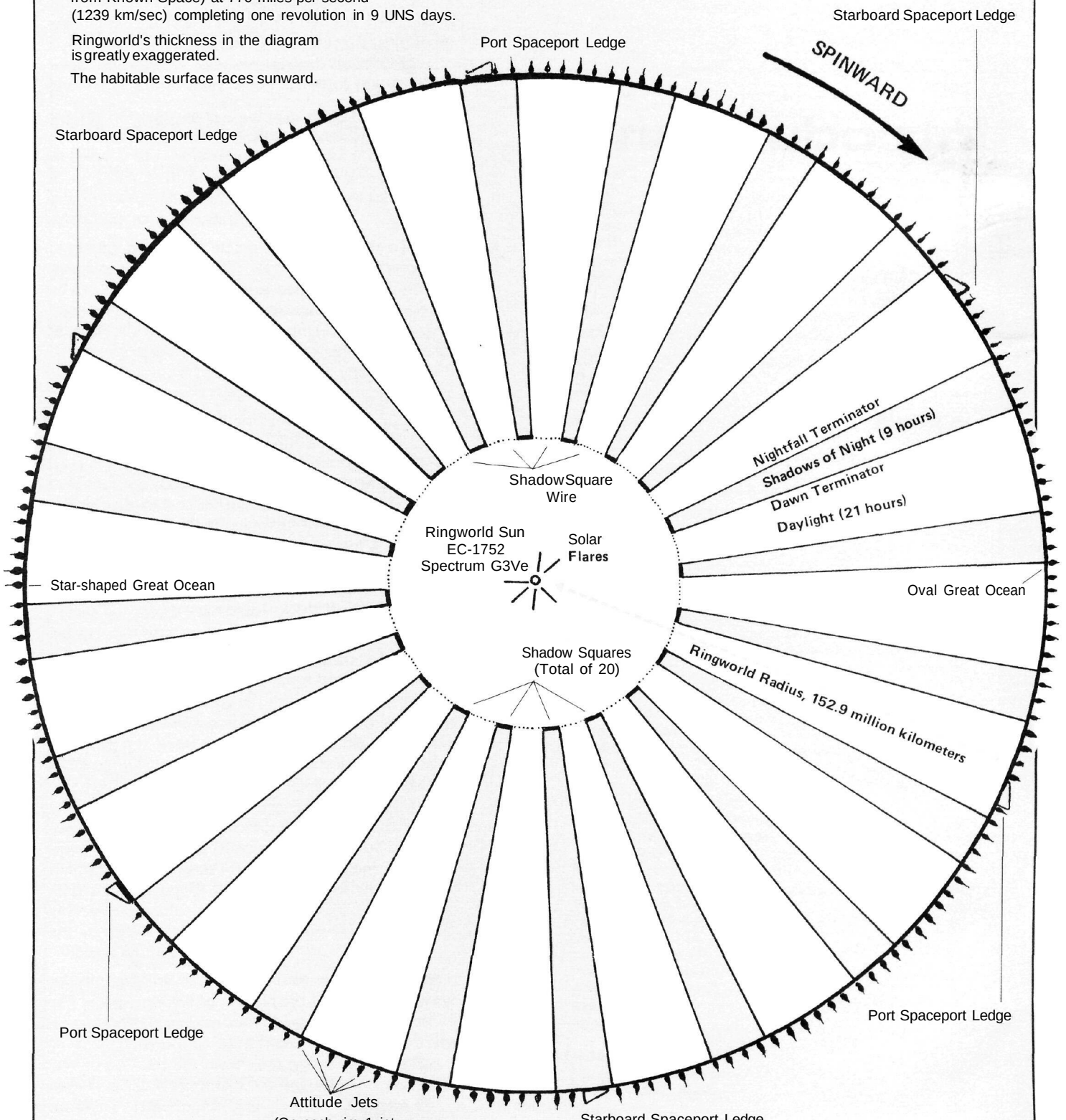
Extensive, well-thought-out submissions for further Ringworld supplements are invited. Scenarios probably will meet with the greatest acceptance, but new hominid or alien species may also be of interest. Use the Agamans section in this book as a guide for the presentation of new intelligent species: an essay covering physiology and culture provides the background for a scenario in which the explorers are introduced to the species; technical items (which may include domesticated animals) give additional background and at the same time position the Agamans within the technical strata of Ringworld. Should a species be widespread, and have cultures of varying technical levels, give technical items used by the species in the scenario.

Much effort has been devoted to bridging physics as we know it and the physics of Known Space. The links that have been published (such as the hyperspace article in this book) must be followed. Nascent authors should shy away from the creation of new physical principles, but interesting new devices based on established principles will find eager reception.

If you intend to create Ringworld material for Chaosium, be sure to write a note or letter of inquiry: someone else may already be working on what you have just thought up. The note of interest in reply will include more detailed manuscript guidelines.

— Sherman Kahn
Lynn Willis

RINGWORLD SCHEMATIC



Note — The elevation in the Ringworld sky of a distant location on the Ring can be determined from this diagram with the use of a protractor.

Ringworld Hominids

BOAT PEOPLE

Many Ringworlders build or use diverse nautical craft in a variety of ways. Across the vast habitable surface of the Ring, the large-scale distribution of seas, lakes, and river-systems is relatively uniform. Shorelines everywhere seem to have been contoured for the convenience of boats and shipping. The depth of the waterways and freshwater oceans seldom exceeds 9-10 meters [about 30 feet] , though, so the biggest vessels all tend to be flat-bottomed and broad of beam.

One hominid species is widely-known for its ancient biological affiliation with seafaring and navigation. The Boat People (also called "Blues") always live on the water — never in and never around it. They are often highly-skilled mariners, naval warriors, shipwrights, and marine farmers who take much pride in their specialized modes of existence. Usually they do not like to swim, and are not well-adapted for it. To them a river is a highway, and a shallow sea is like a wide expanse of rich, fertile soil, and what land-dwellers enjoy crawling through the dirt of their fields?

The Boat People are heirs to a proud cultural tradition, the origins of which are lost in antiquity. Their myths tell of a dim age when their civilization, centered on the Great Oval Ocean, was more powerful than any save the Engineers'. Only in the saltwater Great Oceans are the depths and distances truly profound. There are tales of a once-fabulous floating-island megalopolis called *Violet Four,* surrounded by several million square kilometers of bountiful sea-farm polytopes. According to the legends, Violet Four was attacked and destroyed by hordes of fierce demons who arrived riding on the back of a gigantic ocean-monster. There was a furious battle. The ocean city was finally swallowed beneath the waves — drowning the plague of evil marauders as it sank. Many Blues believe they may live to see Violet Four rise again. Other hominids hear out these tales with varying degrees of patience, awe, or amusement.

Appearance and Activities

Boat People are distinguished by (or are marked with) what is termed the "blue gene" trait. Their heights range considerably, from 1.2 to 2.2 meters [about 4-7 feet] , and their body structure and physiognomy does as well, but their skin pigmentation is invariably blue, and their hair is always some shade of green. Sometimes their skin color is a deep, rich navy blue, and sometimes a fine fragile ivory blue, like china. The hair typically is a dark kelp-green, thick but usually kept well-trimmed. Intense pearly-grey eyes are the rule, though black and midnight-blue are also seen. The ears are often prominent, with crenelated or scalloped rims. The mouth is a slim, stark gash reminiscent of the City Builders', but a diverse spectrum of blue lips tends to relieve the impression of severity. There is almost always a sixth finger and toe. Webbed feet or hands are uncommon, and considered unsightly deformities. Otherwise, the physiognomy shows diverse humanoid influences. Their great genetic variability allows them to interbreed successfully with a surprising number of other hominid species — but the blue gene is dominant and the offspring are usually clearly recognizable as Boat People. They hold their conspicuous heritage in high regard, boasting that the Engineers raised the Arch for them, to keep the seas filled and the blue rivers of the world flowing. There is some indication, however, that the Boat People forebears merely had been genetically color-coded for occupational skill or social function within some ancient civilization long since vanished. Among present-day Blues, however, any such suggestion would be considered incredibly offensive.

In habits and habitats, the Boat People are as varied and adaptable as in their physical features. Their homes are always on the water, and they seldom feel at all safe on dry land. But otherwise they may be encountered anywhere, as ocean-crossing adventurers, shore-hopping traders, ferry operators, shipwrights, sea-farmers, bay fishers, and river wanderers. Many Blues preferring permanent, secure anchorages associated themselves with the seaports of the City Builders, in the days of their rule on Ringworld. Many others — the traders, for example — feel unfulfilled and useless unless they are traveling somewhere along the waterways. In general, they are quite independent, showing little interest in City Builder past glories.

The sea-farmers array their ships (some as long as 100 meters) in triangular, circular, hexagonal, and more complex geometric patterns, connected by floating bridges. From 3-300 such ships may trace out a single sea-farm. The enclosed area, sometimes including an island or big barge, is divided up with netting and fences to create water-pens for a variety of aquatic plants, fish, and animals. Shellfish are raised in tray-beds suspended below the ships themselves. Elsewhere, Boat People cultures may trade, work, or hunt ashore during the day, keeping herds or even tending cultivated lands; but always they retreat to the safety of their moored villages at night. Occasionally, Blues are pirates and raiders.

Some groups of river Boat People live tens of millions of kilometers from the Great Oval Ocean, in smaller freshwater lakes and seas. Often they operate ferry-boat services across larger bodies of water. Many of these distant cousins believe in the continued existence of their lost Violet Four, pointing with pride toward the Ocean on the Arch in the Ringworld sky. Rarely, they have ancient maps of water-passages leading back around the Ring to floating-island cities, if not as far as to the Ocean itself. Boat People are skilled navigators. They can often pinpoint their location rather precisely by observing the exact shape of the sides of the Arch, and the elevation of the Great Ocean upon it.

Boat People Water Craft

The size and sophistication of their seacraft varies with the particular Boat People culture. In the upland rivers and lakes, there is seldom anything more advanced than a collection of durable utility-sized feluccas, dories with centerboards, half-decked sailing skiffs, square-ended junks, round-bottomed fishing boats, and house-barges. In major waterways, there are often traders, ferries, big catamarans, and river freighters with shallow hulls and high coaming. The Blues' distinctive flat-bottomed caravels and brigantines also ply the rivers between the larger seas. Sail and oar are used traditionally as motive power, while alcohol, methane, and hydrogen-powered boats are frequently found in more developed regions. One type of propeller-driven wind-boat is said to be capable of crossing even the swamps. In the larger oceans and bays, much bigger ships occasionally may be glimpsed. Some of these have MAGLEV repulsor units or hydrogen-floatation engines with independent power supplies unaffected by the superconductor plague. Such advanced craft at times appear overloaded and incongruously unseaworthy — but appearances can often be deceiving.

BOATPEOPLE (Blues)

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6	10-11	R Leg	0/8
CON	3D6	10-11	L Leg	0/8
MAS	2D10+3	14	Abdomen	0/8
INT	2D6+6	13	Chest	0/9
POW	3D6	10-11	R Arm	0/7
DEX	3D6	10-11	L Arm	0/7
APP	3D6	10-11	Head	0/8
EDU	negligible			

Age: 1D4 on age table
Average HP: 25
Speed: 3m/im
Action Ranking: 5

ARMOR: No natural armor. Blues seldom wear armor because it restricts swimming. Use the standard hominid hit location chart for Blues.

WEAPONS: Blues are found with weapons ranging from archaic to most sophisticated. As a general rule, the closer Blues are to existing City Builder enclaves, the more sophisticated will be their weaponry. Many Blues still use or affect the primitive warscoop.

Weapon	*Attack*	*Damage*	*Parry*
Warscoop	40%	1D8+3	40%

COMMON SKILLS: Aquatic Vehicle 80%, Archaic Melee Weapon 40%, Archaic Ranged Weapon 40%, Astronomy/Applied 40%, Bargain 50%, Biology/ Aquatic 20%, Botany/Aquatic 20%, Engineering 20%, Farming 45%, Handgun (projectile) 20%, various local Ringworld Languages 40%, Observation 30%, Orate 60%, Repair 60%, Weapons System 20% (if near City Builders).

EATERS

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	2D6+6	13	R Leg	3/8
MAS	3D6	10-11	L Leg	3/8
CON	2D6+6	13	Abdomen	3/8
INT	2D6+5	12	Chest	3/9
POW	3D6	10-11	R Arm	3/6
DEX	2D6+10	17	L Arm	3/6
APP	2D6+2	9	Head	3/8
EDU	negligible			

Age: 1D4 on age table
Average HP: 24
Speed: 4m/im
Action Ranking: 3

ARMOR: Their thick fur gives Eaters 1 point of natural armor. Often they wear treated leather armor made from animal pelts (including those of Grazers) worth 2 extra points. Roll Eater hit locations using the standard hominid hit location chart.

WEAPONS: Eaters are masters of missile weapons and archaic traps. They rarely carry anything more sophisticated than grazer-bone longbows. Eaters have sharp claws and can attack with them in hand-to-hand combat. The base percentage for using these claws for a beginning Eater is 35%. Eaters can (but seldom do) bite at a base percentage of 30% for 1 D4 damage.

Weapon	*Attack*	*Damage*
Longbow	80%	1D10+1
Claw	60%	1D6

COMMON SKILLS: Archaic Melee Weapon 80%, Archaic Ranged Weapon 80%, Athletics/Climb 60%, Athletics/Swim 40%, Emergency Treatment 40%, Hide 80%, local Languages 40%, Musicianship 20%, Observation 60%, Scent 40%, Sneak 80%, Strategy 40%, Track 40%.

That fraction of ships and boats with advanced-technology motors is very small, and they are concentrated mainly in the major seas and the Great Ocean. Most of the MAG-LEV craft must be sailed (or towed) to the big floating shipyards or island-cities for periodic recharging. The Boat People have a strict rule that sophisticated vessels must never be taken out of the water, because in the past many ceased to function when exposed to dry air, even for brief periods. The time of the Fall of Cities is remembered as an object-lesson in becoming over-dependent on land-dwellers. In many areas, the alliance was disastrous, because nearly all the floating ports built with City Builder technology sank without warning when the power failed. For this costly lapse in judgment, the Boat People blame only themselves. The big floating cities presently at the hub of Blue civilization use solar-electric repulsor-nets and slow-fusion hydrothermal plants from a much earlier epoch; while most of the lesser aquatic centers rely solely on mechanical buoyancy techniques. Occasionally, on the Great Ocean, submersible craft are outfitted to search for artifacts in sunken island acropolises.

Meeting Boat People

Boat People are generally courteous and friendly, but they prefer to be hospitable on their own terms — on the water. Rishathra is common only among groups preserving strong alliances with City Builder enclaves, and is elsewhere rare. Like the Machine People, Blues integrate many hominid species into their commercial activities and employ certain races extensively in specific industries. Their relationship with Sea People is usually cordial, except in remote areas of tough competition for limited resources. They detest Vampires, but claim to be mostly immune to the pheromones of all but the legendary salt-water variety. Boat People are not subject to scrutiny by the Ghouls, and bury their dead at sea. The social organization of Blue cultures ranges from loose associations of backwater gypsies to disciplined, almost military, hierarchies of command in the marine metropolises. Customary water sports include rowing and sailing competitions. The traditional archaic weapon of the Boat People is known as the warscoop or fighting-spoon (Interworld translation of City Builder phrase) — an enlarged razor-sharp version of a hand implement usedinharvestingmarinemolluscs.

EATERS

An omnivorous, predatory species, Eaters superficially resemble the herbivorous Grazers. The two races are in fact close biological relatives. They evolved together in the damp bogs, lowland marshes, and silted bays of Ringworld as its idealized ecosystems deteriorated. In many regions, Eaters and Grazers are still subspecies similar enough to produce half-breed progeny, though often these results are sterile and sometimes deformed. Their cultural lines diverged long ago, and Grazer and Eater have since become implacable foes; such matings have little significance.

The Eaters once were low-caste Grazers. They had become expert trappers, guarding the perimeters of primitive Grazer bog-farms in the unremembered past. They began trapping Grazers, however, and from that epoch to the Ringworld era Grazer-meat has remained a preferred food. Eaters may attack Grazers without provocation even when there is no hunger, because of the ancient, irreconcilable enmity between their species. Technologically-advanced Grazer cultures frequently support organized, on-going Eater extermination programs; the mutual antagonism is systematically sustained. When captured, Eaters are often enslaved. When killed, their bodies are hung in the bog-farms as fertilizer.

Light coats of slick fur entirely cover the Eaters. On their heads and feet the fur is thick and bright red, but everywhere else it is neutral gray and thinner. Eaters are excellent swimmers, preferring to spend much of their time in or near the water. They keep their coats meticulously oiled and scented, using refined animal fats and natural secretions. Their faces are more angular and flat than the Grazers'; and they have numerous small, dagger-like teeth. Eaters have small pointed ears and relatively large, orange eyes set wide apart, facing forward. Their night vision is very good, and their sense of smell is particularly acute. Male and female Eaters are the same size, averaging 1.7 meters tall. Both sexes have powerful hands with bright red nails as tough as claws, tapering to sharp points. They run faster and swim more swiftly than most modern Grazers. In diet, habitat, and physical vigor the Eaters are a bit like the African water-mongoose.

Among themselves, Eaters are gregarious and fairly-peaceful. Most have a fiery temperament, though, which can spark brief conflicts over important issues such as the distribution of Grazer-meat. As a species, Eaters are wary and rather reclusive. They show hostility toward anyone smelling of Grazer bog-farms or cities, but they attack other hominids only if they are starving or if left no other choice. Eaters are seldom friendly to strangers: attempts to destroy or invade their swamplands are likely to be met with furious guerilla resistance. They automatically dislike and distrust herbivores, but omnivores and carnivores may earn their respect by skilled trapping and hunting. They do not do rishathra with outsiders. Their keen sense of smell enables them to detect Vampire scent from a considerable distance, and they are one of the few species only moderately affected by it. At the borders of their territory, where the water is fresh, Eaters sometimes hunt Vampires, and may be employed to track them. Eater tribes often migrate along riverbanks, and occasionally must travel long distances overland to reach new marsh habitats.

Mechanistic cultures are only rarely developed by Eaters. In general their intelligence has remained somewhat less than average for sentient Ringworld hominids. They are most likely to be encountered in their native swamps and marshes, or on the fringes of large Grazer civilizations and enclaves. Occasionally, Eater males take female Grazers as captive mates (and emergency food sources) — a practice guaranteed to enrage Grazers and draw them pell-mell into the swamps. A few such forced marriages actually last, but the couple is then cast out and permanently exiled from both cultures.

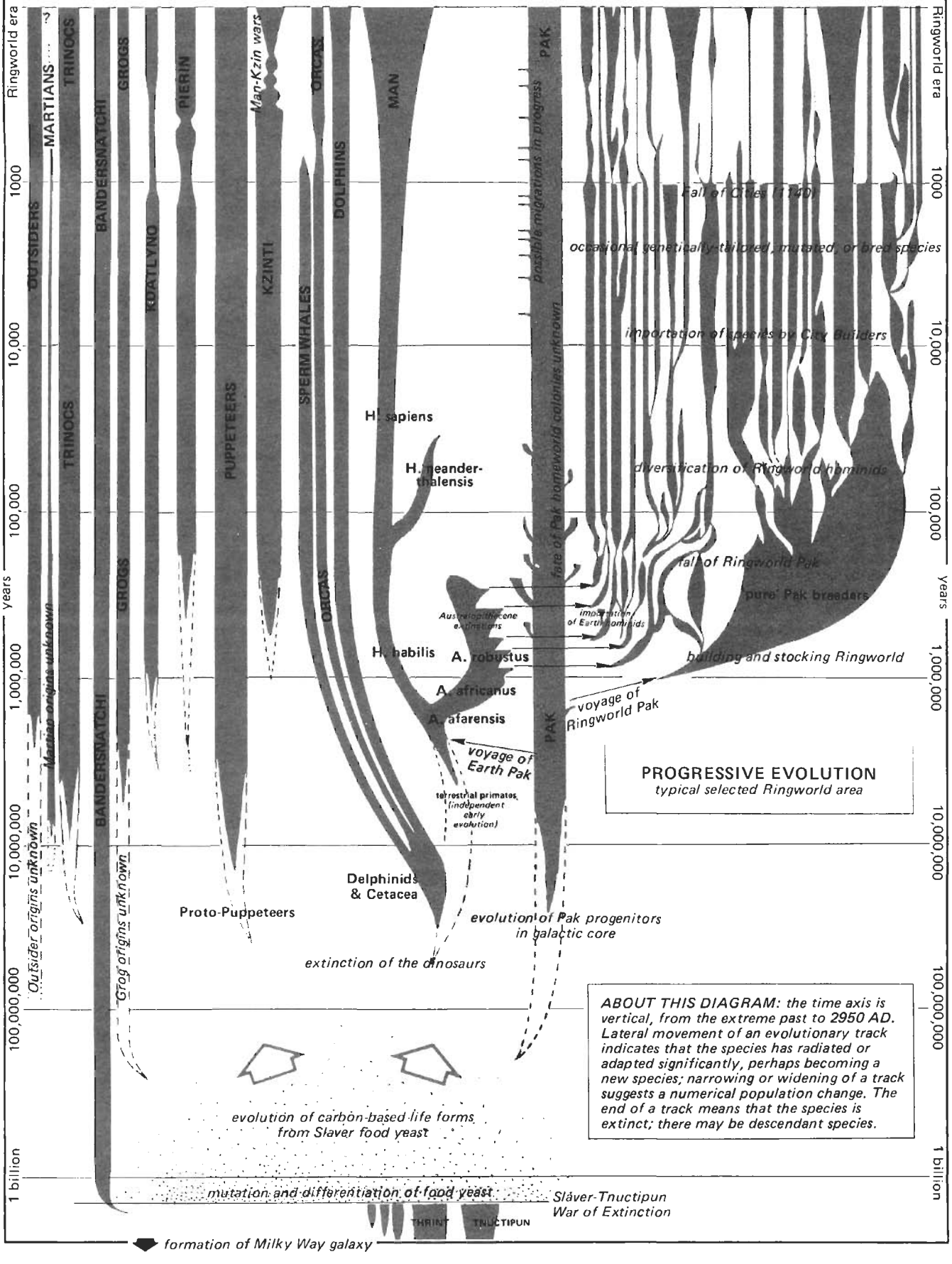
Young Eaters can alter their appearance convincingly enough to pass briefly as Grazers, infiltrate their cities, and steal technological items. Sometimes their permanent mates are determined by the status achieved on such a foray. The cleverest have the best chance of surviving such a mission; quests of this nature are now undertaken by Eater youths as rites-of-passage in many regions. Relatively powerful cultures occasionally have been prompted by fortuitous or inspired thefts, but in general Eater social progress has been painfully slow.

FOREST FISHERS

Forest Fishers are a species of big, tree-living hominids with limited psionic abilities. Sometimes they are called "People of the Woods." The term hominid is applied to many anthropoid species different enough from the advanced hominid races to require a distinct genus classification.

The Forest Fishers are completely arboreal, living among the branches of trees, preferring those with thick limbs overhanging streams and lakes. Only rarely are they obliged to descend to the forest floor to reach distant trees. On level ground, their gait is awkward because of the unequal length of their arms and legs, and because of the elongated conformation of their feet. Though generally slow and deliber-

Evolution of Selected Species



ate in their movements, they can, if necessary, travel rapidly along the branches, sometimes using their mass to sway the boughs in crossing larger gaps. Forest Fishers are too heavy to brachiate easily. They are big-brained, but the mid-lobes are more highly-developed than the cognitive frontal volumes. Over the ages they have achieved equilibrium with their environment. They have never suffered from the common hominid compulsion to master all they survey.

Forest Fishers may reach lengths of more than two meters, massing over 200 kilograms. Their build is muscular, their strength considerable. The larger adults are naturally confined to the biggest trees. They move about less frequently, but with more confidence. Their coarse, shaggy hair ranges in color from deep brown to bright reddish-orange. The arms are long enough so that, in an upright posture, a Forest Fisher can rest on its bent knuckles. The fingers and toes all have one extra joint. The middle three are twice the length of any human's, but the fourth finger and thumb remain conveniently opposable. They can thus hang using the middle fingers while simultaneously maintaining a precise grasp on another object with the same hand. The feet are similarly constructed but are as long as the calves of the short legs. There are tough, curled claws with a hollow triangular cross-section.

The faces of the young are remarkably human in appearance, but the adults all have broad, flattened, wrinkled features overlaying much fibrous tissue. An oval collar of shaggy mane and beardhaloesthe face, and the males have big, drooping mustaches. The eyes are languid pools of gold surrounding deep green pupils, set moderately close together. The nose does not protrude but the nostrils are prominent. The mouth is wide, the jaw big and rounded; the teeth are unimpressive, except for slicing-bicuspid pairs. Forest Fishers do not look threatening, despite their powerful bulk, primarily because their facial expression resembles a smile of contentment, or to some, of idiocy.

Psionic Abilities

Most Forest Fishers do not have to work very hard to get by, because of a remarkable psionic gift. They are teletropes, able to project a psionic lure into the space below them, usually a stream. They are omnivorous, but they prefer to eat certain species of stigfish, or certain forest animals which taste (to them) like stigfish. Their normal mode of hunting involves dangling a hook and line from the limb of a sturdy tree overhanging the stream. The hook is generally one of their own claws, polished, and baited with an insect or brightberry. Stretch-vine and braided hair usually make up the line, which is threaded through the claw. More advanced angling equipment is rarely used, although portions of streams are sometimes blocked off so that fish populations must remain within them. When hungry, a Forest Fisher projects the concept "food" into the water. The primitive stigfish brains receive and interpret the psionic-lure signal as "food—this way." They are attracted by teletropic suggestion to the hook in the water and, eventually, one of them takes the bait. This trick works almost as well on land with some species of zongo and fosdiks which inhabit the forests and swamps. Substantial nooses, hooks, and nets are used to catch and to haul up animals attracted by the psionic lure. In the trees, there are usually platforms constructed of boughs, acting as fishing-spots, communal areas, and sleeping-places.

The Forest Fishers are good mood sensors. Among themselves, psionic communication is very effective for most purposes. Complex waves of telesthesia are slowly passed back and forth around the community in a characteristic mode of expression. Each individual adds, subtracts, or changes a bit of the mood-concert as the afternoon progresses. Thus a peculiar art-form of communal emotion fills much of the leisure time afforded by the psionic fishing-lure; they are not driven by need or boredom to create advanced technology. The Forest Fishers can apply their ability as efficient teletropes only to a handful of species; they cannot survive comfortably very far from their nearly-symbiotic food animals They are not telepaths, after all. Their ability to sense the emotions of hominids entering the forest is limited, though often accurate. Still, they interpret what they read according to their own mood-structures and traditions. They may sometimes react strongly, collectively, to an intrusion, projecting back concepts such as "fear," "dread," "flee," "come no further," "stop feeling," or simply "stop." When no danger is present, they occasionally enjoy psionic mischief with outsiders, distracting them for a moment to steal some interesting article, or even convincing them to run away, leaving all their possessions.

Forest Fishers are not animals, nor are they human. They have a substantial ability that includes intelligence, but does not emphasize analytical thought. They do not build cities, but sometimes they allow themselves to be taken to cities by hominids with fascinating psionic mood-structures. So long as they do not have to exert themselves to get food, and as long as they have not been removed forcibly from their community, they can stand strange environments for months at a time. Learning to communicate with Forest Fishers through spoken language is possible, but difficult, since they are usually silent. Sometimes it is worth the effort. Unwary hominids should take care if they contemplate capturing Forest Fishers for study, since entire communities have been known to charge to the rescue of single individuals held even considerable distances away from the trees of home.

GRAZERS

The gradual development of silted-up bays, swamps, and river deltas on Ringworld led to the rise of the Grazers. They are an herbivorous species markedly preferring certain freshwater plants; it is unknown if this preference is a true biological dependence. They cannot tolerate arid environments. In their elemental state they live only in very damp lowlands, foraging and gathering in the marshes. Although they are not amphibious, they are adept swimmers capable of holding their breath underwater for as much as ten minutes. Grazer agriculture is based uniquely on the swamp-farm, a distinctive pattern of specialized aquatic agriculture found uniquely in all Grazer cultures. No matter how far removed culturally or by distance from their native swamps, Grazer societies always incorporate extensive artificial farm-bogs as a central focus of their environment. Traditional rituals often accompany their cultivation, processing, and consumption of certain marsh plants.

FOREST FISHERS

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	4D6	14	R Leg	1/10
MAS	2D6+12	19	L Leg	1/10
CON	4D6	14	Abdomen	1/10
INT	3D6	10-11	Chest	1/12
POW	3D6+6	16-17	R Arm	1/9
DEX	2D6+2	9	L Arm	1/9
APP	2D6	7	Head	1/10
EDU	negligible			

Age: 1D6 on age table
Average HP: 33
Speed: 2m/im
Action Ranking: 5

ARMOR: 1-pt skin. Forest Fishers do not wear armor. Make hit location rolls using the standard hominid hit location chart.

WEAPONS: Due to their psionic ability, Forest Fishers rarely use physical weapons other than their claws. They have a base chance of 40% to hit with their claws.

Weapon	*Attack*	*Damage*
Claw	60%	1D4+1D6

COMMON SKILLS: Athletics/Climb 100%.

PSIONIC ABILITY: All Forest Fishers are teletropes, able to project a psionic emotional lure. This is usually used to attract small creatures within their reach, to be used as food. They can implant emotional responses (e.g., fear, comfort) in intelligent creatures also, but Forest Fishers rarely eat anything larger than MAS 3.

To successfully lure or implant emotions in a target, a Forest Fisher's player must make a successful POW versus POW roll on the resistance table. If the roll succeeds, the victim is overcome by the projected emotion; he will run, stand in place or do whatever is appropriate.

Forest Fishers can use their psionic ability as a community. When this is done, the gamemaster should calculate the average POW for the community (usually 16 or 17), then add 1 point for each 10 Forest Fishers who are projecting. This number multiplied by ten is the effective projection range in meters for the community. The Forest Fishers can affect one target for every member of their community projecting, and all targets are affected by the community's average POW. Each target should resist separately.

GRAZERS

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6	10-11	R Leg	1/6
MAS	2D6+1 (+3)*	8/10	L Leg	1/6
CON	2D6+3	10	Abdomen	1/6
INT	2D6+6	13	Chest	1/7
POW	3D6	10-11	R Arm	1/5
DEX	3D6	10-11	L Arm	1/5
APP	2D6+2	9	Head	1/6
EDU	1D6			

* male Grazers have MAS 2D6+1, females have 2D6+3

Age: 1 D4 on age table
Average HP: 19/21
Speed: 4m/im
Action Ranking: 5

ARMOR: 1-pt fur. Grazers occasionally wear 2-point armor made from thickly-woven cloth. Determine hit point locations for Grazers on the standard hominid hit location chart.

WEAPONS: Grazers are found with all types of primitive weapons. The higher-technology cultures have projectile weapons resembling those from early 20th century Earth.

Weapon	***Attack***	*Damage*
Rifle	20%	2D6+3

COMMON SKILLS: Athletics/Swim 100%, Botany 60%, Engineering 40%, Farming 80%, Handgun (projectile) 20%, Heavy Weapon (projectile) 20%, Hide 20%, local Languages 40%, Musicianship 35%, Observation 40%, Repair 40%, Search 40%, Sneak 40%, Strategy 20%.

Grazers are fairly intelligent hominids, though their appearance is unimpressive. The males reach about 1.5 meters [5 feet] ; the females are perhaps another 15 cm taller. Both sexes are covered by a light, neutral-gray fur which becomes much thicker and darker around the shoulders, ankles, and feet. Only their hands and round faces are bare skin. Their feet are broad and flat, but not webbed. They have wide, expressionless mouths containing many small, rounded teeth which grow continuously. Their intense, quizzical, orange-brown eyes are set relatively close together, bulging forward slightly from the sockets.

Often highly-strung, almost temperamentally hyperactive, even when absolutely safe Grazers tend to glance about compulsively. Some display annoying nervous twitches over which they seem to have little control. Many carry small pouches filled with stringy, pressed *ikrel* weeds from the swamp farms. Habitually chewing these dried, blue-green tendrils seems to calm Grazers, but *ikrel* is rumored to have the opposite effect on most other hominids.

Grazers have very sensitive hearing, are good musicians on a variety of instruments, and prefer quiet surroundings.

Lands dominated by Grazers are typically remote from active City Builder centers. In those regions where the species have come into contact, Grazers generally dislike and distrust City Builders and their close allies. Most Grazer cultures do not make rishathra a regular practice. They avoid vampire scent, which (though they are susceptible to it) makes them ill. Grazers much prefer the aphrodisiac properties of the *yana* herbs grown in their own bogs. *Yana* is used by many Ringworld hominids as a painkiller and euphoric, and certain of the Grazers' periodic social rituals are performed only under its influence.

A compulsive idealism drives most Grazers to take life-long mates. In practice, their chronic nervous insecurity often plunges them into domestic and social chaos.

Many Grazer cultures exist, from rudimentary associations of bog-tillers to societies whose engineering achievements rival those of early 20th century Earth. Some of these civilizations have developed a technology which includes cities, heavy industry and non-aquatic agriculture.

Grazers are generally tolerant, though often suspicious of strangers. They will adamantly insist that omnivores never eat meat (or discuss eating meat) in their presence. They are unconscionably hostile toward carnivorous species, attacking them without provocation on rare occasions. This attitude may be a holdover from their ancient enmity with the Eaters — a closely-related subspecies with whom they can still interbreed, producing sterile, mutant offspring. The Eaters are omnivorous, but their favorite food is, unfortunately, Grazer-meat. Whenever feasible, Grazer civilizations organize merciless campaigns of Eater extermination. Grazers are marginally more intelligent than Eaters, so in areas with advanced technology these campaigns are often fairly successful. (Sometimes, though, fortuitous thefts of technology turn the tables on the Grazers!) Eaters taken prisoner are enslaved, bodies of those killed are thrown into wiremesh cages and hung in the swamp farms for fertilizer. There is an uneasy truce with the Night People concerning this practice — in general, Grazers do not get along well with them. Fortunately, the Ghouls do not favor the dripping environment of stagnant bogs.

HILL PEOPLE

The Hill People live on the summits and upper slopes of mountain ranges, high hills, and plateaus where the air is thin but breathable. They are uncomfortable at low elevations, and have adapted to altitudes between 1.6 and 4 km [1.9 to 4.7 miles] above sea level. At heights beyond this they cannot survive, so they do not compete for the icy domains inhabited by the Spill Mountain Folk. More frequently they are encountered in mountainous regions nearer the Ringworld median line than the rims. Hill People are omnivores whose tribes may originally have consisted of nomadic outcasts and wanderers, hunting and gathering along the highland ridges. Most have now progressed well past such origins. They live in settlements and rock cities on the mountains, raising hardy crops and a variety of semi-domesticated animals such as greldiks. They are known for their cultivation of an especially nutritious, high-energy seed plant called *achiya,* which does not do well below 2700 meters [9000 feet] or in humid climates.

Hill People are sturdy and tough. Their height ranges between 1.5 and 1.9 meters [between about 5-6 feet] tall. Though very sexually fertile, they almost never do rishathra with strangers. They are at their best scrambling up steep ragged terrain, but their endurance on treks, migrations, and long marches is fantastic. Their feet are always calloused and gnarled, even though boots of soft, thick, greldik-hide usually protect them. Hill People are almost completely covered with a coat of resilient, curly wool, 2-3 cm thick. The color ranges from light brown to black depending on the individual and clan, and the woolly fur provides excellent thermal insulation. Their skin is yellowish, but can be glimpsed only on their faces, hands, feet, and over-sized knee joints (which are hairless and rough). Their eyes, set wide apart, are deep black and disturbingly hypnotic. They have broad, flattened noses, and massive, very human dentition set in powerful, jutting jaws. The lips are yellow-brown, leathery-textured, and prominent. Even without *achiya* seeds, Hill People have phenomenal powers of concentration.

Hill People Society

Hill People cultures are organized into small nation-states dividing up the available territory on a given mountain range or plateau. Each nation is presided over by a single benign Lord or Lady. The system varies from culture to culture, in that these potentates may be primarily male or exclusively female, according to local traditions. Matriarchal feudal societies are not uncommon in some regions. A single leader typically rules over all Hill People within one to two weeks foot-travel of his rock-dome or manor, dictating policy on foreign relations, trade, taxation, the raising of armies, and the dispensing of justice. In such matters the word of the Lord is absolute, but in most other political areas, control is far less rigid, and seldom enforced. In many nations the Lord's supremacy is hereditary, but in some it is determined by democratic processes. A small percentage have no rules at all, with the leader's position always up for grabs. Neighboring Hill People nations may be friendly or hostile toward one another, depending on politics-of-the-moment; but their disagreements are usually settled by shrewd bargaining, games of chance, and endurance competitions. They almost never war among themselves. But Hill People are usually hostile to other hominid species, and do not hesitate to attack them — especially if threatened. Nothing unites the nation-states more quickly and effectively than the real (or imagined) possibility of invasion of their highland realms.

The fertility, limited resources, and relative isolation of Hill People cultures leads to a chronic cycle of overcrowding and migration, since they do not exercise internal population controls. When a particular mountain range can comfortably support no additional population, nations of lowest status must emigrate. They convert their possessions, lands, and herds to weaponry and provisions. Supplies of achiya seeds form the bulk of the food: one tablespoon of achiya seed in water can power a hominid warrior for 30 hours on a forced

HILL PEOPLE

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	2D6+6	13	R Leg	4/8
MAS	3D6	10-11	L Leg	4/8
CON	2D6+6	13	Abdomen	4/8
INT	1D6+12	15-16	Chest	4/9
POW	3D6	10-11	R Arm	4/6
DEX	2D6+3	10	L Arm	4/6
APP	3D6	10-11	Head	4/8
EDU	1D4			

Age: 1D4 on age table
Average HP: 24
Speed: 3m/im
Action Ranking: 5

ARMOR: The wool of the Hill People acts as 1-point armor. Hill People also wear thick-woven shawls which are good for 1 more point of protection. They also wear 2-point greldik leather armor in battle. Use the standard hominid hit location tables.

WEAPONS: Hill People use primitive weapons almost exclusively. Occasionally the lord or lady of a mountain can obtain projectile weapons from the Machine People, or some similar species.

Weapon	*Attack*	*Damage*	*Parry*
Spear	40%	1D8+1	40%
Shield	20%	1D6	40%
Javelin	40%	1D10	

COMMON SKILLS: Archaic Melee Weapon 40%, Archaic Ranged Weapon 40%, Bargain 60%, Climb 80%, Debate 80%, Emergency Treatment 40%, Engineering 40%, Farming 40%, Fast Talk 60%, Hide 40%, local Languages 20%, Musicianship 60%, Observation 40%, Oratory 80%, Strategy 20%, Tracking 40%

march. Hordes of Hill People have been known to journey over vast expanses of inhospitable terrain to reach new mountain ranges. Their travels are seldom without incident, for despite their primitive weapons, migrating Hill People often leave bloody trails behind them where their lines of march pass through the territories of other species. More advanced cultures are sometimes overrun completely, their own weaponry disastrously turned against them. Occasionally a migration-wave will bargain with an intervening civilization, offering their services as mercenaries in exchange for assistance and supplies. In some cases, the destination mountain range is inhabited by other Hill People cultures. If the survivors of the exodus are relatively few, they are usually accepted; but if there are many, the marchers must move on, or compete successfully for permission to settle.

Rock Dome Architecture

Hill People are noted for their distinctive "rock dome" architecture. The fortresses of the Lords are particularly impressive and impregnable. Builders first pile up and carefully shape a mound of compacted dirt and rubble as a template. Precision-hewn stone blocks are then assembled upon the mound in a geodesic jigsaw pattern, one band at a time. Sometimes a circular or hexagonal opening is left at the very top. Upon completion, the dirt and rubble are removed from the interior, and the dome is left free-standing. The outer surface is initially unfinished, but the fortress-domes of certain very durable nations have been carefully enlarged and highly polished. From a distance these may sometimes be mistaken for advanced-technology structures.

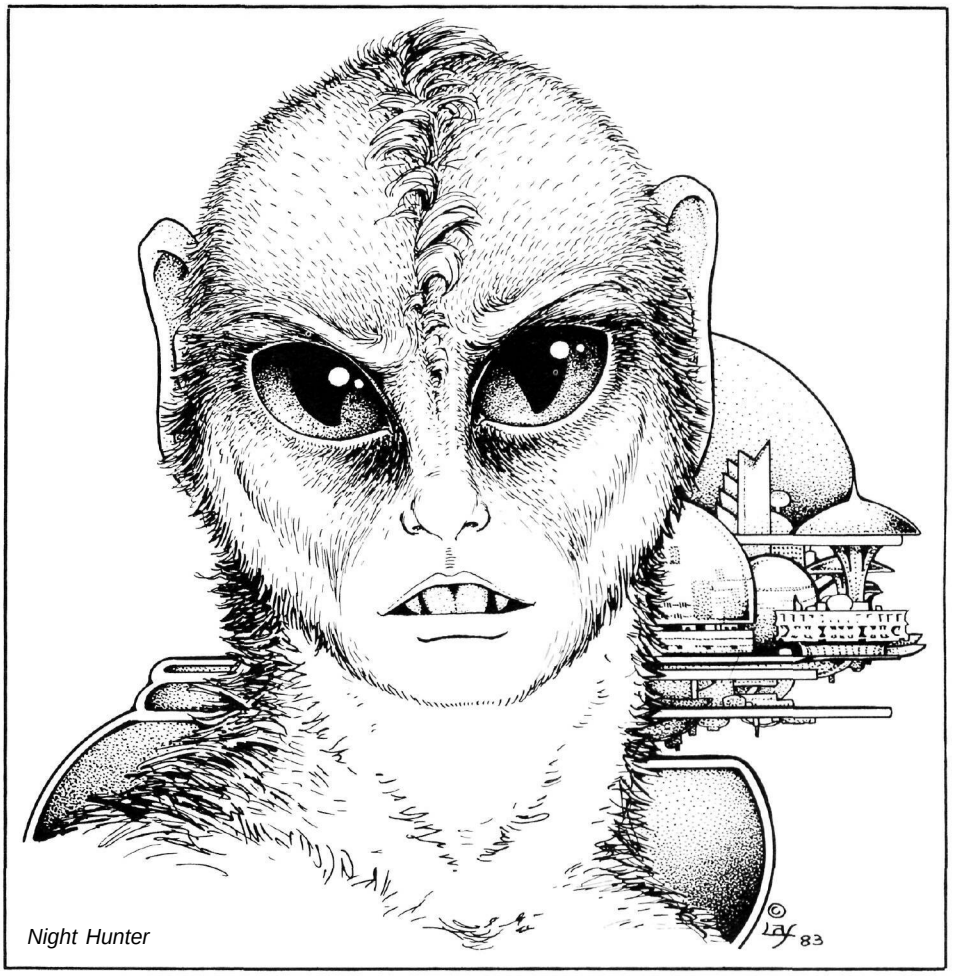
Such rock domes are spacious, and their good acoustics make them natural assembly theatres and concert halls. Freedom of speech is highly valued among the Hill People: they enjoy many forms of verbal exposition, debate, oratory, and argument. Equal opportunity for all points of view to be heard is guaranteed by the Lord or Lady. The speaking-domes are also used for music, often from neighboring states, and occasionally even brought from outside the Hill nations. The native instruments preferred by the Hill People are greldik and unik-horn pipes, with stretched skins and bones for percussion. They also play yadakis and awesome bass-flutes made from hollow logs. There are thousands of traditional tunes, all of which sound very much the same to the uninitiated ear — and Hill People sometimes take offense if the rare visitor does not relish listening to at least a hundred of them at a sitting.

NIGHT HUNTERS

Night Hunters are a nocturnal hominid species with exceptionally good night vision and an even more acute sense of smell. They are widely found closely-associated with surviving pockets of City Builder civilization, although in primitive regions isolated Night Hunter families still prowl in the darkness. These big-eyed sentient carnivores have voracious appetites. In their natural habitats, they catch varmots and other small nocturnal vegetable-eaters, but they may also prey upon grazing herds bedded down for the night, and will pursue larger creatures if they need. Since they neither cook nor use fire, the smell of fresh blood is often on their breath. Their relatively high intelligence breeds caution and respect, though, so they rarely attack if it is unnecessary or clearly unwise. The ecology of any particular locale can generally support only a few wild Night Hunter families.

Their keen olfactory sense allows Night Hunters to detect vampire-scent in tiny concentrations, well below the level at which it becomes overpowering and irresistible. Normally, it sends them running. They have an intense hatred of the vampires, with whom they must share the night. Occasionally, they team up with (or are hired by) more advanced, settled hominid species to track down and exterminate vampires in their realms. Night Hunters are usually suspicious of outsiders, at least initially. They consider Ghouls repulsive and annoying, but do not challenge them.

Night Hunters appear quite humanoid, despite several major evolutionary adaptations. They are much less repugnant to humans than



Night Hunter

to the City Builders they traditionally serve. Standing tall and erect, they sometimes topping two meters, round, catlike eyes are as big as goggles, and seem to glow in the darkness. Usually they are shades of blue or green. They appear close-set only because of their relatively enormous size, the orbits hardly separated by the pointed nose. The head is rounded, with large, naked ears lacking lower lobes. The brain, though marginally less complex, is physically larger than that of a human being. The incisors are buck-teeth like ax-heads; the triangular canines are sharp but not protruberant. The lips arch above slender jaws in graceful cusps. The body is entirely covered with a thin layer of dark fur, grey or brown, and with occasional reddish-brown mottling. The shoulders are thick and sloping; and the arms taper to hands of rather human proportions, with long, straight fingers. The nails of fingers as well as toes are compressed into formidable claws which do not retract. The legs are longer than the torso, and the hind feet are oversized, permitting extraordinary leaps. Night Hunters have good hearing and an excellent sense of balance.

It is at times difficult to tell male and female Night Hunters apart, particularly civilized individuals wearing uniforms. Both sexes have equally-deep gravelly-bass voices. Generally a formal introduction includes the gender as well as the name and species: "I am Mar Korssil, a female of the Night Hunters." Rishathra is performed with sincerity, but never using vampire-scent. Socially unsophisticated, self-conscious, and over-sensitive, Night Hunters sometimes take offense where none is intended in the wisecracks of others. If they feel insulted, they may abruptly leave. When in the employ of more-advanced species, they are loyal, dutiful, dignified, and obedient. Often they are hired as police, guards, night-watchers, and mercenaries for special missions. Though they may be impressed by the superior technology or weapons of adversaries, they remain undaunted. They are expert fighters, using natural weapons and complex systems with equal skill and precision. With chemical-projectile weapons such as those manufactured by the Machine People, they are excellent shots.

Night Hunters are not at all cruel or combative by nature; but whatever their job, they do it well. In the areas of security and specialized administrative duties, the Night Hunters evolved a close-knit, longstanding association with the City Builders and their rise to rule on Ringworld. In many regions they are still closely-tied to City Builders, Machine People, and certain other species whose technological and cultural development has aided and protected them. Very rarely do the Night Hunters undertake to build mechanistic dominions of their own.

NIGHT HUNTERS - *do not confuse with Ghouls (Night People)*

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6	10-11	R Leg	1/8
MAS	2D6+6	13	L Leg	1/8
CON	3D6	10-11	Abdomen	1/8
INT	2D4+8	13	Chest	1/9
POW	3D6	10-11	R Arm	1/6
DEX	4D6	14	L Arm	1/6
APP	3D6	10-11	Head	1/8
EDU	1D6	3-4		

Special Ability: with only a few steps (1 AR) for preparation, a normal Night Hunter can leap horizontally a distance equal to half his STR in meters and vertically a distance equal to a third his STR in meters.
Age: 1D4 on age table
Average HP: 24
Speed: 4m/im
Action Ranking: 4

ARMOR: 1 point fur. Night Hunters may wear leather or wooden armor in battle and sometimes have sophisticated ceramic or metal armor from the Machine People. Determine hit locations on the standard hominid hit location chart.

WEAPONS: Night Hunters can be found employing weapons from all technical levels. As close associates of the Machine People, they often carry manufactured, chemical-powered projectile arms.

WEAPON	*ATTACK*	*DAMAGE*
Rifle	60%	2D6+3

COMMON SKILLS: Archaic Ranged Weapon 40%, Athletics/Climb 60%, Athletics/Run 50%, Debate 20%, Emergency Treatment 40%, Fast Talk 20%, Ground Vehicle 20%, Handgun (projectile) 60%, Heavy Weapon (projectile) 60%, Hide 80%, local Languages 20%, Observation 80%, Orate 20%, Repair 20%, Scent 40%, Sneak 80%, Strategy 60%, Tracking 60%, Unarmed Combat 40%.

RUNNERS

Runners are frequently encountered within the 2.5 billion square kilometer area centered on the Machine Empire, a region partly-explored by Louis Wu and his party during the second expedition to Ringworld. The overall extent of the species' distribution is unknown — although their ancient alliance with the City Builder civilization suggests that these hominids may have become widely spread around the Ring.

The Runner breed is tall and muscular, with long, powerful legs and big feet. Deep, massive chests give them the impression of over-development, or adherence to an extensive weight-training regimen. They average well over two meters in height. Their skin is a deep reddish-brown, their hair dark and glossy. The males' hair grows only on the tops and sides of the heads, but the women's often covers their foreheads and cheeks as well, framing tiny, T-shaped faces. Their eyes are the color of deep midnight-violet, beneath heavy lids and thick brows. The women are certainly as impressive as the men, with overlarge busts on big, muscular chests. Few flatlanders would regard them as attractive. All Runners are plant-eaters, and their flat-topped teeth show it. Unlike some hominid herbivores, they harbor little instinctive animosity toward more carnivorous species.

The early evolution of the Runners took place in the wide open grasslands of the veldt and plains. There they gained the great speed and endurance necessary to outdistance predators, and to evade pursuit by members of more advanced hominid settlements. Runner tribes still live on the veldt; but many groups have progressed to some degree of more sophisticated cultural development. Most commonly, they are found cooperating with, but subordinate to, other civilized species. The mighty empire of the Machine People, for example, uses Runners extensively in manufacturing and transportation industries; and they also serve as rapid overland couriers to its distant, nearly-independent kingdoms. Biomass distilleries, chemical-processing plants, and refueling depots are frequently staffed by Runner clans. In borderland regions, Runners sometimes live on the fringes of civilization as brigands, using their swiftness, strength, and stealth to prey on unwary travelers. They may be armed with chemical-projectile guns stolen from Machine People, or, very rarely, they may possess more devastating weapons taken elsewhere. Because of these robber bands, the great majority of civilized, trustworthy Runners are often unfairly considered potential thieves. Among the City Builders, this paranoid attitude is particularly common.

Runner clans tend to view strangers with suspicion, but (unless they are bandits) are seldom overtly hostile. The females tend to treat with other species; they are more sociable and more adept at discourse than the males. In many instances, the women control the organization of the Runner culture and its political arrangements with outsiders, while the males are sent out on lengthy jobs or on distant missions. Runners do rishathra; but the males usually do not enjoy it, except as a craft, since it is often among the duties assigned to them by the clan in conjunction with their outside employment. Naturally, Runner clans encountered in unexplored regions of Ringworld may have evolved quite different social structures.

In their dress, Runners prefer simple, sturdy garments of woven leather. Articles used for protection or for support are made of tougher hides, with thick straps. Although synthetic materials are frequently employed, any colorful or obviously-artificial fabrics are avoided. Metal decoration is not uncommon. Some Runner clans have an odd fascination for technological jewelry: medallions made from small, intricate pieces of ancient machinery are among the favorite items, frequently handed down for generations. CH

SHELL PEOPLE

Below the age of six Ring years (about 36 UNS years), Shell People appear to be a rather typical hominid species. They are completely hairless, with rich, dark chocolate-brown skin. Omnivorous and non-aggressive, they show a marked preference for orderly agricultural

RUNNERS

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	4D6	14	R Leg	1/8
MAS	2D6+6	13	L Leg	1/8
CON	2D6+6	13	Abdomen	1/8
INT	2D6+6	13	Chest	1/10
POW	3D6	10-11	R Arm	1/7
DEX	1D6+12	15-16	L Arm	1/7
APP	2D6+4	11	Head	1/8
EDU	1D4	2-3		

Age: 1 D3 on age table
Average HP: 26
Speed: 3m/im
Action Ranking

ARMOR: No natural armor. Their typical leather garments give them 1 point of protection. They may buy or steal better armor from advanced civilizations. Determine hit locations on the standard hominid hit location table.

WEAPONS: Runners commonly use Machine People-made projectile weapons. Occasionally, they have better equipment. In wilder areas, they often have only archaic weapons.

WEAPON	*ATTACK*	*DAMAGE*
Submachinegun	40%	1 D8+2/shot

COMMON SKILLS: Archaic Melee Weapon 20%, Archaic Ranged Weapon 20%, Athletics/Acrobatics 40%, Athletics/Climb 20%, Athletics/Run 50%, Athletics/Swim 40%, Bargain 40%, Emergency Treatment 20%, Handgun (projectile) 40%, Heavy Weapon (projectile) 40%, local Languages 20%, Musicianship 20%, Repair 20%, Sneak 40%, Strategy 40%, Tracking 40%.

settlements and specialized cultivation. Their crops include oyster plant, frostberry, arrowroot, and 16 varieties of sausage plant, each with a distinctive, delicious flavor. In some regions, Shell People operate large plantations of ivory trees. They raise a dozen species of domesticated animals, including munils and pilks which they harness and ride. For fences they almost always grow a certain tall, thorny variety of elbow root.

The Shell People are best-known for what they themselves call "the change." It is an attenuated version of the Protector transformation, limited and distorted by mutation and lack of Tree-of-life. Suddenly, sometime between the ages of six and seven Ring years, their body chemistry alters. Their skin toughens and hardens into a horny, chitinous shell, almost like a carapace. Their joints enlarge visibly and their strength increases. They lose interest in sex. Their curiosity diminishes; unlike the Pak, their intelligence declines. All the teeth except the molars, premolars, and bicuspids fall out. The process then terminates, resulting in a strong, well-armored hominid which calls itself a Chellon. It is fierce and tough, but relatively slow-moving and rigid in its patterns of thought.

"The change" has created an unusual social structure with a permanent schism based on age. The post-change adults become quite aggressive. In most human cultures, the youths are those who fight, but Chellonite warriors are at least six Ring years old. The imposing shelled adults are always in charge, enforcing strict social controls and codes of behavior upon the vulnerable, unshelled youths. They give little or no consideration to the opinions, desires, and interests of the younger people. They allow them little responsibility, but require and expect them to perform most of the physical tasks of the society. The younger folk in turn view the Chellons as excessively hostile, stupid, humorless, and overbearing. They are generally thankful that, because of frequent duels and conflicts, there are not more Chellons. Young Shell People confidently assure one another that their generation will bring social justice to their species at last, but this never happens.

The "generation gap" suffered by Shell People cultures is severe and irreversible. Their societies are usually very conservative, and rarely do they possess significant technological capabilities. Naturally, unshelled youths are not permitted to do rishathra, and the adults have no such desire. Relations with other hominid species are often strained, because the Chellonite adults tend to treat outsiders as they behave toward their own young — except that they feel no protective urge toward strangers.

The traditional (and preferred) weapon of Chellonite warriors is the "white-bow," beautifully carved from a single piece of cured, gleaming ivory-wood. The ornate stave is strung with a very tough composite filament, woven meticulously from gut, hair, and resilient stretch-vine fibers. The shafts are carefully-selected, hardened lengths of arrowroot, with polished ivory-wood tips. For interspecies conflicts, a variety of more efficient pellet-bows and stockbows (vertical crossbows with stocks) is available. Metals are almost never employed in Shell People weaponry — although rare ceremonial arrows are rumored to be tipped with tiny shards of scrith. Duels are fought with the white-bows, unless the disagreement is really serious, in which case throwing-hammers are used. Although slightly less accurate, these are much more lethal, often shattering the shell upon impact. Losers are disgraced. Even if they survive the duel they are banished.

SHELL PEOPLE

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6	10-11	R Leg	0/8
MAS	2D6+6	13	L Leg	0/8
CON	3D6	10-11	Abdomen	0/8
INT	2D6+6	13	Chest	0/9
POW	3D6	10-11	R Arm	0/6
DEX	3D6	10-11	L Arm	0/6
APP	3D6	10-11	Head	0/8
EDU	negligible			

Age: 1 D2 on age table
Average HP: 24
Speed: 3m/im
Action Ranking: 5

ARMOR: No natural armor, and do not wear artificial armor before the change - Shell People are pacifistic; Chellons do all the fighting. Determine Shell People hit locations on the standard hominid hit location table.

WEAPONS: Shell People might occasionally carry knifes, axes, scythes, or other tools, but rarely if ever have increased in skill with these as weapons

COMMON SKILLS: Athletics/Climb 60%, Athletics/Run 50%, Emergency Treatment 20%, Fast Talk 40%, Fine Arts 40%, Hide 40%, local Languages 20%, Psychology 20%. White

CHELLONS

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	3D6 x 1.5	16	R Leg	6/10
MAS	2D6+7	14	L Leg	6/10
CON	3D6+6	16-17	Abdomen	9/10
INT	2D6+6-1D6	9-10	Chest	9/11
POW	3D6	10-11	R Arm	6/8
DEX	3D6-1D4	8	L Arm	6/8
APP	1D6	3-4	Head	9/10
EDU	negligible			

Age: 1 D2 on the age table plus 20 years
Average HP: 31
Speed: 3m/im
Action Ranking

ARMOR: Chellons have 6 point shell over their limbs and 9 point shell over their torso and head. This is only rarely supplemented with artificial armor. Determine hit locations on the standard hominid hit location table.

WEAPONS: These great warriors are particularly skilled with primitive missile weapons. Their traditional weapons include the white bow, a carved wooden bow, and throwing hammers.

WEAPON	*ATTACK*	*DAMAGE*
Fist/Punch	80%	1 D6+1 D3
Bow	100%	1D10+1
Throwing Hammer	100%	2D6+1D3

COMMON SKILLS: Archaic Melee Weapon 80%, Archaic Ranged Weapon 100%, local Languages 20%, Observation 60%, Orate 60%, Strategy 60%, Tracking 20%, Unarmed Combat 60%.

SPILL MOUNTAIN FOLK

The Spill Mountain Folk live at extremely high elevations on the slopes of inactive Spill Mountains. These isolated peaks rise some 55 kilometers [35 miles] high, and are regularly-spaced along both rim walls at intervals of about 40,000 km [25,000 miles] . The Spill Mountains play an essential role in recycling the topsoil for Ringworld's ecosystems. About two-thirds of these mountains function at greatly-reduced efficiency, or not at all — and these provide permanent habitats for hominids. The Spill Mountain Folk are adapted to life between the coldest white levels above and the towering 'foothills' below, where the air becomes too dense and too warm for the Folk to breathe.

Spill Mountain Folk are well-insulated, baboon-like hominids; these often-chubby sentients bear a slight resemblance to the lion-maned Abyssinian gelada, Ethiopia's high simian. The Folk's truncated muzzles protrude only mildly, though, and they lack tails. Their noticeably-enlarged canine teeth are not visible when the mouth is closed. Spill Mountain Folk are heavy-bodied with powerful limbs, standing on the average not far below two meters. They are covered entirely with thick, soft, golden-brown fur, and the forequarters of most older adults are cloaked in mane-like mantles of long hair. The males often have a single dark stripe 15 centimeters wide running up their backs and tapering to a point at the top of the forehead. The people of the Spill Mountains have extremely efficient, oversized lungs. At altitudes below five kilometers [or about three miles], they begin to experience hyperoxygenation and breathing discomfort — at the normal atmospheric pressure of the Ring floor, they are unable to live. These hominids did not evolve naturally: their strange physiology and metabolism derive from City Builder genetic-engineering programs, millennia ago.

airless realms, many became seasoned spacers. Biologically, though, they were overspecialized, and they were technologically overdependent on the City Builders. They once flew between their Spill Mountain habitats on magnetic-repulsion skysleds, but for centuries now they have had to rely almost exclusively on balloons for transportation. Only a few skysleds with slow-charge solar power-packs still operate, and these are always heavily-guarded and closely-watched. It is known that Spill Mountain Folk worked in large numbers in the repair crews seen remounting Ringworld's attitude-jet toroids. Some such crews were also said to be engaged in unblocking spill-pipes. For the most part, however, the people of the Spill Mountains have reverted to a technologically primitive existence. Oral traditions alone keep alive among them legends of the ancient star-travelers, and of the secrets of the interiors of the Spill Mountains. Many enclaves might be expected to resist the efforts of repair crews or of anyone else whose activities could re-awaken their slumbering mountain, rendering it uninhabitable.

Natural resources are limited in the domains of the Spill Mountain Folk, so the hoarding of treasure or the unnatural accumulation of material goods is seldom looked upon with favor. Their spirit is one of cooperation, not competition for wealth. They trade among themselves and play games not so much for personal gain as for variety and novelty. Although they're omnivorous, their usual diet is simple. They love sweet-roots, fruit, spice nuts, sausage-plant, eggs, insects, dried fish, nectar, birds, and even larger creatures — which some enjoy catching and tearing apart by hand. Unfortunately, such delicacies can be obtained only by laborious descent to the foothills. In some areas, they use tethered-balloon trams, the baskets of which are sent down loaded with pure, clean ice-blocks and figurines. In exchange, the baskets are filled up with food by hominids living far

times share them without possessiveness. Long-term breeding partners are generally chosen for the variety of their experiences and imaginative skills, not because they represent security, dominance, status, or wealth. Spill Mountain Folk are adept at rishathra, but get few opportunities to practice (they thoroughly enjoyed their golden era of co-enterprise with the ancient City Builder civilization). Their dead are launched festively into the air on balloon rafts filled with figurines, ice sculptures, and ceremonial brahl bowls. Spill Mountain Folk use reflected-light signals to maintain regular contact with the Ghouls in some areas. Most know of the Healers only through grossly-misrepresentative City Builder myths from before the Fall of Cities.

A Spill Mountain Folk City

The vertical habitats of the Spill Mountain Folk are carved into the great gray rocks and blocks of permafrost and dormant Spill Mountain ice floes. From a distance, an ice-rock city exhibits dozens of huge, shadowed shelves with fine threads draped between them. Close inspection reveals myriads of individual entry porticoes, window ledges, sculpted balconies and awnings — hundreds of suspended bridges strung up and down and sideways between them. Narrow, twisting stairways are also hacked into the rock and ice, running for kilometers in strange branching curves, like two-dimensional vertical mazes. A single, guarded stairway usually leads all the way down into the high foothills, to the timberline. Tethered-balloon trams sometimes parallel these solitary paths of descent through the swirling fog at the base of the Spill Mountains.

Spill Mountain Folk do not relish isolation. Their cities usually have populations of 10,000 or more. The center of each city has a large public square carved into it, though a fortuitous flat rock surface often serves the

SPILL MOUNTAIN FOLK

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	2D6+8	15	R Leg	**2/9**
MAS	3D6+6	16-17	L Leg	**2/9**
CON	3D6	10-11	Abdomen	**2/9**
INT	2D6+6	13	Chest	**2/10**
POW	3D6	10-11	R Arm	**2/7**
DEX	2D6+10	17	L Arm	**2/7**
APP	2D6	7	Head	**2/9**
EDU	2D6	7		

Age: 1 D4 on age table
Average HP: 27
Speed: 3m/im
Action Ranking: 3

ARMOR: Spill Mountain Folk get 2 points of protection from their thick wool. They seldom wear artificial armor (resources are scarce where they dwell). Determine hit locations for Spill Mountain Folk on the standard hominid hit location table.

WEAPONS: In battle, a Spill Mountain person may bring a modern weapon left over from the Fall of Cities, or a crossbow, or might use a primitive throwing stick. Since each spill mountain is isolated by enormous distance from the next, the Folk of each mountain may be equipped completely differently.

Weapon	*Attack*	*Damage*
Lasergun	40%	20 points
Crossbow	40%	2D6+2
Throwing Stick	40%	1D6

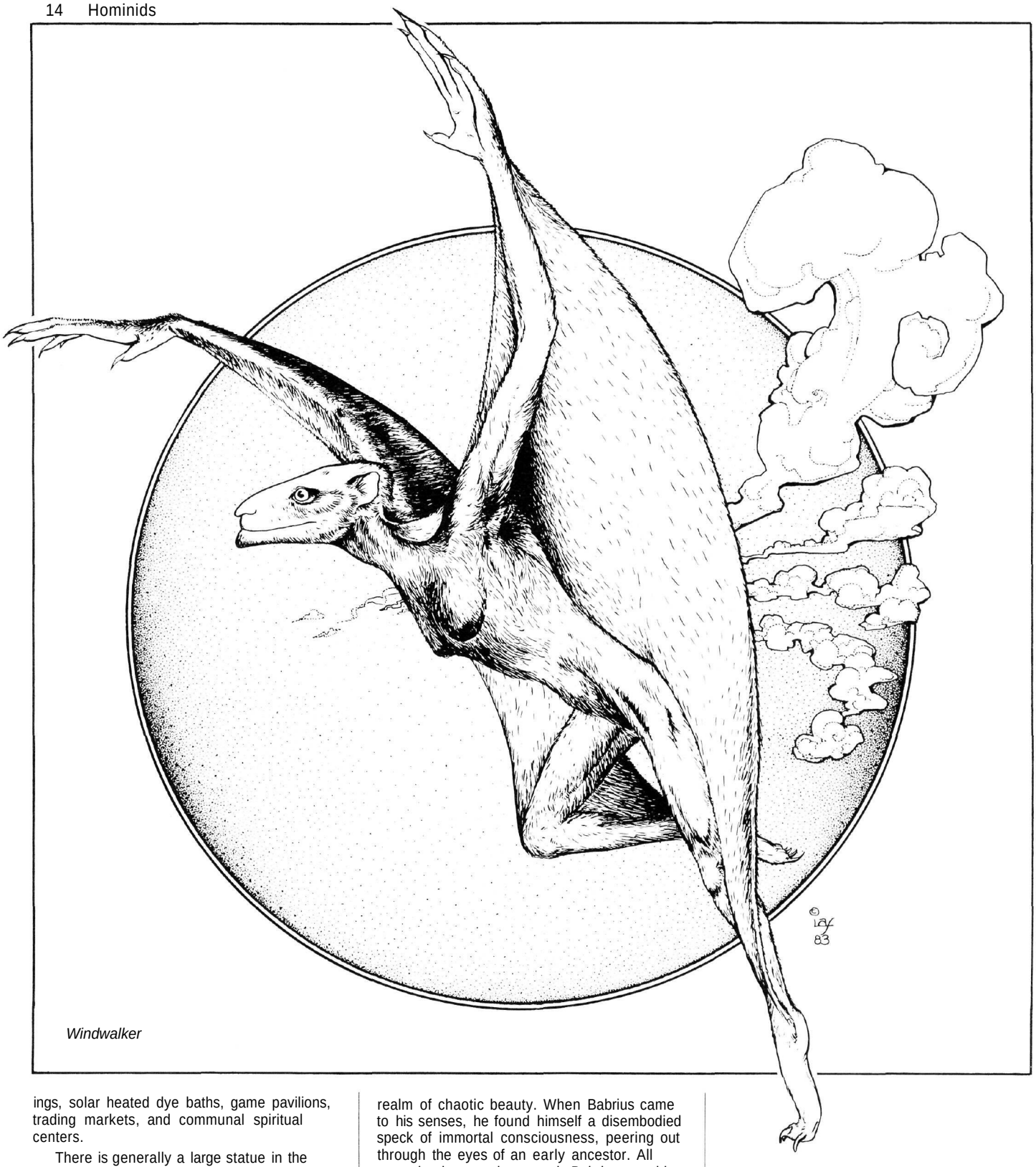
COMMON SKILLS: Archaic Melee Weapon 40%, Archaic Missile Weapon 40%, Athletics/Climb 100%, Atmospheric Craft/Balloon 60%, Emergency Treatment 60%, Fine Arts 40%, Handgun (energy or projectile) 40%, Heavy Weapon (energy or projectile) 40%, Observation 60%, Repair 80%, Search 60%.

Spill Mountain Folk are highly intelligent and educable, but since the Fall of Cities their isolated environment has severely restricted their activities. Long ago they worked with the City Builders to construct and operate the Rim Transport System. They later maintained the elevator tubes climbing up the rim walls, and the rim stations. Before the walls closed forever, Spill Mountain Folk were among those who loaded and serviced the great ramships. Comfortably adapted to nearly

below — Hanging People, Ghouls, Wind Walkers, and, rarely, even City Builders. Most of the time Spill Mountain Folk meals consist mainly of a coarse, thick soup called *brahl,* which they refine from partially-processed flup in the Spill Mountain ice-floes. Brahl is organically nutritious but tasteless, an utterly monotonous staple.

Spill Mountain Folk seek diversity and innovation in family relations. They traditionally change mates every few falans, and some-

purpose. These gathering places typically are crowded with hordes of Spill Mountain dwellers. The staccato squeals, grunts, barks, chatterings, and shriller howlings of their native language quickly die, however, in the thin air. Elaborate posturing and a complex system of hand signals supplements their verbal communication, or substitutes for it. Many decorate their pelts with imaginative designs and mystical symbols. The public squares are sites of pageantry, balloon launch-



Windwalker

ings, solar heated dye baths, game pavilions, trading markets, and communal spiritual centers.

There is generally a large statue in the shape of a hairy, fat, jovial baboon sculptured out of some great boulder at the back of the square, or onto the sheer rock face above. The image often represents some version of the god figure christened "Babrius" by Louis Wu. In a favorite myth, Babrius rose beyond the Rim on a great skysled, passing above the stars. He came to rest at last on a vast, fabulously-varied plateau ideally suited to the tastes of Spill Mountain Folk. He hastened to return to lead his people to freedom in the marvelous new land. Abandoning his depleted skysled, he entered a large, clearly-marked elevator tube — but the bubble would not descend. Instead it went up, through a confused realm of chaotic beauty. When Babrius came to his senses, he found himself a disembodied speck of immortal consciousness, peering out through the eyes of an early ancestor. All around, wherever he turned, Babrius saw himself in the eyes of others, staring back, grinning. Variety and sameness form a central duality in the philosophy and culture of the Spill Mountain Folk — they are always on the lookout for high adventure.

Each Spill Mountain is unique, because of its extreme altitude and isolation. Each has its own ecology. The cultural sketch given in the foregoing is most likely to fit Spill Mountain Folk living on the starboard rim wall within 40° of the Great Oval Ocean. Elsewhere around the Ring, they may be quite different — and of the folk living on the port rim wall Spill Mountains, nothing is known.

WIND WALKERS

The Wind Walkers (Interworld translation of the City Builder term) are an intelligent, winged hominid species native to the foothill forests along the rim-wall regions. "Foothills" on Ringworld are as steep and rugged as the Andes or Himalayas of Earth. These great mountains were designed to keep breeders away from the Spill Mountains and the rim-wall faces. The winds of Ringworld re-circulate here, where topsoil is also recycled. Strong currents blow along the rim walls, and there are vast stable turbulences in the air-forms of

the foothills. The Wind Walkers flourish as dive-gliders in the high forested terrain where the wind always flows. In many lands much nearer to the Ringworld median-line, they are known only in myths of tree-spirits, air-sprites, and flying demons. Wind Walkers are very old as a species. They may be the products of ancient biological science — though they have evolved in the wild for millennia. They eventually became rather widely distributed on the Ring, because the City Builders discovered their abilities and brought them to live in many of their metropolises.

Wind Walker Life Cycle

The Wind Walkers prefer high places: cliffs, steep ridges, big trees, floating cities, and even tall buildings. They are true acrophiles, with a natural urge to explore inaccessible vertical domains. On the flatlands, they are awkward and ungainly. They dislike warm, dry climates, but ground-level atmospheric pressure does not seem to bother them. Wind Walkers are tall, light-boned creatures often reaching 1.9 to 2.2 meters [some 6-7 feet] as adults. Their infants are born very tiny and helpless, since adult females cannot carry heavy fetuses. The immature form develops rapidly. It resembles a small, brown, wooley-monkey, though it is blind and without gender. For a ring year (roughly six UNS years), the young depend almost completely on their parents. They are fed and trained and protected. They climb well, with prehensile tails and sharp claws, but never stray far from the smells of their home cave or tree-top aerie. When they are older, the parents allow them to cling aboard on short airborne excursions. Their vision is very poor, but they learn to echo-locate by issuing strings of audible chirps and clicks, like the cave-dwelling oil-bird of South America on Earth.

As the young grow to a maximum length of a meter, they gradually lose their agility and their bulk increases. Eventually the day arrives when their parents must hang them up, and they spend the rest of their adolescence undergoing metamorphosis. The process is triggered by feeding them special mulch inoculated with biochemical catalysts and genetic material from their parents' reproductive systems. A tough chrysalis soon forms, and the protoplasm inside begins to restructure itself. Every few months, more mulch must be supplied (through a porous flap) as the transition to the adult form progresses. The adolescents are always hung in secure places: a cavern, a cliff-cave, a hollow tree, or even a long-deserted artifact will do if they are unlikely to be discovered. The light-level must be low, and the air must not be too dry. Civilized Wind Walkers (or Flying People, as some call them) often build special nursery-rooms for their growing children, with climate-controls carefully monitored. They enjoy showing off the kids to visitors.

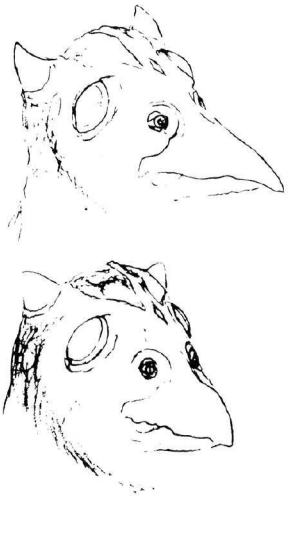
After another ring year has passed, the adult form emerges. The chrysalis dries up and disintegrates after several falans if mulch is no longer supplied, so offspring have a chance to survive even if the parents die. In the wild, newly-born adult Wind Walkers sometimes travel remarkable distances to their people, using their acute senses and an inborn homing ability. Their life begins again as fledglings when they find their families, and they may share for a time in caring for their infant siblings. A big coming-out party is always given for newly-emerged young-adult Wind Walkers.

Adult Flying People come in all shades of green, from dark forest- to yellow-green. There is a soft blue underbelly, visible mainly when the wings are spread, and the dorsal surface of the wings is also light-blue. The fur is like goose-down, but not as thick. The tail is gone. Their relatively small, thin heads are aerodynamically-elongated to serve as rudders. Oval green eyes are set at the widest part of the head, almost in line with a narrow, downwardly-hooked nose. The jaw is slender but deep, with a jutting, triangular chin. When opened, the mouth makes a good airscoop. The lower teeth are sharpest, for snagging prey in flight. The ears are big, streamlined, and flattened against the skull. The "parachute skin" of the wings attaches to the sides of the torso, and down the legs to the ankles. Long, thin feet aid in steering. The hands themselves are free, with spindly muscular fingers. There are small talons like fish-hooks, on the fingers and toes. Wind Walkers in flight resemble a colorful humanoid blend of pteranodon and coluga (the flying lemur).

Adult Wind Walkers

Unless the wind gusts to at least 50 km [about 30 miles] per hour, average adult Wind Walkers can rarely take off under their own power from a flat surface. Once airborne, though, they are expert gliders and navigators. Their distance-vision is excellent, their sense of smell is heightened as adults, and their acoustic echo-location is as good as radar. In their native state they use these abilities for communication as well as for finding food-targets in the air and on the ground beneath them. Incredible sensitivity to tiny amounts of their own ectohormone chemicals, however, allows them to convey information to others of their species and family over much greater distances than sight or sound. Their pheromone-specificity makes them immune to vampire-scent, unlike most hominids. Though expert wind-hunters, Flying People are omnivorous, able to sustain themselves on diverse foods. Some cultures practice extensive aviculture. In the vicinity of some Spill Mountains, they operate balloon-lifts, trading with the Spill Mountain Folk living far above on glacial slopes. In overcast, windy realms near eye-storms, or in thermal-updrafts near the Great Oceans, isolated populations are said to have built their own tall needle-cities on the Ring floor, far from their origins along the rims.

As hominid species go, Wind Walkers are moody, but generally friendly — unless their habitats are threatened, or unless their helpless young are endangered. The City Builders found their mode of living intriguingly exotic, useful for their natural abilities and daring. They became pilots, navigators, scouts, guides, messengers, and specialists in vertical exploration and salvage operations. Although adept at using high-technology items, Flying People have not often evolved advanced mechanistic cultures themselves. Many have fallen back to a relatively traditional existence on present-day Ringworld, though some doubtless survive in pieced-together floating cities. When stranded or abandoned on the flatlands, Wind Walkers are miserable and usually suspicious of strangers. They become quite resourceful in such circumstances, and will not hesitate to take whatever materials, weapons, or vehicles might help them return to their lofty homes.



Pierin heads; see entry, pp. 18-20.

WIND WALKERS

Char.	Range	Averages	Hit Locations	Armor/Av. HP
STR	2D6+6	13	R Leg	0/6
MAS	2D6+1	8	L Leg	0/6
CON	3D6	10-11	Abdomen	0/6
INT	2D6+6	13	Chest	0/7
POW	3D6	10-11	R Arm	0/5
DEX	3D6+12	22-23	L Arm	0/5
APP	2D6	7	Head	0/6
EDU	1D6	3-4		

Age: 1D3 on age table
Average HP: 19
Speed: 2m/impulse on the ground, 6m/impulse in the air
Action Ranking: 2

ARMOR: Wind Walkers have no natural armor, nor can they use artificial armor and still fly. Their hit locations are determined on the standard hominid hit location chart.

WEAPONS: They use a variety of archaic ranged armament as well as available advanced ranged weapons. They are masters at Aiming while moving, and suffer no penalties for firing on the move, unless they are actually performing acrobatic stunts or dodging.

Weapon	*Attack*	*Damage*
Javelin	60%	1D8
Pistol	60%	1D8+2

COMMON SKILLS: Archaic Ranged Weapon 60%, Emergency Treatment 40%, Languages 20%, Observation 80%, Scent 20%, modern weapons skills if living with or near to City Builders.

Base Chances

SKILLS	Agamans	Boat People	Eaters	Forest Fishers	Grazers	Hill People	Night Hunters	Runners	Shell People	Spill Mountain Folk	Wind Walkers	Martians	Orcas	Pierin	Sperm Whales	Thrintun	Tnuc.
Anthropology	—	03	0	—	0	0	0	0	—	0	0	0	0	0	0	—	0
AquaticVehicle	—	10	0	—	0	—	—	—	—	—	—	—	10	0	01	0	0
Archaic Melee Weapons	08	08	05	0	05	05	05	07	10	05	05	07	—	05	—	0	0
Archaic Ranged Weapons	05	05	05	0	05	06	09	08	10	05	08	05	—	05	—	—	0
Astronomy	03*	05*	02*	0	0	0	05*	0	—	0*	0*	0*	0	0	0	0	05
Athletics	06	03	03	10	03	02	05	03	05	05	05	04	05	05	05	—	05
Atmospheric Craft	—	0	—	—	—	—	—	—	—	0	0	—	—	03	—	0	0
Bargain	0	09	03	—	02	04	05	03	05	03	07	01	10	06	05	0	10
Biology	—	0	0	—	0	0	0	0	—	0	0	—	0	0	—	0	08
Botany	—	0	0	—	0	0	0	0	—	0	0	—	0	0	0	0	08
Chemistry	—	0	0	—	—	—	0	—	—	0	0	—	0	0	0	0	05
Computers	—	—	—	—	—	—	0	—	—	—	—	—	0	03	—	0	08
Debate	06	05	02	—	03	05	06	05	05	03	10	03	05	05	05	05	10
Emergency Treatment	10	10	10	—	10	10	10	10	05	08	05	03	05	05	05	0	08
Engineering	0	05	0	—	—	0	01	0	—	05	0	0	0	0	—	0	15
Farming	—	05	0	—	05	06	0	0	0	0	0	0	0	0	0	0	08
Fast Talk	0	04	03	—	03	04	05	03	02	05	05	03	06	07	0	05	15
Fine Arts	—	04	0	—	02	02	02	05	02	04	05	02	03	06	10	0	03
Ground Vehicle	0	0	—	—	—	—	0	—	—	—	—	—	—	08	—	02	04
Handgun (energy)	0	0	0	—	—	—	0	—	—	—	—	—	—	04	—	0	05
Handgun (projectile)	02	03	0	—	03	—	02	02	—	03	03	0	0	03	—	—	04
Heavy Weapon (energy)	0	0	0	—	—	—	03	—	—	—	—	—	—	05	—	0	07
Heavy Weapon (projectile)	06	04	0	—	03	—	02	02	—	04	04	0	0	05	—	—	06
Hide	09	05	07	10	02	02	08	10	05	05	08	10	05	08	0	0	15
History	0	05	0	—	0	0	02	0	—	0	0	0	03	03	15	0	12
Hyperdrive	—	—	—	—	—	—	—	—	—	—	—	—	0	0	—	0	03
Law	0	0	0	—	0	0	0	0	—	0	0	0	0	0	0	—	—
Listen	08	05	08	10	05	05	10	12	05	05	05	05	15	10	20	05	08
Mathematics	—	0	—	—	—	—	0	—	0	0	0	0	0	0	15	0	10
Musicianship	07	03	05	0	06	05	09	09	0	0	0	01	09	06	25	0	0
Observe	10	05	10	12	05	05	12	15	05	07	08	04	05	10	05	0	15
Orate	09	04	02	—	03	05	05	05	05	05	05	03	05	05	25	15	0
Own Language	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5	I/5
Perform	0	01	0	0	04	03	02	01	0	05	03	0	07	05	15	0	15
Personal Flyer	—	0	—	—	—	—	0	—	—	0	—	—	0	—	—	03	05
Physics	—	0	—	—	—	—	0	—	—	0	0	—	0	0	0	0	10
Planetology	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	05
Psychology	—	0	—	—	—	—	—	—	0	05	05	05	06	06	0	0	15
ReactionDrive	—	0	—	—	—	—	—	—	—	0	—	—	0	02	—	0	10
Reactionless Drive	—	—	—	—	—	—	—	—	—	—	—	—	0	05	—	—	10
Repair	0	03	0	—	02	02	03	0	—	04	01	0	02	05	—	0	15
Ringworld	05	10	0	0	0	0	02	0	0	05	05	0	0	0	0	0	0
Scent	06	03	20	10	09	02	12	01	05	04	04	03	04	05	09	05	06
Search	08	05	09	06	05	05	10	12	05	06	05	05	05	10	05	0	15
Second Language	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	—	0
Sneak	10	05	10	05	05	05	10	12	05	05	05	10	05	10	0	0	20
Strategy	05	05	01	0	03	03	10	08	—	0	0	03	05	06	—	—	20
Theology	12	0	0	0	0	0	0	0	0	0	0	03	05	10	25	05	0
Track	10	—	05	—	12	14	08	10	05	02	0	08	0	04	—	—	05
UnarmedCombat	07	0	05	0	0	0	08	0	0	0	0	0	0	0	—	—	05
Var. Sword/Flashlight-Laser	—	—	—	—	—	—	—	—	—	—	—	—	0	07	—	05	10
Weapons System	0	0	—	—	—	—	0	—	—	—	—	—	0	0	—	0	05
Zoology	0	0	0	0	0	0	0	0	—	0	—	0	0	0	07	0	15

* *This skill known is Astronomy/Observational*

The accompanying table lists base chance skill percentages for the hominids and aliens included in the Ringworld Companion. Ringworld hominids may become important explorers in some campaigns; the table (along with the species essays and statistics) gives enough information to create native explorers. Table values are starting values. You will have to choose learning rates and pursuits to match the societies from which these sentients come. In general, follow the human age/occupation scheme in the Ringworld rules for human explorer creation; an individual might earn more or less than 20 occupation points per UNS year, but the game is calibrated for about that yield. The Kzin and Puppeteer sections provide procedures for alien creation. To use the explorer sheet for another species, the human base chances must be systematically replaced by the base chances appropriate to the species. Zero as a base chance indicates that the skill is specialized, but that it exists in some form within most or within representative cultures of the species: for instance, Chemistry might amount to how to make dyes and soap in very primitive cultures, and be alchemical in nature in medieval-style eras. The dash (—) indicates that the particular skill is very unusual for the species, or that is ordinarily impossible for the species to achieve, physiologically or psychologically. Creatures with natural weapons have base chances with those weapons equal to the chance given in the appropriate creature description.

Aliens

MARTIANS

The world that never mankind hath possessed.
- Dante, Inferno, XXVI

Robot reconnaissance of the planet Mars began in 1965 A.D. with the Mariner 4 fly-by mission, and culminated in the spectacular Viking landings of 1976 and the Project Gulliver marsrovers of 1990. On July 20, 1996, the first manned landing took place — highlighted by the astonishing discovery of a mummified Martian, incompletely preserved, and a few badly-eroded artifacts. The weathered corpse unfortunately was lost: it burst into flames when, in an emergency, an astronaut dashed it with water. Volatile and radically non-terrestrial, Martian biochemistry is based on highly-reactive acids and oxides of nitrogen; it has never been fully understood.

There followed a brief wave of intense interest in the Red Planet — despite the evident lack of industrially-usable resources on Mars, the planet's inhospitable environment, and the great expense of planetfall in its 0.38 gee gravity-well. The disastrous failure of Lacus Solis Base early in the 21st century, however, and the bizarre death of a stranded smuggler (a Belter named Muller) near the ruins of that base in 2112 ended UN plans for immediate Mars colonization. Muller and the earlier explorers at Lacus Solis, it became clear, had been murdered by still-living Martians.

Only a few humans ever saw an intact Martian alive or dead. Eyeless, with an oversized head balanced on a skinny neck, it is not known how the xenophobic aliens perceived humans. Martians were attenuated, fragile beings about 1.25 meters tall, humanoid in general plan but described as 'goblin-like' in appearance. They were bipeds, with broad, webbed flat feet and long, spindly limbs. Their delicate-looking hands had three digits: two enormous, fragile, tapered fingers, and a long, flattened opposable thumb. Though weak, Martians possessed considerable strength for their size, and were tirelessly single-minded in their ant-like devotion to a task. Their intelligence evidently was high, despite the apparently-primitive state of their civilization. Diamond-tipped spears were their only weapons, yet they rapidly learned how best to sabotage equipment vitally-necessary to Mars-bound humans.

Over the eons, as their world dried and cooled and as its reddish air thinned, the Martians adapted to life within vast seas of soupy marsdust. Far from the moist polar caps and the permafrost of ancient channels, in endless deserts of crescent-shaped dunes and beneath debris-strewn wastelands, the Martian sands are soft, and fine enough to flow like thick oil. An exotic ecology survived, with solar-powered microorganisms in the sulfur and iron-rich upper layers, feeding intermediate stages of life further down. At the bottom of these viscous, dry oceans the Martians endured, shielded from meteor strikes and the harsh surface climate. They once must have had a respectable technology. Much later, they built only stone maze cities, with curved walls, rounded corners, and multifarious openings. Their written language is a strange, slanted script which has yet to be well-deciphered. They wore clothing. They brought their dead to the surface for burial in crematorial wells the mouths of which were rings of inscribed cut-diamond blocks slightly more than two meters high and three in diameter. Of Mars' ancient culture little else remains.

No peaceful contact with Martians ever was established. Olympus Base was eventually rebuilt, isolated, and safeguarded from possible hostile Martians — but interest in them and their world dwindled as the Belt prospered from the wealth of the asteroids, and as the UN found habitable planets elsewhere to populate. A large ice-asteroid, Mahmen, impacted Mars in 2293, briefly straining Earth-Belt relations even though no humans died. This event probably caused the extinction of any remaining Martians, to whom free oxygen, liquid water, and water vapor were lethal poisons.

Whether Martians ever were advanced enough to develop spaceflight, whether they were even originally native to Mars, and whether their remote cousins may flourish elsewhere remains sheer conjecture. In the Ringworld era, Mars is only sparsely populated by humans, although interest in terraforming it runs high in some circles. Corrosive superoxides in the Martian soil destroy terrestrial organic compounds, however, and the few previous attempts to introduce gene-tailored plants have ended in failure.

The Ringworld Map of Mars contains a thriving colony of Martians, but due to their peculiar metabolism, it is highly unlikely that they would be met with anywhere else on Ringworld. These Martians, adapted to a 1-gee environment, will be correspondingly robust.

ORCAS

I sometimes wonder what our human lives would be like if we were not, as we are, creatures of fear.

— *P. Spong,* Mind in the Waters

Killer whales *(Orcinus Orca)* were granted federal protection as early as 1972 A.D. in the archaic sub-state United States, under the Marine Mammal Protection Act. Early in the 21st century, Orcas were found to be sentient, first achieving full human equivalence under the comprehensive Cetacean Rights Act of 2017.

Orcas are easily identifiable by their sharply defined, flamboyant coloring. They look like black-and-white oversized dolphins; they are in fact the largest species of the dolphin family *(Delphinidae).* Males grow as long as 10 meters and as heavy as 9 tons; females are smaller, 6-8 meters, and may weigh over 5 tons. Both have glossy black bodies, with rounded heads and massive conical teeth, 10-14 per jaw half. Behind each eye is a conspicuous white patch, and the underbelly from head to tail is also white. Behind the large, triangular dorsal fin is a distinctive gray "saddle patch" which varies in size and shape with the individual. Vision is excellent, due to an extra crystalline layer in the eyes. Orcas can swim in excess of 50 kilometers per hour. They have long life-spans, up to 100 years for the females. On Earth, they may be found in polar, temperate, or tropical oceans.

Orcas rely mainly on a diet of fish, particularly the large schooling species of tuna and salmon. They are voracious eaters, exceptional in that they are the only cetaceans who regularly feed upon marine mammals, on aquatic birds as big as penguins, on squid, and occasionally even on larger whales. Because of their appetite for warm-blooded prey, they were dubbed 'killers' originally. Today, however, Orcas are often compared to humans because of their intelligence, independence, playfulness, individual identities, family units, and ability to communicate with one another. For their codes of honor, senses of personal dignity, fearlessness, and courage they sometimes are referred to as 'Kzin of the Sea.' Unlike the Kzinti, giant delphinids have never attacked humans without clear cause.

MARTIANS

Char.	Range	Averages	
STR	3D6*	10-11	Average Hit Points: 17
MAS	1D6+3	6	Speed: 3m/im
CON	3D6	10-11	Action Ranking: 4
INT	2D6+6	13	
POW	3D6	10-11	
DEX	2D6+6	13	
APP	3D6	10-11	
EDU	unknown		
Age	unknown		

*Add 3 to STR if Ringworld native.

ARMOR AND HIT LOCATIONS: Martians have no natural armor. There is no evidence that martians wear any form of artificial armor. Martians, though they have similar body shape to humans, distribute their locational hit points differently: they have 35% in their heads, chest, and abdomens, and 25% in their limbs.

Location	D20 roll	Armor/HP
Right Leg	01-03	0/4 (.25)
Left Leg	04-06	0/4 (.25)
Abdomen	07-10	0/6 (.35)
Chest	11-15	0/6 (.35)
Right Arm	16	0/4 (.25)
Left Arm	17	0/4 (.25)
Head	18-20	0/6 (.25)

WEAPONS: the only weapon which humans have identified as of martian origin a long diamond tipped spear. These spears do 1D6 damage. Undoubtedly the martians on Ringworld have other, as yet undiscovered, weapons.

SKILLS: Archaic Melee Weapon 65%, Astronomy/Primitive 90%, Athletics 70%, Emergency Treatment 65%, Engineering/Primitive 65%, Fine Arts 70%, Planetology/Mars 50%, Hide 75%, Own Language (INTX5), Repair 30%, Strategy 60%.

ORCAS

Char.	Range	Average
STR	4D6+12	26
MAS	3D6+50	60-61
CON	2D6+6	13
INT	2D6+6	13
POW	3D6	10-11
DEX	2D6+6	13
APP	2D6+6	13
EDU	as for humans	

Age: 1 D6 on age chart

Average Hit Points: 74
Speed: 8m/im
Action Ranking: 4

ARMOR AND HIT LOCATIONS: Orcas have thick blubber which protects them for two points. Orca hit locations are found on the cetacean hit location table. Their hit points are distributed as follows; 25% in the flukes and fins, 30% in the hind-body and the head, and 35% in the forebody.

Location	D20 roll	Armor/HP
Flukes	01-02	2/22 (.25)
Hind-body	04-08	2/22 (.30)
Forebody	09-13	2/26 (.35)
Right Fin	14-15	2/19 (.25)
Left Fin	16-17	2/18 (.25)
Head	18-20	2/22 (.30)

WEAPONS: Orcas have huge and powerful jaws with which they can bite for 6D6 damage. A limb bitten by an orca is torn off and swallowed if the damage exceeds twice the hit points of the member. Orcas base chance to bite is 65%.

SKILLS: Orcas can learn all the knowledge and communication skills available in Known Space and, by purchasing Hands, they can learn most of the agility, perception, and technical skills as well. The Hyperspace skill may not be possible.

Orcas live, hunt, and travel in permanent family groups called pods *(Tschi'Larhi).* A pod-family consists of 5-50 close-related adults and young, who all bear the hereditary pod name. The pod name often is given before the name of the individual, as in *Korla Na'gring* or *Korla Maree.* Each Tschi'Lar has its own social structure, always highly organized. Each adult possesses special areas of expertise and responsibility, though the larger males generally are charged with defense.

A number of the smaller Orca families are nomadic, preferring to travel extensively in pursuit of their favorite schools of migratory fish. They most frequently visit bights and estuaries along undisturbed coastlines like that of archaic British Columbia on Earth; these sites are marked by their peculiar rubbing rocks and beaches. Larger pods are usually more cosmopolitan, building and maintaining impressive labyrinthine sea-castles *(Ls'Ni)* just offshore in home waters. These fortress-like structures are often natural formations much-modified over centuries. Inside, kilometers of smooth, round water-tubes connect galleries big enough to breach in; these galleries vary in shape from asymmetrical toroids to perfect spheres. The antipodal capital cities of the Korla family, *Ti'Ekwak* and *Ti'Nianasa-noongliak,* are splendid, but humans rarely are allowed to visit them. There are thousands of Korlas, and on Earth this royal dynasty is traditionally empowered to speak for the entire species.

The Orcas' complex system of sonar language is intriguing. They vocalize nearly 70% of the time, producing a variety of sounds. Each pod has its own dialect. Echo-location sounds, usually high-frequency clicks, are used mainly to interpret the environment. Social and communication sounds — whistles and rapid low-frequency clicks (burst pulses) — are used to identify and to converse with each other or with Dolphins, at distances of up to 80 UNS kilometers [50 miles] .

The Orca language is *Sharruli'K;* interspecies dialog is always conducted in the Korla dialect. Many complicated treaties have been drawn up with the Dolphins, but with humans only basic assured-mutual-assistance and non-aggression pacts exist. Orcas do not war amongthemselves.

Killer whales have been rather less willing than Dolphins to forgive and forget the past predations of man. Before the Cetacean Rights Act ended all forms of whaling, Orcas had first learned fear from the merciless factory-ships of the 20th century. Killer whales had occupied a place in the oceans equivalent to the one humans enjoy on land: capable of preying upon anything alive, but not themselves preyed on by other creatures. By 1979, however, Soviet commercial whalers were killing nearly a thousand Orcas each season, mostly for oil and byproducts. It is not surprising that Orcas have only gradually begun to show much interest in human enterprises.

Though they supervise certain underwater shipping industries on Earth in order to purchase "Hands," they mainly have been pleased to help re-establish the natural harmony of the oceans. Few pods have ventured to the seas of other worlds as yet, although one courageous family, the *Unimak Achernari,* has migrated to the fabulously untamed Circle Sea of Gummidgy.

Orcas are believed to inhabit the Great Oceans of Ringworld, but none have been sighted or contacted.

THE PIERIN

We view things not only from different sides, but with different eyes — we have no wish to find them alike.

-Pascal

These intelligent, spacefaring aerial aliens were first encountered by humanity just before the onset of the third Man-Kzin War. Initial contact occurred in the Zeta Reticuli system, where the short-lived Wunderland Coalition's cartographic resource ship *Hopewell* (piloted by the later notorious Serpent Belter, Darlita Domergue-Munro) happened upon a bustling Pierin base. UN probes and independent scout craft had long ago mapped the inner planets and reported one as suitable for colonization — but events in human space forestalled settlement of so distant a world — 12 light years beyond Silvereyes. The Pierin captured the *Hopewell,* then released and warmly welcomed the crew. A cooperative alliance arose from this meeting.

Centuries before, the Kzinti had enslaved the Pierin home planets; from that time, four unconquered Pierin colony worlds in the galactic south had been marshalling resources in a final effort to free the rest of their species. The spectacular destruction of the Warhead military complex on Canyon (accomplished by the human-built Wunderland Treatymaker) was of crucial strategic significance to the free Pierin, enabling them to retake and to successfully hold their devastated ancestral system. The double suns of Zeta Reticuli remained under Pierin control, and is their nearest major colony to Earth in the Ringworld era.

To understand the evolution of the Pierin, it is necessary to review the characteristics of the stellar system in which they evolved, Puppeteer star catalog TC 1211, a double-star called Vinijir, after the primary. Vinijir is a brilliant main-sequence star of spectral type F, somewhat similar to Procyon. Its companion Tawi is an M-type red dwarf. (Picture the Solar System if it had more mass: the sun would be brighter, and Jupiter might shine as a faint, crimson star.) The remarkable twin-planet of the Pierin orbits Tawi, whose modest output provides enough warmth to create a stable, habitable shell at an otherwise excessive distance from Vinijir. The combination of predominantly long-wavelength (red) radiation from Tawi and abundant ultraviolet from Vinijir has given the Pierin a much broader range of vision than humans — and the benefit of a second set of large, infrared-sensitive eyes.

The Pierin 'home world' is a beautiful double-planet system consisting of two terrestrial, oxygen-atmosphere worlds in orbit around their common center of mass, with a minimum separation of 623,000 kilometers [about 387,000 UNS miles] . Both planets are somewhat smaller than Earth. Tidal forces have slowed but not stopped the spins of the worlds with respect to each other. The larger planet, Cimalor (Pierin B), rotates in 55.3 hours; the lesser, Tereke (Pierin A) rotates in 8.1 UNS days. The surface gravity of the lesser, rocky world is 0.64 gee, nearly as light as Wunderland; that of the larger, oceanic planet is 0.79 gee. The ancestors of the Pierin evolved on Tereke, the smaller mountainous world, where they flourished along the windy shores of its many lakes.

Pierin as Individuals

Many humans find the appearance of Pierin bizarre and disturbing, yet somehow oddly familiar. Light and graceful flyers, Pierin have little else in common with terrestrial birds. The species seems to trace its origins to a large 12-armed amphibious creature vaguely reminiscent of the marine cephalopod *Vampiroteuthis.* Adult Pierin average 1.8 to 2.1 meters tall. Their 'wings' are flexible and elastic, but become quite rigid in fully-extended flight by means of internal fluid redistribution. Each wing-structure incorporates four tough, tube-like 'arms' of variable length, for support, trim, and motive power. The arms contain central muscle-and-ligament segments (some of which slide past one another) ultimately anchored to both sides of a muscular 'keel' — part of a Pierin's so-called 'internal exoskeleton' (flatlander students of the Pierin must discard any notion of Earthly analogs). Maximum adult wingspans are 4.8 to 6 meters.

Two large, tubelike limbs beneath the wings give the Pierin effective bipedal locomotion, while two smaller ones above the wings serve as true arms, terminating in 'hands' of six mutually-opposed tendrils, with roughened surfaces for grasping. Two of the tendril-fingers are twice as long and much stronger than the other four. The 'toes' are similarly-constructed, but flattened and considerably larger.

The mouthparts of a Pierin are protected within a slightly flexible, pointed beak-like structure which emerges from the skull in a pattern of symmetrical ridges. There are two short, horn-like projections on either side of the head, which house a Pierin's keen acoustic, electromagnetic, and barometric senses. A single narrow nostril-slit is located equidistant from the sense-horns, in the front of the head. The eyes are perhaps the most unsettling aspect of a Pierin's appearance. The large infrared eyes are spaced widely apart, directed nearly 90° from one another, and covered with an opaque membrane. Below them, closer-set and just above the beak, are rather human-looking green eyes, facing forward. A human's gaze involuntarily shifts back and forth between the two sets of eyes — the lower set alert and familiar, the upper set inscrutable and monstrous. Pierin are always at a disadvantage on worlds with a single sun (except at night), and few can lift unassisted from a one-gee surface.

compounds, and have shown little interest in developing them.

Pierin are omnivores, though most prefer a diet rich in raw fishlike creatures, crustaceans, and other marine organisms. Infrared vision, mobility, and intelligence allowed their ancestors to evade predators and ensured emergence as the dominant life form on Tereke. In the sky above always floated the blue world of Cimalor ("farthest lake" in Old Pierin).

Relations with the Universe

Science and civilization eventually brought interplanetary space travel, and the fulfillment of the ancient dream of flight to Cimalor. Its oceans held a magnificently abundant marine ecology, and the development of its food resources heralded the beginning of a long age of leisure and enlightenment for the twin-planet system. Many Pierin became expert, colorful pilots whose skill and daring in high-altitude aerobatics, atmospheric skips, and dive-turns has rarely been matched.

Extensive traffic between Tereke and Cimalor attracted Puppeteer traders, who began supplying the Pierin with advanced, highly-aerodynamic spacecraft which closely resembled the outlines of traditional Pierin Monitor design. These ships were two variants of the spherical GP no. 1 hull, about 21 and 36 meters in diameter respectively — thinner, but fully transparent to certain narrow bands of infrared light. The main hulls are sunk into smoothly-tapering disks of Puppeteer hull-metal, 40 to 90 meters in diameter (in their hottest aerobatic maneuvers, Pierin pilots claim they must "risk the disk"). Monitors land as gracefully in water as on a solid surface. A number of GP no. 3 hulls were also obtained, as mother ships.

When the Kzin Empire traced a Pierin scientific scout back to Tereke and Cimalor (ca. 1964 A.D.), Pierin space exploration was already several thousand years old. Six interstellar colonies flourished, and scientific-monitor research vessels had even visited Earth from time to time. The Patriarchy conquered the twin planets of the home system, but the Pierin brilliantly defended four of the colony worlds.

In the Ringworld era, there is a Pierin starport on Silvereyes, leased for two centuries. Despite its disadvantages (single sun, high gravity, short day), Silvereyes is the only world in Human Space which slightly resembles Cimalor.

Many Pierin follow an animistic religious philosophy which most humans find primitive and an annoying hindrance to rational discourse. It is called *Tiagra,* which translates loosely as "holding onto the truth of Tia," an ancient teacher. No Interworld phrase captures the essence of its meaning. Adherents say Tiagra is "an old religion, a good religion — the way of our ancestors who flew no machines." Tiagrans view nature as a delicate harmony of forces, natural and supernatural. They believe that sentient beings, material objects, natural phenomena, and perhaps the universe itself all possess spirits akin to souls, which interact with one another in a realm that parallels physical reality. The tradition teaches that if one does not live an attractive life, his soul will desert him in darkness — flying away to join ancestors who dwell in the rising sun beyond a twelve-peaked mountain. Tiagra holds that many diseases of the soul cannot be cured by autodocs or any other technology. Expelling evil spirits and diverting evil forces are looked on as personal and social duties. Pierin often little-distinguish between their religion and their other activities, examining even routine situations for anything that might seriously upset the balance of supernatural harmony, careful not to anger the souls of things. They are much given to ritual, and conduct clandestine ceremonies despite any proscription.

Pierin society is communal, with collective ownership of resources, free access to information, and relatively equal distribution of goods and services. Narrow specialization in social or industrial tasks is frowned upon as unnecessary, elitist, self-limiting, and (worst of all) boring. Nonetheless many distinctions exist among individuals and clans in Pierin society that seem to be taken for granted as part of the mysterious harmony of the universe. The cultures of Tereke and Cimalor are quite different. Natives of Cimalor are more apt to lack a sense of urgency than Terekeans, and less likely to follow Tiagra. Cimaloreans have been heard to remark, "If there is much work to be done, someone may do it."

In dealing with alien civilizations, the Pierin sometimes have attempted to translate their mystical outlook into action, often showing undisguised contempt for diplomatic protocol and governmental secrecy. From time to time, this had made them unwelcome on a number of Known Space worlds, including Earth. Planetary officials often stereotype Pierin ideas as subversive, economically dangerous, and unfathomably obscure. Many flatlanders view the Pierin as, at least potentially, posing a serious and fundamental challenge to flatland values. There is truth to this. Many Pierin who follow Tiagra see themselves as agents of change, with a profound duty to divert evil

PIERIN

Char.	Range	Average
STR	2D6+6	13
CON	2D6+6	13
MAS	2D6+4	11
INT	2D6+6	13
POW	3D6	10-11
DEX	2D6+6	13
APP	3D6	10-11
EDU	as for humans	
Age	1D6 on age table	

Average Hit Points: 24
Speed: 7 (flying); 3 (land-bound)
Action Ranking: 4

ARMOR AND HIT LOCATIONS: Pierin have no natural armor and they never wear artificial armor. Pierin hit points by location are as follows; 30% of total hit points in each leg, each wing, and the head, 35% in the torso, and 25% in each arm.

Location	D20 roll	Armor/HP
Right Leg	01-02	0/7 (.30)
Left Leg	03-04	0/7 (.30)
Torso	05-12	0/8 (.35)
Right Wing	12-13	0/7 (.30)
Left Wing	14-15	0/7 (.30)
Right Arm	16-17	0/6 (.25)
Left Arm	18-19	0/6 (.25)
Head	20	0/7 (.30)

WEAPONS: Pierin have full access to Known Space weapons technology and, though they are not fond of combat, can become quite effective with weapons.

SKILLS: Pierin have access to every skill on the standard skill list, and have a special skill called Fly, at which they are 90% efficient.

Most Pierin are white or sulfur-colored, with black to golden-brown markings. Their faces are sharply outlined in a pattern that some humans compare to the mask of Alaskan malamutes. (Darker-hued Pierin look like they're wearing pantomime make-up.) Their bodies are almost entirely covered by a downy, fur-like material. From a distance Pierin resemble great horned birds, but closer up they seem like occult idols brought to life. Individual Pierin often are nosey and overly-friendly, though usually intelligent and fairly efficient. Pierin music is ethereal and highly-regarded by many humans. Pierin on occasion have an elusive, sardonic sense of humor; some are so given to visionary poetry (often related to their religious philosophy) that they quote it annoyingly in lieu of a direct answer to a question. Pierin voices are hard for most humans to appreciate — their speech sounds like serial raspy screeches and complex atonal clicks. There are two sexes, both sentient and rather similar in physiology: both bear young — the males always give birth to females, and vice-versa. The Pierin mature slowly, and may live as long as 200 UNS years. They use no life-extending

forces. They advocate impractical schemes to entirely restructure the political and economic priorities of Known Space in terms of collective cooperation, not incentive competition between individuals and species. Tiagrans believe that ever-increasing industrialization and mechanization do not in themselves hold answers to the problems of sentient beings, and usually prove too costly to the majority for the benefits which those achievements provide for the few. Tiagra teaches that economic exploitation is a form of organized violence, that true progress must take into account the common good first, not profits. A cosmic brotherhood of intelligences and the restoration of supernatural harmony can only come about from redefining traditional concepts of property, employment, wealth, and social institutions on unenlightened worlds.

Pierin are not militarists, though they can fight tenaciously and in a disciplined manner. Tiagra holds that there is an internal spiritual force latent in all sentient beings which is ultimately more powerful than any external force. Pierin tactics frequently presume that a small, brilliant gesture of defiance or sacrifice will be enough to mobilize the energy of a whole population, and that a peaceful chain-reaction of change will follow inevitably. At times this has been successful (as on Wunderland in 2772), but more often this naively optimistic view of alien psychology has led to new injustice, disaffection, and even bloodshed. Pierin-inspired cults on several human worlds have experimented with communal economics and emphasized what they term "the search for right livelihood."

furious whales. The whale symbolizes hugeness, and in fact these marine mammals include among their species the largest organisms known to have evolved upon the planet Earth. Both the whale and the Dolphin have constellations named after them.

Several species of great whales became extinct during the 20th century, including in the last decade of the century the sentient Sperm Whales. These majestic beings fell victim to intensive whaling by the archaic sub-states of Japan, the Soviet Union, South Africa, and others; and to widespread poisoning of the seas by pesticides and industrial chemicals. They were driven to final extinction by experimental underwater sonar stations funded as aids to oceanography and shipping, but actually intended to track nuclear submarines. Many Sperm Whales were driven insane; the rest, unable to communicate with one another or to navigate, could no longer breed efficiently enough for the species to survive. Prized for their meat and high-grade body oil, they had suffered terrible depredations during the centuries man hunted them. Their depleted numbers could not recover.

The Cetacean Rights Act of 2017 was passed because of the loss of the Sperm Whales, and because of the resoundingly positive results of the Dolphin experimental program. Sperm Whales were declared sentient and given full human equivalence — posthumously. This was the end of a shameful episode in human history.

Sperm Whales were large, even for aquatic mammals. The males could exceed 20 meters in length, while the females occasionally reached 12 meters. Their backs were gray or brownish, brightening on the sides to silver-gray, sometimes with a white belly. Lacking baleen, Sperm Whales were the only toothed great whales. Their conical teeth, up to 20 centimeters long, were numerous in the lower jaw but vestigial or absent in the upper jaw. They dined almost exclusively on large squid, but also took fishes. They preferred to feed in warmer waters.

Extraordinarily-efficient divers, Sperm Whales were able to stay submerged for well over an hour, and to reach depths of nearly two kilometers. That far below the surface it is nearly dark, and only auditory signals can accurately assess the environment. Cetaceans can perceive a far-greater range of sounds than can humans, and they emit a wide variety of noises and whistles when communicating and echo-locating. In general, their vision as modified for underwater use is adequate, and their sense of smell almost altogether lacking. Their ability to taste minute concentrations of chemicals in the water is acute.

The most direct information concerning the lives and history of the Sperm Whales is from a single source, an underwater recording made in 1996 by a naval research team. The existence of this tape was made public by the Dolphins at the beginning of their legal proceedings against humanity, but only portions remained intact when the tape was de-classified. The tape holds a final, resigned attempt to communicate with humans or, failing that, at least to leave some minor cultural legacy. The poignant Dolphinese translation may still be heard at the Smithsonian. One well-known passage is particularly haunting:

> *In the ocean of immortal stars you gave us a home* [a reference to the constellation Cetus] ; *in the ocean of home our death and madness .... All our lives, dissolving in the endless sea, unnoticed, like dying storms .... And we too shall leave the Earth and the sea . . . in dreams among the stars . . . we shall swim forever.*

The message was the work of a single individual, whose reward for delivering it was deafness and starvation.

There may be Sperm Whales in the Great Oceans of Ringworld.

SPERM WHALES

Char.	Range	Averages	
STR	5D6+20	32-33	Average Hit Points: 95
MAS	3D6+70	81-82	Speed: 14m/im
CON	2D6+6	13	Action Ranking: 5
INT	2D6+6	13	
POW	3D6	10-11	
DEX	3D6	10-11	
APP	3D6	10-11	
EDU	unknown		
Age	unknown		

ARMOR AND HIT LOCATIONS: Sperm whales are heavily girded by up to a foot of blubber, giving them eight points of protection. Sperm whale hit points are distributed as follows; 30% in the flukes, hind-body, and head, 35% in the fore-body, and 25% in the fins.

Location	D20 roll	Armor/HP
Flukes	01-03	8/29 (.30)
Hind-Body	04-08	8/29 (.30)
Fore-Body	09-13	8/34 (.35)
Right Fin	14-15	8/24 (.25)
Left Fin	16-17	8/24 (.25)
Head	18-20	8/29 (.30)

WEAPONS: Sperm whales have powerful jaws with which they can bite and do 8D6 damage. Any limb damaged to twice its hit points by a sperm whale bite has been chewed beyond recognition and should be considered permanently lost. A sperm whale's base chance to bite is 65%.

Sperm whales were renowned for their powerful ram. In the days of the whaling industry a sperm whale occasionally sank a ship with a single buffet. The sperm whale has a 75% base chance to ram. The ram does 10D6 to the target.

Sperm whales can also slap with their flukes, an attack which once sent whaleboats foundering. The flukeslap has a base chance of 50% and does 6D6 damage.

SKILLS: Sperm whales are extinct on Earth, and it is unknown whether there are any on Ringworld. The skills of these magnificent sentients are entirely unknown, though speculative base chances for them have been included on page 16. They certainly would not much resemble either Orcas or Dolphins.

SPERM WHALES

Future things swim before me, as in empty outlines and skeletons; all the past is somehow grown dim. — Starbuck: Moby Dick

The unfathomable mysteries of the great whales have always roused human curiosity and imagination. From antiquity the whales and the Dolphins have inspired charming legends and fables. Even before the time of Biblical mythology, travelers told tales of boats beached upon sleeping whales, of adventurers mistaking whales for islands, and of ships smashed or swallowed whole by

THRINTUN (Slavers)

The Power separates Thrint from Animal.

Two to three billion years ago, a race of ravenous telepathic carnivores, the Thrintun, enslaved most of the sentient species in the Milky Way galaxy. Their home world, a small light-gravity planet with a dense terrestrial atmosphere, has never been located, and may no longer exist. Thrintun have been extinct for at least 1.5 billion years — victims of their own degenerating intelligence, and of a final empire-wide revolt led by the cleverest of their slave-races, the Tnuctipun.

THRINTUN

Char.	Range	Averages	
STR	3D6	10-11	Average Hit Points: 19
MAS	1D4+4	6	Speed: 5m/im
CON	2D6+6	13	Action Ranking: 4
INT	2D6	7	
POW	5D6+6	17-18	
DEX	2D6+6	13	
APP	3D6	10-11	
EDU	unknown		
Age	unknown		

ARMOR AND HIT LOCATIONS: Thrints have scaly integument worth one point of armor. Often they armored their vac-suits. Thrints distribute their hit points in the same manner as do humans; 30% of general hit points in their legs, abdomens, and heads; 25% in each arm; and 35% in their chests.

Location	D20 roll	Armor/HP
Right Leg	01-03	1/6 (.30)
Left Leg	04-06	1/6 (.30)
Abdomen	07-10	1/6 (.30)
Chest	11-15	1/7 (.35)
Right Arm	16	1/5 (.25)
Left Arm	17	1/5 (.25)
Head	18-20	1/6 (.30)

WEAPONS: Thrintun weapons include the variable sword and the famous mining disintegrator. Thrints have no natural weapons, but see the psionics section below.

COMMON SKILLS: Thrints have access to all the Known Space standard skills, though most will have few knowledge skills; they rely on slave races for knowledge. All thrintun know Athletics/ Acrobatics to at least 50%. Instead of the Hyperdrive skill Thrints have the skill, Jump Drive.

PSIONIC ABILITY: The Thrintun had the most powerful psionic ability ever known, by humanity, to exist. Each Thrint can exert a psionic compulsion over that number of sentient creatures equal to its POW x1. This compulsion is irresistible unless the victim has the Mind Shield psionic ability, or possesses a device equivalent to the ability. If a Thrint successfully exerts the power over a creature, that creature cannot act of its own will, and will commit any action that the slaver wishes — even self-destructive or suicidal deeds. A single slaver using a power amplifier can control millions of individuals, without the amplifier he can control 20-30. In Known Space, only bandersnatchi are immune to the Thrintun power.

The Thrintun species died out billions of years before the Ringworld era. The threat still remains that a Thrint or even a whole Thrintun colony is trapped in stasis somewhere, and upon emergence will attempt a re-subjugation of the galaxy.

Then the suns of Known Space lay dispersed in "lawless" sectors of the galaxy, on the fringes of the still-expanding Slaver Empire. In many systems, new Thrint masters seeded the oceans of primitive planets with Tnuctipun-developed food yeast, the first step in Thrint-forming their worlds. On a few others they had already introduced whitefood herds (Bandersnatchi) to graze on the food-planets' thick, cheesy-gray scum. To guard their food planets, and to oversee the operation of meatpacking ships, Thrint caretakers often built lunar palaces and observation posts on their worlds' circling moons. Most of the carbon-based life currently known ultimately descends from the prolific, adaptable unicellular micro-organisms spread by the Slavers. Mutated descendants of whitefood yeast still choke the steamy, pressurized sea of Jinx, along whose shores early human colonists first encountered Bandersnatchi. Humanity has met only a single Slaver, Kzanol, buried for an eternity in silent stasis — the "Sea Statue" permanently in possession of the UN Comparative Cultures Exhibit at the Smithsonian.

A typical adult Thrint stands 1-1.25 meters tall, and weighs 30-50 kilograms. Despite its small size, its appearance would terrify any sane human. A Thrint seems a monstrous perversion of the humanoid form: one-eyed, two-armed, bipedal, and covered with tough, iridescent-green scaly integument. The single large eye, centrally-located on the squat, massive head, is usually bluish or greenish in color, though its hue may vary with the Thrint's emotional state. Beneath the eye is a broad slash of a mouth lined with numerous piranha-like teeth, needle-sharp with a metallic glint. At its corners are six pairs of prehensile eating-tendrils, three large and three much smaller on either side. Resembling giant grayish-pink earthworms, these may writhe reflexively when the Thrint is agitated, flatten for protection against the cheeks, stand away from the mouth as the Thrint probes distant minds, or hang relaxed to the side in limp arcs. Eating-tendrils also serve as sensitive flexible fingers. Powerful shoulders meet in a triangular hump behind the Thrint's globe-like head, while its oversized arms terminate in bulky, club-like hands. Set like mechanical grabs, each hand has three thick clumsy fingers. Proportionally less-massive legs end in great splayed chicken feet with three toes and prominent heel-spurs. Startled, a Thrint tends to jump like a terrified gazelle rather than to run, and its natural gait is more a hop than a walk. Well-fed Thrintun had very long lifespans, perhaps greatly exceeding a thousand UNS years.

There were various Thrintun spoken languages, and each family had its own distinct dialect. Two languages were most important: Thrintun, for use only between adult Thrints, and Overspeak (Overtalk) for use between Thrint and slave. Most Thrintun speech sounds like unmodulated guttural growls that would shock any human throat, punctuated by sharp bleats.

The Power

On this particular point all 12 Thrint religions were agreed: the Powergiver's primal decree, given before he lit the stars, made the Thrintun the chosen Lords of Creation, masters over every intelligent beast. The awesome Slaver telepathic ability, the Power, was irresistible to lesser beings. Far beyond mere telepathy, the Power enabled Thrintun to probe the minds and to control the behavior of all the protoplasmic sentients they encountered, utterly enslaving them. Its effect has been described as absolute telepathic hypnosis or compulsion. The Power had various modes, attributes, and faculties: active/passive, conscious/preconscious, cognitive/empathic/ motor, listen/tell/attention, and so forth. Using his native ability, a single Thrint could normally control 20-30 slaves (non-Thrints) within a 50 km radius, independently or simultaneously — at least on modestly-populated worlds with nominal telepathic noise. Boosted by a thought-amplifier, a Thrint could impose its will upon an entire planet. Distance, though, was of much less importance to the Power than other factors: numbers, noises, and velocity-differences. A slight difference in relativistic time-rates, for example, could make communication impossible, even between two Thrintun. In empty space, a lone Thrint once paralyzed a human at a range of more than 1.6 million kilometers — and it could probe the minds of others at distances several times more remote. Even the emotional mental outburst of a Thrint may unintentionally cripple unshielded minds for miles around, sometimes leaving them permanently insane.

The Power is better-protected than human sight or hearing: adult Thrintun possess formidable mind-shields, impenetrable telepathic walls under both reflexive and voluntary control, like an eyelid. The mind shield may be raised or lowered suddenly, or cautiously, only part way. (In telepathy-prone humans, this ability is latent, attainable only with great effort.) The teeming masses of the Thrintun worlds always kept up their mind shields in public. Those rare Thrintun who reached adulthood without manifesting the Power were called *ptavvs.* Tattooed permanently pink, or with Overspeak inscriptions in dots and curlicues, ptavvs were sold into slavery or secretly killed by their families. Some adult Thrint stricken with the humiliation of Powerless became wildly unpredictable or went catatonic: they might commit suicide; they might go on killing sprees, slaughtering every slave or thrint who crossed their paths; or they might compulsively forget even the existence of a Power. Thrintun considered their females non-sentient perhaps because no female possessed the Power.

Attitude and Outcome

Over the millennia, the Slavers built a vast interstellar empire, eventually drawing upon the resources, labor, and technologies of many advanced slave-races. Often single wealthy families owned and ruled entire slave planets. New worlds belonged to their Thrint discoverers for life, to be transformed into rich plantations under the absolute rule of their overseers. Wealth and power, respect, hundreds of mates, and tens of thousands of personal retainers to serve one's every whim were the tangible rewards for a Thrint master. The amplifier helmet was the universal symbol of his authority.

Thrintun Slavers rarely were intentionally cruel or sadistic masters — at least they did not consider themselves so. Rigid and complex Thrint traditions, religions, and codes of ethics made it dishonorable for owners to mistreat their slaves, as long as those slaves obeyed without resistance and always showed proper deference. Furthermore, though hardly squeamish, Thrintun recoiled at the thought

of eating intelligent food animals. Nonetheless, their callous arrogance, childish naivete, emotional petulance, inattention to detail, lack of patience and foresight, and limited capacity for mature, rational consideration sometimes resulted in hideous atrocities beyond the comprehension of the normal reader. Though enjoying the benefits of the most sophisticated technological civilization that the galaxy had produced, the aristocratic Thrintun believed that anyone who worked was a slave. Ultimately, their lordly overconfidence killed them all.

In Known Space and far beyond, scattered relics of the ancient Slaver Empire have survived into the Ringworld era. Most eagerly sought after are valuable artifacts of vanished technology preserved virtually unchanged in stasis boxes (sometimes detectable by deep-radar on narrow-beam maximum setting). Only a small fraction of stasis boxes contain priceless items — on rare occasions, such finds have revolutionized human society. For example, the Slaver disintegrator was a common Thrintun digging tool, and the variable-knife was a standard personal weapon with the ceremonial significance of a sword. Most Slaver technology, however, has been entirely lost: their high-velocity jump drive, telepathic amplifier helmets and recorders, total conversion batteries, self-sustaining anti-gravity fields, and an endless list of simple, elegant devices so compact and so efficient that beside them the finest human machines seem complex, jury-rigged makeshifts. Biological relics of the Thrintun Empire have also endured; among them Bandersnatchi, stage-trees, air plants, Slaver sunflowers, and in a sense we ourselves.

In the end, Thrintun no longer understood the technologies they controlled and upon which they had become so thoroughly dependent. The Power, which once had separated Thrint from Animal, ultimately relegated the Slavers to oblivion. When it became clear that the Tnuctipun-inspired rebellion would succeed in destroying the Empire, Thrint military leaders built a doomsday machine: an immense thought-amplifier. With it they Ordered every sentient species in the galaxy to commit suicide. With no slaves, cut off from their distant food-planets, the remaining Thrintun themselves rapidly died out.

TNUCTIPUN

Why would the Tnuctipun have made an intelligent food animal? A slave that can't be controlled can't be trusted.

Kzin nobles aren't supposed to be superstitious — yet there are ghost legends among them. Some of the most fearsome speak of captured weapons haunted by their dead owners, weapons that wreak vicious and vindictive retribution upon those who defile the spirits of their former masters. There are strange legends, too, among spacefaring sentients far beyond the Patriarchy: tales of being overtaken in hyperdrive by huge ships; of worlds in hyperspace; of sunless phantom planets between the stars, glimpsed once and never again; of whole planets in stasis, crowded with exotic life-forms awaiting shipment to unimaginably remote destinations; of billion-year relativistic hibernation; of exotic civilizations scattered through the obscure dark masses beyond the galactic rim. Ringworld era storytellers often attribute such manifestations to the past or present activities of a mysterious, long-vanished species, the Tnuctipun. In a very real sense, Known Space is haunted by the ghosts of the Tnuctipun.

Fifteen million centuries ago, the Tnuctipun, the most advanced of the Thrintun slave races, engineered a galaxy-wide revolt against the Slavers. The Tnuctipun slaves possessed high intelligence, higher technology, and a slyness more terrifying than even the Thrintun telepathic Power. By developing machines, energy sources, and gene-tailored life-forms for the Slavers' convenience and amusement, they proved the worth of their free-thinking brains — and eventually earned more freedom than any other slave race. Many Tnuctip gifts, though, turned out to be deadly traps. In the long Slaver-Tnuctipun war there could be no neutrals and no quarter. Countless covert operations and minor battles must have occurred before open warfare broke out. In the end, Slavers, Tnuctipun slaves, and every other sentient being then in the galaxy died, exterminated by a Slaver-developed ultimate weapon.

Humanity's knowledge of the Tnuctipun is limited, deriving only from a few sources: fragmentary records and artifacts found in stasis-boxes; the incomplete reports of Larry Greenberg, based on telepathic contact with the Sea Statue in 2106; the Papandreous' partially-declassified descriptions of a mutable Tnuctip spy-weapon; the squiggly Tnuctip science-language of the Jinxian Bandersnatchi; the detailed studies of mutated Tnuctip biological creations (beginning with Dr. R.H. Schultz-Mann's pioneering field work); and a handful of lesser references. Greenberg, the only human capable of recognizing a Tnuctip, unfortunately was lost aboard a Lazy-Eight-series slowboat which blew its drive systems while moving at near light-speed. [The ship is now somewhere hundreds of light years from Known Space, its crew and passengers probably still alive, riding in stasis.) At the time of his departure for Jinx to contact Bandersnatchi, Greenberg had not been subjected to total hypnotic recall — the importance of the Tnuctipun had yet to be fully appreciated.

The Tnuctipun are believed to have been small, carnivorous sentients, highly dextrous, agile, and compactly built. To the Slavers, they seemed too small to be intelligent animals, and thus probably did not exceed 0.5 meters in height. It has been suggested that they vaguely might have resembled terrestrial tarsiers. Quick, wiry bipeds, the Tnuctipun are thought to have had hands with six tapering fingers and two long opposable thumbs on each. Their manipulative abilities were unquestionably exquisite. A few authorities speculate, however, that there may have been many strains of Tnuctipun; or that in some cases their Slaver masters had ordered them to genetically alter their own physiques for aesthetic (or other) reasons. Some have suggested that the general behavior and diet of the Tnuctipun pleased the Slavers, corresponding in many ways to proper Thrintun customs.

Bioengineering and Technology

The Tnuctip were already accomplished biological engineers when the Slavers found them — and the Slavers soon put their talents to work devising biological tools and toys for Thrintun use, Most such Tnuctip creations have long since disappeared or mutated beyond recognition. A few, though, have survived into the Ringworld era, among them stage trees, air plants, sunflowers, food yeast, and Bandersnatchi. Stage trees are organically-grown solid-fuel rockets: gene-tailored *mpul* trees on

TNUCTIPUN

Char.	Range	Averages
STR	2D6+2	9
MAS	1D6+3	6
CON	3D6	10-11
INT	2D6+6	13
POW	3D6	10-11
DEX	1D6+13	16
APP	3D6	10-11
EDU	unknown	
Age	unknown	

Average Hit Points: 16-17
Speed: 3m/im
Action Ranking: 4

ARMOR AND HIT LOCATIONS: Tnuctipun have no natural armor. It is unknown whether they wore artificial armor, or whether they manipulated their own genes to make themselves more resistant to damage. Use the hominid hit location table to determine locations affected, but the chest and abdomen switch in physiological importance. Tnuctipun have 30% of general hit points in their legs, chest, and head, 25% in their arms, and 35% in their abdomens.

Location	D20 roll	Armor/HP
Right Leg	01-03	0/6 (.30)
Left Leg	04-06	0/6 (.30)
Abdomen	07-10	0/7 (.35)
Chest	11-15	0/6 (.30)
Right Arm	16	0/5 (.25)
Left Arm	17	0/5 (.25)
Head	18-20	0/6 (.25)

WEAPONS: Tnuctipun weapons technology is the most powerful known. If a gamemaster wishes to revive a Tnuctipun for use in a campaign, he or she should make up an appropriately-advanced hand weapon for the alien to carry. See the story *The Soft Weapon* for an elaborate description of a particular Tnuctipun weapon.

COMMON SKILLS: Tnuctipun have full use of Known Space skills, particularly biological skills. Every tnuctipun is proficient to at least 60% with the Biology/Genetics skill. Tnuctipun are also master technologists, and should be well-skilled in all the physical sciences.

The discovery of a living Tnuctipun might revolutionize all the sciences and technology of Known Space.

the outside, with powerful chemical-propellent cores on the inside, around a star-shaped hollow. Slavers used these as booster rockets to lift their ships far from places where fusion drives would have done damage. The Tnuctip-bred air plants for Slaver ships produced oxygen, filtered and regenerated air and water, and performed other basic life-system duties. A few of these have been discovered floating naked in space in cellophane bubbles between the stars. Slaver sunflowers were another Tnuctip development: these plants had flexible parabolic mirrors mounted on thick bulging stalks — mirrors to send concentrated sunlight to their dark-green photosynthetic nodes, or to direct their deadly focus elsewhere, on wild animals, rebellious slaves, or even on attacking enemy Thrints. Sunflowers, planted for defense around Slaver estates, never attacked the members of the House they protected — until the rebellion; Tnuctipun house slaves must have controlled them.

The creation of food yeast may have been another Tnuctip trap: seeded on remote worlds to transform them into food planets, its introduction logistically overextended the Thrintun empire. Soon enough, the food supplies became easy to cut off. Bandersnatchi (whitefoods) were meat-animals designed to feed on the Tnuctip yeast. Everything but the flexible, jointless skeleton was edible, and the huge brain was particularly tasty. It was one of the Tnuctipun's ultimate weapons. Unbeknownst to the Slavers, Bandersnatchi had been built sentient, so that they could be used as spies. They somehow had been made immune to the Slaver Power, and were mutation-proof. Probably there came a day when huge herds of docile, 60-ton herbivores all turned upon their Thrintun overseers. The Tnuctipun were always efficient, the Slavers believed, but never cruel; the Slavers could not believe that an intelligent food-animal had been created — the Powergiver forbade it!

If not cruel, the Tnuctipun were certainly not squeamish. The lovely simplicity of their mutated racing viprin was typical of their work. The natural animal had been the fastest alive; there was little the Tnuctipun could do in the way of redesigning. They had narrowed the animal's head and brought the nose to a point, leaving the nostril like a single jet nacelle, and they had made the skin almost microscopically smooth against wind resistance, but this had not satisfied them. They removed a kilogram or two of excess weight and replaced it with extra muscle and extra lung tissue. The weight removed was all of the digestive organs. The mutated racing viprin had a streamlined sucker of a mouth which opened directly into the bloodstream to admit predigested pap. In action the result was worth the trouble: their bowed skeletal shapes like great albino whippets seemed to skim the dirt surface of the track, their jet nostrils flaring, their skins shining like oil, racing around and around the audience standing breathless in the center of the circle.

Tnuctipun also were master technologists. They settled and colonized many worlds, and possessed space drive systems possibly capable of reaching the great galaxy in Andromeda (M-31). Indeed, a fleet of free Tnuctip escaped into space when Thrintun found the Tnuctipun home system, and the Slavers always believed they had fled the Milky Way in just such an attempt. Probably, though, that fleet stayed between the stars — and a few 'civilized' Tnuctip slaves in each Thrint system must have taken their orders. Slaver ships in subsequent millennia used a variable-jump hyperspace drive [governed by the Uncertainty Principle] which may have been a Tnuctip invention. The touchy fusors which powered the Slaver drives may have been Tnuctipun-developed total conversion power sources — for the Tnuctipun had the secret of complete matter-to-energy transformation. Near the end of the Slaver empire, Plorn's Tnuctipun are said to have created and released true anti-gravity propulsion systems (as opposed to gravity polarizers or energy-hungry negative artificial generated-gravity) to trigger economic chaos, accelerating the Thrintun downfall.

The weapons and devices used by Tnuctip saboteurs and spies, powered by small total-conversion batteries, are masterpieces of technological sophistication. A single, mutable hand weapon might have many settings, flowing from one configuration to the next at the touch of a button. One such versatile device contained a variable sword with a 60-meter blade, a reaction-pistol, two projectile weapons, a powerful sonic projector, a plasma gun which emitted a firestream of fearfully-hot incandescent gas, a remarkably-efficient energy-absorber, an extremely-advanced computer/translator, and a matter-conversion beam (a hazy blue line that evidently set up spontaneous mass-conversion in anything it touched!). The weapon also contained a self-destruct, and was lost.

Other Tnuctipun technology produced sub-miniature hyperspace communicators of wholly-unknown design, which could function within gravity wells. They may have produced devices which defended against the Slaver Power, and devices which detected the thought-signatures of enemies concealed from view. Stasis fields were used by the Tnuctipun, and may have originated with them. Perhaps because they too may have been — or might still be — Tnuctip traps, Slaver stasis fields make some humans (and aliens) feel uneasy. Governments supervise the initial opening of stasis boxes, and restrict their later use.

The discovery of total conversion may someday make fusion power as obsolete as the internal combustion engine. Meanwhile, any species learning the principles behind Tnuctip weaponry, regardless of power-source, would be in a position to command Known Space utterly. Probably only an entire world of Protectors could defeat such power.

Ringworld Animals

Anxaoma Description

Anxaoma are land animals living only in moist, overgrown, lowland habitats such as river-banks, swamps, marshland, jungles, and cloud forests. They estivate during dry periods, emerging once again when rains come.

Anxaoma vaguely resemble gigantic armored slugs. There are several different species on Ringworld, but their ranges do not overlap. Adults exceed 2 meters in length, and may approach a meter in height. They weigh over 200 kilograms.

The dorsum of an anxaoma is covered with a tough, resilient, jointed plating resembling horn. This flat-shell is like the inverted hull of some alien barge. Thorny falcate spines mark periodic growth.

An armored crown at the center of the shell houses three bright blue eyes on individually-retractable stalks. When the beast is feeding or moving it will shoot out its eyes, seemingly at random from under this protective ridge. When the anxaoma sights prey or is frightened, the eyes

ANXAOMA

Char.	Range	Average	
STR	4D6	14	Average Hit Points: 51
CON	3D6+18	28-29	Speed: 1 m/im
MAS	3D6+12	22-23	Action Ranking: 7
POW	2D6	7	
DEX	1D4	2-3	

ARMOR AND HIT LOCATIONS: 7-point shell, 2-point flesh. When frightened, the creature curls up, leaving only its shell as a potential target (roll 1D10 + 4 to determine hit location under these conditions), but if it is wounded through the shell, the anxaoma will uncoil and begin to spray its tormentors.

Location	D20	Armor/Average HP
Rear Body	01-04	2/16 (.30)
Mid Body	05-11	7/21 (.40)
Turret	12-14	7/13 (.25)
Right Eyestalk	15	2/11 (.20)
Center Eyestalk	16	2/11 (.20)
Left Eyestalk	17	2/11 (.20)
Fore Body	18-20	2/16 (.30)

NOTE: there is a 50% chance that an eyestalk will be retracted when its hit location is rolled. If the stalk is retracted, treat the hit as a turret hit.

Weapon	Attack%	Damage
Spray	60%	special

SPECIAL DAMAGE: the spray has a range of 5 meters. This highly alkaline fluid acts both as a contact poison and as a solvent. The target takes 1 D3 points of general hit point damage immediately (clothing or armor will not protect against this unless it covers the entire body and is waterproof). The substance then slowly corrodes the target, who will take 1 point of damage every 10 minutes after first being hit. Any clothing, even plastics and synthetics, will hang in rags after less than a half-hour exposure. If the anxaoma scores a special success with its spray attack, the target is poisoned as well, with a class B, potency 14 poison.

After the spray has been rinsed off with prodigious quantities of alcohol-based solvents, the target will cease to take damage after another 30 minutes. Unprotected equipment will almost certainly be ruined by this spray.

protrude more frequently and for longer periods of time, looking like the creature is under a strobe-lamp.

Anxaoma feed on fungi, fleshy plants, and animals, though they can usually only catch small animals or large animals that are asleep or injured. They cannot digest cellulose, and avoid plants containing this material. Thus, a barrier of paper will prevent them from molesting an encampment.

When the anxaoma sights food (anxaoma hunt both by chemical signs and visually), it will spray the food with noxious digestive fluids squirted from three thick extensible proboscis mounted on its down-sloping front. Objects sprayed by anxaoma juice become inedible and poisonous to hominids and most animals. Hominids sprayed by this fluid may die or become quite ill if not treated. The spray includes chemical cues to ward off other anxaoma, who will not eat anything sprayed by another anxaoma.

Anxaoma are most active at night. The day is spent in moist dens, where they digest food engulfed during the night. Anxaoma require comparatively enormous amounts of food, and must eat every night, except when estivating.

An anxaoma spends the first part of each night roaming and spraying potential food organisms. The creature normally only sprays immobile targets. The latter part of the night is spent retracing its path and engulfing the sprayed, now digested food organisms. Anxaoma have no territories, but wander randomly, often seeking or digging a new den each night.

Anxaoma go into periodic breeding fits in which all the anxaoma of an area fanatically follow one another's odor trails. These fits culminate in mad orgies and huge seething breeding masses. Each participant then buries eggs in a nearby riverbank.

Anxaoma are vulnerable to drying, but are not amphibious, and will drown if immersed. Anxaoma will spray threatening predators. They are inedible to most Ringworld natives, and evidently hail from a non-earthlike planet.

BLOATH

Char.	Range	Average	
STR	3D6 + 6	16-17	Average Hit Points 50
CON	4D6	14	Speed: 7m/im
MAS	4D6 + 22	36	Action Ranking: 5
POW	2D6	7	
DEX	2D8	9	

ARMOR AND HIT LOCATIONS: 3 point skin

Location	D20	Armor/Average HP	
Right Hind Leg	01-02	3/13	(.25)
Left Hind Leg	03-04	3/13	(.25)
Hindquarters	05-07	3/18	(.35)
Forequarters	08-10	3/18	(.35)
Right Fore Leg	11-12	3/13	(.25)
Left Fore Leg	13-14	3/13	(.25)
Head and Neck	15-20	3/15	(.30)

Weapon	Attack%	Damage
Bite	40%	2D10
Kick	30%	1 D6 + 3D6

NOTE: the bloath does not have the ability to make simultaneous attacks, though it can choose which attack it is to make on a particular action ranking.

Bloath Description

Bloaths are roaming plains animals, also found in the fringes of forests and jungles". They are yellow-skinned tetrapods up to 2 meters high at the shoulder. Their necks reach up another 2 meters and culminate in a large, spherical head with a gaping, toothed mouth. A half-meter tail ends in a pom-pom of fluff, and is used to signal other bloaths.

Bloaths feed on tall plants and tree leaves. They prefer to flee rather than fight. They are sometimes solitary, though they are usually found in small groups of no more than a dozen individuals. The young receive no maternal care, and are born capable of running with the herd. Bloaths have two sexes.

Bloaths can be domesticated as riding beasts and are easily trained as cavalry mounts, learning how to bite and kick in battle. Though edible, they are unsuitable as food beasts, because they breed slowly, though they live a long time. Some tribes of hominids live as hunting nomads upon bloath-back.

BUSHCANKER

Char.	Range	Average	
STR	1D6	3-4	Average Hit Points: 6
CON	2D3	6	Speed: 1 (larval)/0 (adult)
MAS	1D3	2	Action Ranking: 7
POW	1D4	2-3	
DEX	1D4	2-3	

ARMOR AND HIT LOCATIONS: 3 point cartilage

Location	D20	Armor/Average HP	
Body	01-20	3/6	(1.00)

Weapon	Attack%	Damage
Shove	60%	1D2

Bushcanker Description

Bushcanker larvae are small, 15-limbed, disc-shaped organisms topped by a branching umbrella of pink-and-blue cartilage. The legs are segmented and tipped with tiny claws. A tangle of fine pink and yellow filaments with a shiny, acrylic look at the tips covers the body. The umbrella is a central stalk of flexible cartilaginous tubing which contains extensible optic and olfactory receptors, fluid-intake pores, nephrons, and airducts.

The bushcanker's poorly-understood life-cycle aids the maintenance systems of many temperate Ringworld forests. Rainfall triggers the emergence of immature bushcankers. These larvae scuttle over the forest floor for several falans, feeding on detritus and burying seeds and half-eaten leaves in tiny feeding burrows.

Upon reaching 25-50cm across, each bushcanker picks out a suitable tree and attaches itself firmly to the trunk, protected beneath its loosely-woven shield of hard, thorny tubing. After attachment, the only motion possible to the animal is a reflex jab of the protective shield, which discourages all but the dullest herbivores. The adult absorbs nutrients from the tree, and may live several hundred falans quiescently parasitizing its host, spewing out clouds of zygotes every two falans without fail.

The body juices of adult bushcankers are bitterly alkaloid, sufficient to dismay most potential predators with a single bite. The young are less noxious, and are eaten by a variety of hardy predators.

Chiller Description

Chillers are carnivores native to rugged areas, such as mountains, badlands, and ruined cities. A related species (identical in game terms) is native to swamps and bogs.

These creatures have extremely thin bodies with six even thinner stalk-like legs. Their skin is like soft magenta velvet. Their heads are large and ungainly, covered with warts and ridges. A typical chiller stands just under a meter high at the shoulder, but weighs only 20 kilograms.

Chillers have a potent psionic ability to broadcast fear. When hunting a chiller pack emits waves of uncontrollable panic, causing their chosen victims to flee blindly. Even a lone chiller can bring panic to most creatures.

A chiller can attack one target for each of its action rankings by matching its POW vs. the target's POW on the resistance table. If it succeeds, the victim is panicked, and will remain frightened until its player successfully rolls a reasoning roll (or 01-05 in any case). He may attempt to recover from the panic once every (25 - POW) impulses. A frightened target will remain scared even after the chiller switches to another target, until it succeeds in a reasoning roll. A panicked victim cannot perform any actions beyond running directly away from the chiller at maximum possible speed, possibly exhausting itself. If no chillers are visible, the victim will run in a random direction.

CHILLER

Char.	Range	Average	
STR	2D6	7	Average Hit Points: 15
CON	3D6	10-11	Speed: 4m/im
MAS	2D3	4	Action Ranking: 4
POW	2D6+12	19	
DEX	2D6 + 6	13	

ARMOR AND HIT LOCATIONS: 1 point hide

Location	D20	Armor/Average	HP
Right Hind Leg	01	1/3	(.20)
Left Hind Leg	02	1/3	(.20)
Hindquarters	03-05	1/4	(.25)
Right Center Leg	06	1/3	(.20)
Left Center Leg	07	1/3	(.20)
Forequarters	08-10	1/4	(.25)
Right Fore Leg	11-12	1/4	(.25)
Left Fore Leg	13-14	1/4	(.25)
Head	15-20	1/5	(.30)

Weapon	Attack%	Damage
Bite	40%	1D10

Chillers hunt in two ways. One is to scare prey towards a group of hidden chillers. The second is to frighten prey toward a natural obstacle such as a cliff, hot spring, or bog, where the victims will be killed or trapped.

This fear projection is also a potent defense mechanism. Only a few Ringworld creatures are resistant to the chillers' fear projection, and no hominids are. The chillers can broadcast their fear effectively more than a kilometer, but usually wait till they are closer before attacking prey.

DAUKOON

Char.	Range	Average	
STR	4D10 + 30	52	Average Hit Points: 93
CON	2D10 + 30	41	Speed: 2m/im
MAS	4D10 + 30	52	Action Ranking: 7
POW	3D6	10-11	
DEX	1D6	3-4	

ARMOR AND HIT LOCATIONS: 12 point bone on head, 9 points elsewhere

Location	D20	Armor/Average HP
Right Hind Leg	01-02	9/28 (.30)
Left Hind Leg	03-04	9/28 (.30)
Hindquarters	05-08	9/38 (.40)
Forequarters	09-12	9/38 (.40)
Right Fore Leg	13-14	9/28 (.30)
Left Fore Leg	15-16	9/28 (.30)
Head	17-20	12/32 (.35)

Weapon	Attack%	Damage
Ram	50%	1 D6 + 8D6

Daukoon Description

The adult daukoon is a forest-dweller weighing 2 to 4 metric tons. Black fuzz covers its gray skin. The daukoon's head is a hideous mask of horny growths, spines, and lumps. Beak-like jaws driven by powerful muscles shear plants and trees for food.

Daukoons are herbivores, and feed solely on cellulose obtained from treetrunks and uprooted stumps. They are placid, and only attack in perceived self-defense. They are solitary and not territorial, but wander seemingly at random.

Male daukoons leave shiny blue packets of gelatinous genetic material about as they travel. Gene transfer is accomplished when a female, attracted by the scent of a packet, swallows it whole. Subcutaneous buds then grow upon the back of the females, and immature daukoons are rubbed off after about four falans. These young are capable of feeding themselves, but for protection remain near their mother up to three UNS years.

Domesticated daukoons tend to wander off if not kept strictly penned up. Valley people sometimes use them to uproot trees and clear farmland. The male genetic material is very high in protein, and is eaten by hominids and many other creatures.

Dusk Devil Description

Dusk Devils (also called bastrils) are savage, non-sapient, carnivorous hominids with bluish-black skin. They seldom exceed a meter and a half in height, and often are no more than a meter tall. Sharp teeth set in an elongated skull protrude from behind glossy lips. Large dark eyes and wide mobile ears give dusk devils excellent sight and hearing. The hands are large and possess hooked claws. Dusk devils are frequently armed with rocks or crude spears. They are nomadic plains-dwellers, but instinctively occupy the huts or vehicles of those whom they destroy. They may have derived from certain diminutive herder species, which they parallel: lean and wiry, nearly hairless, rapid runners with legs long in proportion to the torso.

Dusk Devils hunt nocturnally in packs which range in size from a dozen to a hundred. Ambushes are a dusk devil specialty, and stories of their cunning have spread to lands where they themselves do not dwell. They devour prey on the spot and leave only bone fragments for the morning scavengers.

Dusk devils are extremely aggressive, but do not attack large parties of armed hominids. If the chosen prey fights back effectively and kills one or more dusk devils, the rest respond more ferociously in an instinctive attempt to kill off such dangerous enemies. If the prey continues to kill dusk devils, even the most persistent killers will eventually flee by suddenly breaking off the attack and unanimously racing into the dark. If pursued, they will turn and fight.

Dusk devils do not communicate vocally among themselves, and observe strict silence on the hunt. Yet they have an eerie ability to mimic the voices of hominids and the cries of animals — a talent both offensively and defensively advantageous, and potentially dangerous to explorers.

Expanding dusk devil populations have occasionally forced hominids possessed of moderately high technology to abandon their territory — evidence of the persistence of these little horrors.

Little is known about the actual lifestyle or culture (if any) of the dusk devils. However superstitions abound.

DUSK DEVIL

Char.	Range	Average	
STR	2D6	7	Average Hit Points: 16
CON	3D6	10-11	Speed: 5m/im
MAS	2D3 + 1	5	Action Ranking: 3
INT	2D3	4	
POW	2D6 + 3	10	
DEX	2D6+10	17	

ARMOR AND HIT LOCATIONS: none

Location	D20	Armor/Average HP
Right Leg	01-03	0/5 (.30)
Left Leg	04-06	0/5 (.30)
Abdomen	07-10	0/5 (.30)
Chest	11-15	0/6 (.35)
Right Arm	16-17	0/4 (.25)
Left Arm	18-19	0/4 (.25)
Head	20	0/5 (.30)

Weapon	Attack%	Damage	Parry%
Thrown Rock	40%	1D4	
Spear	40%	1D6 + 1	40%
Bite	50%	1D6	
Claw	30%	1D3	

NOTES: each action rank, a dusk devil may attack once, except that if it attacks with claws, it can attack twice. It must drop any weapons it is carrying to do so.

SKILLS: Hide 60%, Sneak 80%, Track 50%

Dire Description

Dires live on plains and in open forests. These brown, hairless, vaguely-porcine beasts grow over two meters in length, and up to almost a meter high at the shoulder. A pair of sharp red spikes thrust upward from the angle of the upper jaw, and a double row of teeth decorate a small ventral mouth.

Dires subsist on offal, decaying fruit, and burrowing animals uprooted by their tusks. They are omnivorous, but primarily feed on plant matter.

Their rutting season occurs every 4-5 falans. Normally solitary, they band into small family groups and savagely assault any lesser beings which venture near.

At the best of times dires are ferocious and have uncertain tempers, and are avoided, except by hunters.

DIRE

Char.	Range	Average	
STR	3D6 + 8	18-19	Average Hit Points: 40
CON	4D6	14	Speed: 5m/im
MAS	4D6+12	26	Action Ranking: 5
POW	3D6	10-11	
DEX	3D6	10-11	

ARMOR AND HIT LOCATIONS: 3 point hide

Location	D20	Armor/Average HP
Right Hind Leg	01-02	3/12 (.30)
Left Hind Leg	03-04	3/12 (.30)
Hindquarters	05-08	3/14 (.35)
Forequarters	09-13	3/16 (.40)
Right Fore Leg	14-15	3/12 (.30)
Left Fore Leg	16-17	3/12 (.30)
Head	18-20	3/14 (.35)

Weapon	Attack%	Damage
Gore	75%	2D8 + 2D6
Trample	75%	4D6 vs. prone opponent only

NOTES: can attack with Gore once per action ranking. Alternatively, it can use the Trample once per impulse if there is a downed foe within reach.

SKILL: Observation 40%

TABLE OF CREATURE HABITATS

Creatures in Ringworld

deserts	*forests*	*hills*	*marsh*	*mountains*	*plains*	*ruins*	*water*	*domesticated*
	dendrobrach	dar'los	bogworm		breakneck	razor-wasps	bogworm	breakneck
	doublescream	razor-wasp	doublescream		dak-dak		flob	dar'los
	hueti		flob		dar'los		wrillabee	havlig
	zongo				razor-wasp			hueti
					sarkbeste			sarkbeste
					zanjii			

Creatures in Ringworld Companion

deserts	*forests*	*hills*	*marsh*	*mountains*	*plains*	*ruins*	*water*	*domesticated*
chiller	anxaoma	chiller	anxaoma	chiller	bloath	chiller	stigfish	bloath
jibber	bloath	dusk devil	chiller	greldik	dire	dusk devil		daukoon
	bushcanker	loper	dusk devil	loper	dusk devil	goron		haemont
	daukoon	munil	pilk	onik	haemont	varmont		loper
	dire	snorter	varmot	rimspinner	loper			pilk
	dusk devil	varmot			munil			rimspinner
	loper				pilk			snorter
	trembler				snorter			varmot
	varmot							vindwight

MOUNTAINS: means above tree line — otherwise see Hills

FOREST: includes jungle

RUINS: creatures may be found on abandoned floating cities or buildings as well as surface ruins.

DOMESTICATED creatures that do not appear on any other chart are only found where there are domesticators — nowhere else.

Goron Description

Gorons are odoriferous flying creatures, producing an ozone-like stench. Their bodies are usually no more than a half-meter long, but their wingspan can reach 2m across. Their have wiry, five-limbed bodies which are deep violet in hue and possess a surface network of bulging leaden veins. In flight, a goron resembles a bony monster-kite. Two branching sidelimbs reach horizontally, stretching a flap of skin between long, slender processes and the animal's back. The flap terminates on a long third arm which rises from between the goron's shoulders, reaching forward. This arm contains a threadlike antenna and ends in a needle-sharp pick partially composed of titanium. The two hind limbs are free of any flap and are used solely in ground movement. All four paired limbs end in a single mobile claw for grasping, piercing, and slashing.

A long, narrow beak ranged with sharp ragged teeth is centered in the goron face. Gorons have three large emerald eyes, one on each side of the beak, and the third beneath it.

A nasty temperament and ravenous appetite makes the goron detested by most hominids. They thrive on bones, either from carrion or freshly killed prey, ignoring all softer tissue. To the alarm of most civilizations, they also eat an amazing variety of synthetic materials, including organic superconductors, plastics, artificial fibers, and even light metal.

Gorons are not common, but in those locations where they are known, they are found in great flocks. They seem incapable of surviving in small groups. Some ruined cities are permanently infested with these pests. Other flocks inhabit facilities designed for occasional visits or destroy abandoned vehicles. Derelict floating buildings occasionally serve as sanctuaries.

Gorons can sense magnetic beams and surface energy fields. An attracted flock will often fly along such a beam for hundreds of kilometers. Migrating gorons are guided by police, transport, or power beams. They can sense buried superconductor grid circuits, and are drawn to any strong or persistent electromagnetic source. The clever and resourceful gorons are known to cling to giant flobs and flying vehicles for transport. Gorons do not sleep, but are most active at night.

Gorons spawn quantities of maggot-like larvae every falan. These thrive on the same wastes as their parents, and will tunnel through a hundred meters of plastic cable housing or superconductor material. Adults smear a conductive, sticky reproductive paste over sites occupied by their young, which serves both as a stimulant to more breeding by the adults and a vitamin source for the maggots.

Greldik Description

Greldiks live on high plateaus, hillcrest ridges, and mountain slopes from 1 500 meters up to the snow or bare scrith line. They are extremelycold-resistant.

Adults average slightly under a meter at the shoulder and are 1.5 meters long. They are four-limbed, with the hind legs much longer and more muscular than the forelimbs. Some species have long, coarse hair and are predominantly yellowish or white, while other, short-haired woolly types come in a

GORON

Char.	Range	Average
STR	1D3	2
CON	3D6	10-11
MAS	1D2	1-2
POW	2D6	7
DEX	2D6+15	22

Average Hit Points: 12
Speed: 1 (crawl)/8 (flight)
Action Ranking: 2

ARMOR AND HIT LOCATIONS: no armor

Location	D20	Armor/Average HP
Right Wing	01-07	0/4 (.30)
Left Wing	08-14	0/4 (.30)
Body	15-20	0/6 (.50)

Weapon	Attack%	Damage
Bite	60%	1D3
Pick	80%	2D3

NOTES: will attack at the end of its action ranking with the pick attack, followed one impulse later with a bite. If the pick attack receives a special success, it does 4D3 damage instead of 2D3.

SKILLS: Fly 100%, Hide 75%, Observe 90%

GRELDIK

Char.	Range	Average
STR	2D6	7
CON	1D6+12	15-16
MAS	2D6	7
POW	2D6	7
DEX	3D6 + 8	18-19

Average Hit Points: 23
Speed: 8m/im
Action Ranking: 3

ARMOR AND HIT LOCATIONS: 1 point fur

Location	D20	Armor/Average HP
Right Hind Leg	01-02	1/6 (.25)
Left Hind Leg	03-04	1/6 (.25)
Hindquarters	05-09	1/9 (.35)
Forequarters	10-14	1/9 (.35)
Right Fore Leg	15-16	1/6 (.25)
Left Fore Leg	17-18	1/6 (.25)
Head	19-20	1/7 (.30)

Weapon	Attack%	Damage
Butt	60%	1D8
Kick	40%	1D4

NOTES: only bucks can use the head butt. The kick is usually only employed when the greldik is fleeing.

SKILLS: Climb 70%, Jump 90%, Listen 50%

variety of solid colors. Greldiks have ludicrously long-muzzled heads (sometimes almost a meter long, though very narrow), and usually show pronounced cheek bulges. Rather than teeth, each side of the jaw, both upper and lower, relies upon a long sharp blade of bone. Mature bucks display colossal convoluted horns that are transparent and red in color. A female gives birth to a single young every 8-12 falans, after a 2-falan gestation period. The fawn can climb and jump within minutes after clawing through the birth sac.

Greldiks are herbivores, feeding mainly on cellulose obtained from tree saplings, tough alpine plants, and stumps. Minerals, protein, and vitamins are obtained from manure-browsing and even carrion-feeding.

Hill People value these hardy gregarious animals as sources of meat; hair; thick, soft hide; and skume — obtained from female greldiks which have just given birth. Skume is an opaque liquescent cheesy substance with a frightful odor produced in throat glands to feed the young fawn. Hill People refine and modify this substance, producing a type of gelatine and dozens of varieties of palatable, though extremely fatty, drinks.

Greldik paths can be seen traversing many mountain slopes in many ranges. They are astonishingly agile, and live in seemingly impassable terrain.

HAEMONT

Char.	Range	Average	
STR	2D6+18	25	Average Hit Points: 61
CON	3D6 + 18	28-29	Speed: 4m/im
MAS	4D6+18	32	Action Ranking: 6
POW	1D6	3-4	
DEX	2D6	7	

ARMOR AND HIT LOCATIONS: no armor

Location	D20	Armor/Average HP	
Right Hind Leg	01-02	0/19	(.30)
Left Hind Leg	03-04	0/19	(.30)
Hindquarters	05-08	0/22	(.35)
Forequarters	09-12	0/22	(.35)
Turret	13-14	0/16	(.25)
Right Fore Leg	15-16	0/19	(.30)
Left Fore Leg	17-18	0/19	(.30)
Neckmouth	19-20	0/19	(.30)

Weapon	Attack%	Damage
Rear and Plunge	15%	2D6+3D6
Trample	25%	6D6 damage to prone foe only

NOTES: normally kicks once per action ranking. If it can reach a prone foe, it can trample him once per impulse.

Haemont Description

Haemonts are horse-sized quadrupeds also known as Bleeders. They are hairless, with a translucent pale hide — resembling a tough membrane more than true skin. Large veins and arteries are visible throbbing under their hide, as is their whitish musculature.

Haemonts are tailless. Each has a long thick neck ending in a circular blunt-toothed mouth reminiscent of a herbivorous lamprey's. Two pairs of eyes and a half-dozen sensory membranes peer from a hump (called *a* 'turret') just over their forelegs. Instead of hard hooves, they have rough pads protecting their feet. Their legs are quite thick and obvious not made for swift running.

Haemonts are slow-moving, and sicken in strong direct sunlight. They are domesticated by some types of Herders and evidently originally came from a permanently overcast world.

Haemonts are hermaphroditic, and give live birth to a single calf-sized young every four falans. The young are not tended by the adults, and can graze and walk within minutes after birth.

Haemonts produce prodigious quantities of blood when well-fed. An adult haemont can be bled of nearly a gallon of blood daily without harm. It can be bled up to three gallons of blood daily, but haemonts thus-bled cannot breed. Haemonts are herded for their blood rather than their meat, though their meat is eaten as well.

Haemonts respond to danger primarily by fleeing slowly and clumsily, though a cornered wild haemont might try to turn and crush a man-sized threat. Domesticated specimens offer no resistance to being cut and drained. Haemonts are sluggish to react to any threat whatsoever, and "haemont" is a common Herder epithet applied to the dull witted.

Jibber Description

The jibber (plural: jibberjex) is a small shelled carnivore which inhabits disturbed habitats and desert regions. Some species exceed centimeters in length. All can leap over a hundred times their own body length.

There is a wide variation in shape among different species of jibberjex, but the carapace is always seamless, and generally aerodynamic, sometimes even possessing gliding flanges on either side of the shell. Around the perimeter of the shell protrude 24 short, hooked, three-jointed-legs, and many short tentacular sensory organs. Jibberjex have no eyes, but can precisely target victims using motion, heat, sound, ground vibrations, and water-sensing biochemical receptors. Centered on the animals ventre is a single powerful jumping leg coiled around a sharp beak, normally withdrawn into the shell.

At night, Jibberjex scuttle restively, and may travel considerable distances. During the sunlight hours, a jibber will spend its time concealed by a shrub or a thin layer of sand.

A jibber in action will leap upon its victim, landing with its ventre against the target. The great leg will compress to store the energy of landing. The small hooked limbs grip the victim so tightly that it takes pliers to pull a dead jibber's claws out of its target, one by one. The pointed hollow beak will extend after landing and drive into the victim's flesh. If the victim wears armor, the probing jibber finds a crack or crease. Once the beak is driven into the prey's flesh, it injects a paralytic venom, and the victim will be helpless in seconds and thoroughly paralyzed in minutes.

If the victim is large and succulent enough, and the jibber is mature and mated, its reproductive cycle may commence. This is a process so revolting that it is taboo to describe it to outsiders among most desert hominids. The adult discards its carapace and burrows into the softer parts of its prey, swallowing vast quantities of the fattiest organs. Then the now-soft and baggy creature buries itself underground and is later eaten alive by its spawn, which hatch inside its body. Each jibber will "give birth" to up to 100 spawn, many of which survive to adulthood, continuing the cycle.

JIBBER

Char.	Range	Average	
STR	1D4	2-3	Average Hit Points: 5
CON	2D3	4	Speed: 2 (walk)/25 (leap)
MAS	1	1	Action Ranking: 1
POW	1D3	2	
DEX	2D6 + 20	27	

ARMOR AND HIT LOCATIONS: 1 point shell

Location	D20	Armor/Average HP	
Body	01-20	1/5	(1.00)

Weapon	Attack%	Damage
Bite	80%	1 D3 + poison

NOTES: The jibber attacks by leaping onto its target and then digging with its beak. Each impulse, the bite will penetrate through 1 D3 points of the victim's armor (cumulative) until it contacts flesh, when the jibber will begin to inject a paralytic poison. On each impulse thereafter, roll 2D6 and keep a running total. When the total exceeds the victim's MAS, he has become incapacitated, though he can still think, speak, and move feebly. When the total exceeds twice the victim's MAS, he becomes completely paralyzed.

SKILLS: Hide 200%, Jump 500%

LOPER

Char.	Range	Average	
STR	4D6+12	26	Average Hit Points: 37
CON	3D6	10-11	Speed: 9m/im
MAS	4D6+12	26	Action Ranking: 3
POW	2D6 + 2	9	
DEX	2D6+12	19	

ARMOR AND HIT LOCATIONS: 3 point fur and hide

Location	D20	Armor/Average HP	
Right Hind Leg	01-02	3/10	(.25)
Left Hind Leg	03-04	3/10	(.25)
Hindquarters	05-09	3/13	(.35)
Forequarters	10-14	3/13	(.35)
Right Fore Leg	15-16	3/10	(.25)
Left Fore Leg	17-18	3/10	(.25)
Head	19-20	3/12	(.30)

Weapon	Attack%	Damage
Bite	50%	1D8 + 3D6

SKILLS: Observe 75%, Run 150%, Scent 90%

Loper Description
Lopers are fast nocturnal quadrupeds commonly encountered in temperate and semi-tropical veldt and savanna, and somewhat less commonly encountered in rolling hills and woods.

These large creatures are covered with bright orange-red or crimson fur, occasionally mottled or banded with dull ochre. They are muscular and large, reaching 1 to 1.8 meters high at the shoulder. Their heads are narrow and deep, with large eyes and a flexible neck. They lack tails, and have a series of eyelid-like structures running down their back on either side of their spine. These lids can be voluntarily opened, revealing an opalescent patch of membrane upon which live colonies of luminiferous bacteria. By varying the lids opened, a loper can create a row of bright spots, a pattern of seemingly moving spots, or simply expose a single dot. At night, these glowspots are used for signaling on the hunt as well as for mating behavior.

Lopers are primarily carnivores, though they also dine with relish upon melons, eggs, and fresh carrion. They feed upon live prey of almost any size and type.

Lopers live in small family groups including five or six adults and a mob of young. Herders and other hominids sometimes keep semi-domesticated lopers for herd-protection, hunting animals, and even food. Lopers are easily trained and can guard encampments at night. Though lopers are nearly voiceless, their flashing lights work almost as well in signaling an intruder's presence.

Mountain and jungle lopers are far more ferocious than the plains species, which seldom attack adult hominids.

MUNIL

Char.	Range	Average	
STR	4D6 + 36	50	Average Hit Points: 88
CON	4D6 + 24	38	Speed: 3m/im
MAS	4D6+36	50	Action Ranking: 6
POW	3D6	10-11	
DEX	2D6	7	

ARMOR AND HIT LOCATIONS: 8 point skin, plus spikes. Any ranged fire has a 25% chance of hitting a spike instead of the creature itself. Spikes each have 30 hit points, and must be completely broken through before a shot hitting one will harm the munil itself. This protection does not apply to area-affect weapons such as explosives.

Location	D20	Armor/Average HP
Right Hind Leg	01-02	8/27 (.30)
Left Hind Leg	03-04	8/27 (.30)
Hindquarters	05-08	8/31 (.35)
Forequarters	09-13	8/44 (.50)
Right Fore Leg	14-15	8/27 (.30)
Left Fore Leg	16-17	8/27 (.30)
Head	18-20	8/31 (.35)

Weapon	Attack%	Damage
Bite	30%	1D6 + 7D6
Spike Ram	50%	2D8

NOTES: The munil itself will attack with a bite every action ranking. Anyone attacking the munil with melee weapons that are less than 2 meters long, or in hand-to-hand combat, will undergo an automatic Spike Ram attack. This is a side effect of the munil's natural armor, and costs the munil no action rankings or impulses to perform.

Munil Description
Munils are large herbivores native to moist plains and scrubby hills. They are occasionally domesticated by the Shell People as war animals or beasts of burden. They are tailless tetrapods reaching 3 meters at the shoulder. The back slopes quite rapidly from the houlders to the hips, which are about 2 meters high. The head is attached quite low on the front of the torso, giving munils a hunch-backed look. The head is reminiscent of the extinct shovel-tusked mastodons of Earth.

Most bizarre are the munil's spikes. All over the creature's back, flanks, proximal legs, and head sprout narrow, meter-long, spikes, triangular in cross-section. A typical munil has 50-60 such spikes, scattered more or less evenly over the body; 4 to 5 per leg, a half-dozen on the head, and 25 to 30 on the body itself. Individual munils can be identified by their spike-patterns. These spikes are defensive in nature — it is difficult for a predator to get close enough to a swaying, lurching munil to harm it without risking impalement on the spikes.

In breeding season (every 6 falans), the female munils lay quantities of basketball-sized jelly-like eggs in a lake or pond. The males then wade into the pond and fertilize the eggs. Half a falan later, the eggs hatch into muck-feeding, wormlike 'wrigglers' which lash their way about the pond until they have reached the size of anacondas, at which time they thrash out of the pond and bury themselves in the earth in spherical dirt cocoons. From hatching to cocoon takes 10-12 falans, but can vary with food supply. A horse-sized adolescent munil, with spike buds and shaky legs, will dig its way from the cocoon in 2 falans, and reaches maturity in 10-15 more falans.

Munils feed on shrubs, brush, and soft leafed plants. They cannot eat grass. Sometimes a munil will overturn a tree and feed on the leafy crown.

The Chellon riders of domestic munils saw off certain dorsal spikes to make room for a saddle.

Onik Description
The onik is a peculiar animal found only in the high mountains, well above the tree line. An onik's body is a flabby sack of waxy tissue. A large sucker on the underside is used to cling to rocks and creep slowly along. The sucker allows it to adhere to sheer cliffs and even hang upside-down. At one end of the ovoid body-sac is a short neck topped by a spherical head with a long tapering horn.

ONIK

Char.	Range	Average	
STR	2D6	7	Average Hit Points: 35
CON	4D6	14	Speed: 1 m/im
MAS	6D6	21	Action Ranking: 7
POW	3D6	10-11	
DEX	1D3	2	

ARMOR AND HIT LOCATIONS: no armor

Location	D20	Armor/Average HP
Body	01-15	0/35 (1.00)
Head	16-20	0/14 (.40)

Weapon	Attack%	Damage
Horn	40%	1D10 + 1D3

Oniks slowly creep over the mountain rocks, grazing on lichen, moss, tundra plants, and insects. They are completely inedible to most organisms, for their body solvents are based on alcohol rather than water. Any creature trying to eat an onik is poisoned almost immediately. Sometimes a Hill People or Spill Mountain Folk tribe will refine and purify the onik fluids, distilling the ethanol to derive an intoxicating, rather than murderous, drink. Oniks are even processed for lampwax and fuels.

Oniks start life as tiny frilled seeds, which drift almost aimlessly across the sky for a time ranging from a single hour to over a falan. If a seed comes to rest on a cold mountaintop, it sprouts a tiny head, horn bud, and sucker, and begins life.

Pilk Description
Pilks inhabit moist plains and marshes. They cannot abide arid climates. They are sometimes domesticated by Shell People or others. They are strictly grass feeders.

The pilk has a long neck and round head. Two unblinking beady black eyes peer outward, and a smooth, rounded beak uproots grass. The grass is swallowed in gulps, then ground and digested internally.

PILK

Char.	Range	Average	
STR	2D6 + 18	25	Average Hit Points: 48
CON	4D6+3	17	Speed: 7m/im
MAS	2D6+24	31	Action Ranking: 4
POW	2D6	7	
DEX	3D6 + 3	13-14	

ARMOR AND HIT LOCATIONS: 2 point hide

Location	D20	Armor/Average HP
Right Hind Leg	01-03	2/12 (.25)
Left Hind Leg	04-06	2/12 (.25)
Body	07-14	2/24 (.50)
Right Fore Leg	15-16	2/12 (.25)
Left Fore Leg	17-18	2/12 (.25)
Head	19-20	2/16 (.30)

Weapon	Attack%	Damage
Peck	30%	1D10
Kick	50%	3D6

NOTES: at the end of each action ranking, the pilk will kick, followed on the next impulse with the peck attack.

SKILLS: Jump 40%, Observe 50%

Weird lumps and swellings cover the pilk's body. The creature's four legs sprout from a single pelvis . The first segment of each leg extends parallel to the ground and at right angles to the other legs, creating a cross shape when viewed from above. From the first joint, the legs descend to the ground through three more knobbly joints. A running pilk looks like it is frantically trying to brake a forward rush, and as if at any second it will collapse into a tangle of legs. But it never does, and runs fairly swiftly for all its antics.

Pilks have fine gray fur everywhere but the chest, where lank wool covers a broad porous plate. All a pilk's wastes are excreted through this plate. A bubbling gluey froth, composed of excess water, carbon dioxide, ammonia, and excrement, continually oozes down the chest. This exuviate emits a fearful stench, and only devoted pilk-lovers ever ride or tend the things.

Every 3-5 falans the hermaphroditic pilks bury clusters of eggs in the soil. These hatch in a half a falan and release miniature pilks which tunnel to the surface to begin life on their own. Infant pilks can jump over two meters in a bound, but this power is lost as they mature and grow in weight. Pilks reach adulthood in a dozen or so falans.

RIMSPINNER

Char.	Range	Average	
STR	4D6	14	Average Hit Points: 30
CON	3D6	10-11	Speed: 2m/im
MAS	2D6+12	19	Action Ranking: 4
POW	2D6	7	
DEX	2D6 + 6	13	

ARMOR AND HIT LOCATIONS: 3 point hide

Location	D20	Armor/Average HP
Leg 1	01	3/6 (.20)
Leg 2	02	3/6 (.20)
Leg 3	03	3/6 (.20)
Leg 4	04	3/6 (.20)
Leg 5	05	3/6 (.20)
Leg 6	06	3/6 (.20)
Leg 7	07	3/6 (.20)
Leg 8	08	3/6 (.20)
Body	09-14	3/12 (.40)
Right Eyestalk	15	3/3 (.10)
Left Eyestalk	16	3/3 (.10)
Neck	17-20	3/9 (.30)

Weapon	Attack%	Damage
Horn	40%	2D3 + 1D6

SKILLS: Climb 200%, Jump 80%

Rimspinner Description

Rimspinners are mountain animals semi-domesticated and often hunted by hill or mountain hominids. They are white, with a velvety texture to their thick skin. Their bodies are horizontal disks, swollen in the middle. Eight long thin legs, spaced evenly around the perimeter, are each tipped with a pair of thin barbed claws. At one end of the disk a stout neck ends in a pair of thick, gently curved horns. On either side of this neck, a long stiff stalk holds aloft a spheroidal compound eye. The underpart of the neck opens lengthwise to expose a long lipless mouth with sharp slicing ridges on either side.

Rimspinners feed on moss and small alpine plants. They are not quick, but are very agile, and can clamber readily over seemingly impassable piles of rock or up sheer cliffs.

Rimspinners, all of which are hermaphroditic, give birth to a single young every 4 falans. Whether domesticated or wild, they are slightly territorial, and a herd of rimspinners space themselves out so that each animal has approximately a hectare of land to itself.

Snorter Description

Snorters, powerful quadrupedal herbivores with caviling temperaments, are often herded for their meat and hides by plains and lowland hominids. Sometimes they are ridden or used as draft animals.

Snorters stand 1.75 to 2.5 meters at the shoulder and are massively muscular. Their reddish-gray, fuzzily-bristled skin is broken by a dorsal checkerboard pattern in bright orange. Each limb terminates in a wide, four-toed foot, each toe tipped with a small pointed hoof. A snorter's skull is massive, elongated and downcurved. Their heads show bulbous, heavily-lidded eyes and gigantic, wrinkled flaring nostrils.

Snorters' mobile features wear many expressions, all seeming variations of uneasy disgruntlement, grouchiness, or disgust. Their long, lash-like tails crack like whips.

Life seems to be a pandemonium of minor annoyances to snorers — even when placidly grazing they issue a nearly continuous series of grunts, bellows, squeals, coughs, and sneezes. The loudest noise is their favorite mode of flushing out tasty morsels by sudden blasts of air. This knocks loose clots of vegetation, mounds of debris, piles of stones, or carefully-stacked explorers' supplies with gusts of hot breath.

Snorters enjoy wallowing in water and idly submerging themselves, though even then they give the general impression of discomfort. Snorters travel in herds of from 15-50 individuals, and stop for extended periods of time at each major body of water.

Stigfish Description

Many species of eyeless, slender, voracious stigfish inhabit Ringworld's freshwater bodies of water. They range in length from 0.5 to over 2 meters, and in weight from 2 to 25 kilograms. Narrow flattened snouts curve slightly upward at their apex to form a bony spline. Five rows of horny plates protect their flanks and back. Stigfish are muddy brown to green above, but lighten on the sides to silver-blue.

Stigfish travel in small schools of 10-50 individuals, hunting with sonar and feeding socially. Though they are avid predators, they panic when something unfamiliar and larger than themselves draws near. A stigfish school will then thrash about wildly — its individuals leaping, swimming erratically, or diving. This energetic display confuses many predators, and an aggressive attacker might even be seriously injured through being stabbed by a stigfish's beak.

Stigfish are edible, and taste like overripe oysters to Known Space humans. In seas with operational dredges, stigfish have geared their migratory and reproductive cycles to the local maintenance schedule. Many travel far upstream to mate and bear young, each defending their own stretch of woodland stream for several days. In some areas, stigfish have developed a symbiotic relationship with the Forest Fishers, whose psionic lure attracts them. The Fishers protect the stigfishes' highly edible eggs, while the fish seem to allow themselves to be caught in return. Boat People also relish the meat of the stigfish.

SNORTER

Char.	Range	Average	
STR	6D6 + 20	41	Average Hit Points: 64
CON	3D6+12	22-23	Speed: 5m/im
MAS	6D6+20	41	Action Ranking: 5
POW	2D6	7	
DEX	3D6	10-11	

ARMOR AND HIT LOCATIONS: 4 point hide

Location	D20	Armor/Average HP
Right Hind Leg	01-02	4/16 (.25)
Left Hind Leg	03-04	4/16 (.25)
Hindquarters	05-09	4/23 .35)
Forequarters	10-14	4/23 .35)
Right Fore Leg	15-16	4/16 .25)
Left Fore Leg	17-18	4/16 .25)
Head	19-20	4/20 .30)

Weapon	Attack%	Damage
Bite	30%	1 D6 + 6D6
Trample	50%	12D6 to prone foe only

NOTES: normally attacks with bite once per action ranking. Can trample prone enemies once per impulse.

STIGFISH

Char.	Range	Average	
STR	2D3	4	Average Hit Points: 8
CON	1D6	3-4	Speed: 6m/im
MAS	2D3	4	Action Ranking: 3
POW	1D6	3-4	
DEX	2D6+12	19	

ARMOR AND HIT LOCATIONS: 2 point scales

Location	D20	Armor/Average HP
Tail	01-06	2/3 (.30)
Body	07-14	2/3 (.35)
Head	15-20	2/3 (.30)

Weapon	Attack%	Damage
Spear	30%	1D8

NOTE: a stigfish will charge and try to spear an intruder only when protecting home territory in breeding season or when cornered and severely frightened. A stigfish Spear attack which receives a special success impale, and does triple damage. However, if the Spear attack impales, the stigfish will break its jaw, soon leading to death.

Trembler Description
Tremblers are sessile animals found only in rain forests. Superficially, tremblers resemble puffy, barrel-shaped, hollow-spiked gourds. A ring of fleshy, pale-yellow, spiked leaves surround the body. A dozen ropy green tendrils grow from the base. The whole surmounts a pale, fuzzy, tapering stalk mottled in reddish purple. The stalk is flexible and muscled, and extends vertically when the organism is hungry and dangerous. When the bulb rests low amidst its protective leaf cluster, it is relatively harmless.

When a trembler is attacked it reacts with a violent burst of ultrasound, and attempts to enfold and immobilize the attacker within its leaves both to prevent it from harming the trembler and to keep it within range of the destructive sound.

Tremblers are not intelligent, but chemically alert other up to a kilometer distant of a prey's presence and direction of movement.

Trembler reproduction is little studied. Some believe that the trembler has an active life-stage during which breeding takes place.

TREMBLER

Char.	Range	Average	
STR	2D6	7	Average Hit Points: 39
CON	4D6	14	Speed: 0
MAS	7D6	24-25	Action Ranking: 6
POW	3D6	10-11	
DEX	1D4 + 4	6-7	

ARMOR AND HIT LOCATIONS: 6 point touch cuticle, plus resistance to sonics — double effective MAS of a trembler for defense vs. sonic attacks. If a tendril location is rolled on a hit, roll 1 D3 to determine which tendril actually was struck

Location	D20	Armor/Average HP	
Stalk	01-03	6/12	(.30)
Tendrils 1 to 3	04	6/4	(.10)
Tendrils 4 to 6	05	6/4	(.10)
Tendrils 7 to 9	06	6/4	(.10)
Tendrils 10 to 12	07	6/4	(.10)
Leaf 1	08	6/8	(.20)
Leaf 2	09	6/8	(.20)
Leaf 3	10	6/8	(.20)
Leaf 4	11	6/8	(.20)
Leaf 5	12	6/8	(.20)
Body	13-20	6/24	(.60)

Weapon	Attack%	Damage
Sonic	Auto.	special
Grapple	30%	immobilizes

NOTE: The trembler can use its sonic attack each impulse, in addition to normal attacks and actions. In this attack, the trembler matches its CON vs. the MAS of each being within the beam's 10 degree arc of play, and within 6 meters. Those between 6 and 20 meters have their MAS matched vs. half the trembler's CON, and those between 20-50 meters match their MAS vs. a fourth the trembler's CON. All those whose MAS is overcome by the trembler's CON take 2D6 general hit point damage.

The trembler can attempt to grapple all targets adjacent to it, as well as emit its sonic pulse. This does no damage, but those gripped by it can escape only by overcoming the trembler's STR with their own, and may try once per action ranking. Characters gripped by the trembler are always included in the sonic beam's path on each impulse.

Tremblers derive nourishment in two ways: from nutrients in the soil and air, and from the decaying flesh of organisms it kills. Enticing chemical attractants draw prey which is then killed by short bursts of ultrasound. The odor is pleasant to humans, and irresistible to many Ringworld hominids and native animals. Sonar is its primary preceptor. It senses a target's direction via reflected pulses of sound and aims its destructive ultrasound via sonar as well. Organs in the central bulb channel the ultrasound through hollow spikes. Its weakly prehensile tendrils drag small corpses close enough to be enveloped and digested by the leaves. Larger bodies enrich the creature's environs less directly by fertilizing the soil. Communities of sonic-resistant organisms may surround a long-established trembler, sharing the fertile environment donated by the victims.

VARMOT

Char.	Range	Average	
STR	1D3	2	Average Hit Points: 4
CON	1D3	2	Speed: 3m/im
MAS	1D2	1-2	Action Ranking: 4
POW	1D6	3-4	
DEX	4D6	14	

ARMOR AND HIT LOCATIONS: no armor

Location	D20	Armor/Average HP	
Body	01-20	0/4	(1.00)

Weapon	Attack%	Damage
Bite	25%	1D3

SKILLS: Burrow 60%, Hide 25%, Observation 40%

Varmot Description
Varmots are small furry animals which have created a secure niche for themselves over a fourth of the Ring. They are found everywhere but deserts, high mountains and aquatic habitats.

Varmots range from the size of a large rat to almost half a meter long. Their flat heads have a tapering muzzle ending in moist olfactory pits. Fuzzy jowls hide the lower jaw. Soft thick lids cover large silver eyes, giving the creatures their characteristic squint. Thin sinewy forelimbs end in four short-clawed fingers. Two fingers are close-set centrally and two are splayed thumb-like to either side. Some species of varmot lack paws completely, with hoof-like stumps at the end of their forelimbs. The hindlegs are powerful and rabbit-like. A manelike ridge of fur runs the length of the body in many species. Tails range from long, flat-ended structures to nonexistent.

Varmots are mainly herbivores, but some types are nearly omnivorous, feeding on worms, fungi, insects and eggs. Varmots are prolific breeders and are near the bottom of many Ringworld food chains. Most types are edible to hominids, though they are usually remarkably bland in taste. Although there are literally hundreds of thousands of varmot species, usually a given area will harbor no more than a dozen species. Some hominids keep strains of domestic varmots as pets or food animals.

Vindwight Description
Vindwights are large carnivores found in isolated spots scattered all over Ringworld. They stand a little under a meter and a half at the shoulder. A bony ridge runs down the spine from the crown of the head to the tip of the thick tail. A thick horny coat plates the entire body. They have wide padded feet and a lizard-like head.

A newly-hatched vindwight can be inoculated with blood or tissue from almost any animal. When mature, the vindwight will neither attack nor defend itself against the species of creature whose blood was used to inoculate it. It will viciously attack all other creatures (except other vindwights), even when satiated. Since this inoculation is species-specific, vindwights make excellent defenders in some primitive hominid societies, warding off enemies, hunting food, and serving as an emergency food supply. Of course, the tribe must take care to inoculate each hatchling with blood from that tribe's species as well as with blood from all that tribe's herd animals and with blood from any hominids the tribe wishes to deal with.

VINDWIGHT

Char.	Range	Average	
STR	5D6+18	35-36	Average Hit Points: 50
CON	6D6	21	Speed: 4m/im
MAS	3D6 + 18	28-29	Action Ranking: 5
POW	3D6	10-11	
DEX	3D6	10-11	

ARMOR AND HIT LOCATIONS: 6 point hide

Location	D20	Armor/Average HP	
Tail	01-02	6/13	(.25)
Right Hind Leg	03-04	6/15	(.30)
Left Hind Leg	05-06	6/15	(.30)
Hindquarters	07-09	6/18	(.35)
Forequarters	10-13	6/18	(.35)
Right Fore Leg	14-15	6/15	(.30)
Left Fore Leg	16-17	6/15	(.30)
Head	18-20	6/15	(.30)

Weapon	Attack%	Damage
Bite	80%	2D6 + 4D6
Claw	50%	1D6 + 4D6

NOTE: at the end of each action ranking, the vindwight will bite, followed by a claw attack one impulse later.

The Pak created vindwights. They are found in the wild only in areas which were or are inhabited by intelligent hominids. Vindwights do not compete well against natural, more efficiently-evolved predators.

Vindwights lay up to six eggs every six to seven falans, and the eggs hatch within a few weeks. Hatchlings can be successfully inoculated up to four days after emerging. If well-fed, they reach adulthood in nine falans.

Ringworld Plants

Achiya
This hardy seed plant grows well in moderately dry mountains at altitudes above 2700 meters. It does not do well in humid climates or low altitudes. Its seeds are a nutritious and high-energy-producing food. Achiya plants seldom exceed a meter in height. The thin, tough stalks produce compound clusters of small, blue-white flowers, which give way to dense clumps of tiny seeds. The upper part of the plant then dries up, but persists long after most of the seeds have scattered. Achiya is cultivated by the Hill People and used almost exclusively as a bulk food substitute on their long marches.

Fishbane
This odd-looking, broad-leaved plant has thick, orange-brown leaf-stalks growing from large, fleshy rhizomes. The big, elongated leaves are crinkled and greenish-pink. Fishbane is sometimes carefully leached and eaten as a vegetable, but unleached it is sometimes thrown into ponds to stun fish: a volatile organic poison induces convulsive nerve-shock in most fish, but the poison breaks down harmlessly in about half an hour. Fishbane will not grow in arid or elevated lands.

Frostberry
A colorful perennial herb, it has reverse heart-shaped, silver-haired leaves and purple-throated, pale-orange flowers. Frostberry grows to about human shoulder height, and is found in many temperate and subtropical regions. Most hominids find its round, silvery-purple berries edible and delicious. The plant is cultivated by Shell People, Valley People, Hairy Ones, and others.

Grulba
A favorite food of Runners and other non-agricultural hominids, grulba fruit grows wild in many regions. Grulba plants become quite large in tropical climates, their normally chaotic tangle of massive, big-leaved running vines forming a tall, thick cylinder of bronze-green foliage capped by huge, orchid-like flower clusters. The spectacular grulba fruit average over 30 centimeters in diameter, with a purple or magenta-green skin, a coppery-red, moist flesh, and a large yellow-and-brown striped edible seed.

Ibana
The ibana is a massive, startling tree of often tremendous proportions. It thrives along sluggish rivers and in Ringworld's swamplands. Ibanas have complex, intertwining trunks, and vine-like foliage which cascades down from a thick upper layer of large, bright-green, multi-lobed leaves. The trees may reach heights of 30 meters, marching readily across even permanently-flooded terrain by means of aerial roots sent down from their spreading branches. The roots, stems, and trunks of a single ibana may resemble a densely-overgrown, tangled thicket.

Ikrel
This stringy aquatic weed-plant flourishes in streams, swamps, and marshes. It has pungent leaves. The blue-green variety is cultivated for its pharmacological properties by the Grazers in their bog-farms. Its dried tendrils produce a calming effect on the hyperactive Grazers, but many other hominids use it as a stimulant.

Ivory Tree
A tall, graceful tree with a leafy crown, it resembles certain Known Space gemwoods. When cared for, ivory trees grow almost unnaturally straight. Immature trees have smooth slender trunks covered by thin orange-red bark, which later peels off to reveal a striking, shiny-white adult bark. Mature trees often reach 35 meters in height. Atop the trunk is a burst of clean, green foliage, the glossy, leathery leaves of which are splashed with creamy yellow-white. Ivory trees enhance almost any architectural style, and withstand widely-different climates. Their extremely hard, gleaming wood is prized for sculpting, fine furniture, luxurious construction, and primitive weaponry.

Jupins Grass
Terrain too steep for cultivation or too hilly for most hominid habitation may abundantly grow this hardy, vigorous, medium-to-high-altitude grass. Its low, resinous leaves provide mountain animals nutritious forage; its thick tangle of rootlets counteract erosion and enrich the topsoil by fixing nitrogen. Jupins grass has miniature flowers with a clean, mildly-spicy scent. Fields of it produce a continuous stream of tiny airborne seedlets.

Lizard Bush
A distinctive, prickly, water-bearing succulent often found in chaparral regions and desert borderlands, lizard bush grows 0.5-2 meters high in small towers of neatly-stacked, fleshy leaves. Its color is a dark, ashen-green with a tracery of brownish-purple veins. The plant is named for the colonies of edible, lizard-like animals frequently symbiotic with it. Non-spiky varieties of lizard bush sometimes harbor colonies of poisonous, aggressive lizards.

Katjang
A flashy subtropical vine which usually grows in three or more interwoven strands, its three-lobed leaves are bright red with yellowish-green leathery pods. 7-12 centimeters long. Each pod contains as many as a dozen katjang beans, rich in vegetable protein.

Needle-Grass
A tough, resilient, drought-resistant grass, it is found in many transitional scrublands and semi-arid regions. It ranges from 0.3-1.5 meters tall. Needle-grass has stiff, round, semi-solid stems, which gradually taper to sharp, spike-like points. The dried grass is used for arrow tips, blow-darts, needles, and other tools, and even sewn together as armor.

Rim Pine
Reaching heights of 50 meters, these hardy, often timberline trees are found throughout the rimland foothills. Their roots occasionally penetrate the bonded bedrock. Their leaves are flat, pointed, and narrow. In dense evergreen forests, rim pines grow tall and slim-trunked, with tiers of nearly-horizontal branches. Elsewhere, they vary in form. Solitary trees in rugged, mountainous terrain may grow heavy-trunked and spreading. Though adaptable, rim pines do poorly in warm lowlands.

Sausage-Plant (Weenie Plant)
These may be any of numerous Ringworld plants bearing heavy, edible fruit resembling melons or large cucumbers which grow sprawling along the ground like so many links of sausage. Clusters of rootlets and wide, crescent-shaped leaves spring from the nodes between the links. The meaty fruit usually has a ribbed, rough-textured, green-and-yellow striped skin. Fully-ripened 'sausages,' if not harvested, split open to give birth to golden blossoms. Wild sausage-plant grows in moist, warm areas, and is not very tasty; many delicious varieties are cultivated by Ringworld hominids.

Spice-Nut Bush
It is a fragrant, coarse-twigged woody shrub with twisted, wide-spreading branches. Its spatulate leaves arranged near the ends of the twigs are a dark, glossy green or creamy-white with variegated light green patterns. The many small flowers are white, yellow, blue, or magenta-cream. Spice nuts have numerous flavors, and are prized for use in cookery. In shape most are ovoid, resembling miniature acorns. Spice-nut bushes grow best in hilly terrain that is not too damp.

Sweetroots
Many species of these low, colorful plants flourish in Ringworld's temperate regions, usually in habitats shielded from the harsher weathers. Sweetroots sometime completely carpet a forest floor, in single hues or riots of colors. Several separate flower-stems grow from the base of each plant, with a whorl of bright green leaves (heart-shaped in most varieties) beneath a small, lily-like flower at the summit of each stem. Though sweetroot berries are indigestible, the thicker roots are often nutritious and tasty. Some sweetroots are sought for medicinal properties, not for flavor. The roots usually are fleshy, tapering, white, and semi-transparent.

Velvet Grass (Vale Grass)
A silky, hollow-stemmed grass with a distinctive covering of fine, soft, velvety-purple hairs, it grows thickly in fields up to a meter high. It is common in clearings, woodland hills, and river valleys of Ringworld's moist, temperate climates. Velvet grass forms an extremely comfortable, cushion-like mat for overnight rest or non-regulation hijinks.

Yana
An aquatic herb with small, balloon-shaped, translucent brown bulbs, Grazers grow it in their bog-farms for its aphrodisiac properties. It is found elsewhere in ponds, marshes, and rivers, adhering by means of sucking-disks to rocks, logs, crustaceans, and boats. Many native hominids find it useful as a painkiller and as a euphoric.

RINGWORLD EXPLORER SHEET

Front

Player Name . . . . . .
Explorer Name . . . . . .
Species . . . . . Homeworld . . . . . Gravity . . . . .
Gender . . . . . Chronological Age . . . . / . . . . Physiological Age

STR . . . .
MAS. . . .
CON. . . . Health Roll . . . . .
INT . . . . Reasoning Roll . . . . .
POW. . . . Luck Roll . . . . .
DEX. . . . Dodge Roll . . . . .
APP . . . . Damage Modifier . . .
EDU. . . . Speed . . . meters/im.

General Hit Points

Occupation Points
Workspace

Agility Skills

Root Max . . . . %

Archaic Melee Weap. (___)R . . . . % ☐
. . . . % ☐
. . . . % ☐
Archaic Ranged Weap. (___)R . . . % ☐
. . . . % ☐
. . . . % ☐
Athletics (___)R . . . . % ☐
. . . . % ☐
. . . . % ☐
Hide (___) . . . . % ☐
Sneak (___) . . . . % ☐
Unarmed Combat (___) . . . . % ☐
V. Sword, F. Laser (___)R . . . . % ☐

Communication Skills

Root Max . . . . %

Bargain (___) . . . . % ☐
Debate (___) . . . . % ☐
Fast Talk (___) . . . . % ☐
Fine Arts (___)R . . . . % ☐
. . . . % ☐
Musicianship (05%)R . . . . % ☐
. . . . % ☐
Orate (___) . . . . % ☐
Own Language (INTx5) . . . . % ☐
Perform (___)R . . . . % ☐
. . . . % ☐
Psychology (___)R . . . . % ☐
. . . . % ☐

Knowledge Skills

Root Max. . . . %

Anthropology (___)R . . . . %
. . . . %
. . . . %
Astronomy (___)R . . . . %
. . . . %
Biology (___)R . . . . %
. . . . %
. . . . %
Botany (___)R . . . . %
. . . . %
. . . . %
Chemistry (___)R . . . . %
. . . . %
. . . . %
Computers (___)R . . . . % ☐
. . . . % ☐
. . . . % ☐
. . . . % ☐
Emergency Treatment (___)R . . . % ☐
. . . . % ☐
Engineering (___) . . . . %
Farming (___)R . . . . % ☐
. . . . % ☐
History (___)R . . . . %
. . . . %
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Law (___)R . . . . %
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Mathematics (___)R . . . . %
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Physics (___)R . . . . %
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Planetology (___)R . . . . %
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Second Languages (___)R . . . . % ☐
. . . . % ☐
Strategy (___) . . . . % ☐
Theology (___)R . . . . %
. . . . %
. . . . %
Zoology (___)R . . . . %
. . . . %

Perception Skills

Root Max. . . . %

Handgun, energy (05%)R . . . . % ☐
. . . . % ☐
. . . . % ☐
. . . . % ☐
Handgun, projectile (___)R . . . . % ☐
. . . . % ☐
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Heavy Weapon, energy (___)R . . . % ☐
. . . . % ☐
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. . . . % ☐
Heavy Weapon, projec. (___)R . . . % ☐
. . . . % ☐
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. . . . % ☐
Listen (___) . . . . % ☐
Observe (___) . . . . % ☐
Scent (___) . . . . % ☐
Search (___) . . . . % ☐
Track (___) . . . . % ☐

Technical Skills

Root Max. . . . %

Aquatic Vehicle (___)R . . . . % ☐
. . . . % ☐
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Atmospheric Craft (___)R . . . . % ☐
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Ground Vehicle (___)R . . . . % ☐
. . . . % ☐
. . . . % ☐
. . . . % ☐
Hyperdrive (___)R . . . . % ☐
. . . . % ☐
. . . . % ☐
Personal Flyer (___)R . . . . % ☐
. . . . % ☐
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Reaction Drive (___)R . . . . % ☐
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Reactionless Drive (___)R . . . . % ☐
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. . . . % ☐
Repair (___) . . . . % ☐
Ringworld (___) . . . . %
Weapons System (___)R . . . . % ☐
. . . . % ☐
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RINGWORLD EXPLORER SHEET

Back

Player Name . . . . . .
Explorer Name . . . . . .
Species . . . . . Homeworld . . . . . Gravity . . . . .
Gender . . . . . Chronological Age . . . . / . . . . Physiological Age

STR . . . .
MAS . . . .
CON . . . . Health Roll . . . . . .
INT . . . . Reasoning Roll . . . . . .
POW . . . . Luck Roll . . . . . .
DEX . . . . Dodge Roll . . . . . .
APP . . . . Damage Modifier . . . . .
EDU . . . . Speed . . . . . meters/im

Unconsciousness Level

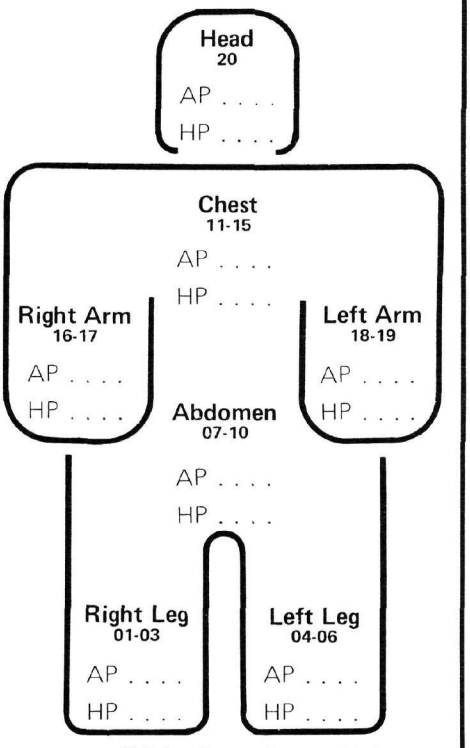
Defects (list): . . . . . .
. . . . . .
Psionic Ability? ☐ Yes ☐ No
. . . . . .
. . . . . .
. . . . . .

GENERAL HIT POINT TALLY

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54

Action Ranking: 1 2 3 4 5 6 7 8

Impulse of Action Completion



ranged hit location numbers provided

Weapon (applicable skill)	Attack Skill	Damage	Range short/med/long	Energy Draw or Rate (shots)	Standard Power Supply	HP
. . . . .	. . . %	. . . . .	. . . / . . . / . . .	. . . . . (. . .)	. . . @ . . . / . . / . . .	. . . .
. . . . .	. . . %	. . . . .	. . . / . . . / . . .	. . . . . (. . .)	. . . @ . . . / . . / . . .	. . . .
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Regular Income . . . . . Credit Rating . . . . . .
Stars On Hand . . . . . In Bank . . . . . .

Pursuits	wealth value	years	occupation points
Education	0	. . . . .	. . . . .
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Ringworld Errata

June 26, 1984

EXPLORER SHEET:

The number 30 is missing in the Hit Point Tally on the back of all the explorer sheets; write in "30" on the margin of the explorer sheet. A corrected and photocopiable back sheet is included in the *Ringworld Companion.*

EXPLORER BOOK:

(1) Page 5, column 2; page 10, column 2; other locations — include only the first 24 points of EDUs when calculating knowledge-skill root maximums.

(2) Page 16, column 1, Archaic Melee Weapons — the human fist has a 1 D3 attack; the human kick has a 1 D6 attack; remember any damage modifier.

(3) Page 26, column 3, Zero Atmospheric Pressure - the explorers should exhale in vacuum to minimize pressure damage; adequate air is left in the lungs after-exhalation: not exhaling does 1 D6+2 points of damage as per the first paragraph.

(4) Page 38, column 2 — the picture is of a wriilabee; see *wrillabee* in the creatures book, page 42.

(5) Page 58, columns 2 and 3 — the picture is of a dak-dak; see *dak-dak* in the creatures book, page 37.

TECHNOLOGY BOOK:

(1) Page 24, columns 3 — the repetition of the marinex maximum acceleration entry is a paste-up error; disregard.

CREATURES BOOK:

(1) Kzin and Puppeteer characteristics in the creatures book are superseded by the slightly different values found on pages 47 and 51, respectively, of the explorer book.

(2) Page 9 — the INT characteristic for Outsiders should read "2D6+12," not 2D6+6.

(3) Animal hit locations given are used for both ranged and melee weapons.

(4) The reference "Standard Hominid Hit Location Table" refers to the Human Hit Location Tables in the explorer book.

(5) Page 46, column 1, Slaver Sunflowers — an individual sunflower has 1 hit point.

GAMEMASTER BOOK:

(1) Page 46, column 2 — the "prism" in the tower laser is actually a mirror (which may be quite dirty, not having been fired in several Ring years).

(2) Inside Back Cover — the material there is continued from page 2 of the gamemaster book.

AUTOPILOT PRINTOUT:

Surface gravity induced by spin should read 0.992 — not 9.92. The gamemaster's Ringworld printout is correct.

Human Space Technical Items

CHEMKIT

WEIGHT: 1 kg

VOLUME: 15cm x 5cm x 10cm

ENERGY USED: .1/im, (6/minute)

POWER SUPPLY: battery 60/1/20g/N

SPEED OF OPERATION: heater brings 1 liter of water from 0 to 100 degrees Centigrade in under 30 impulses.

COST: 45 Stars

This kit contains equipment and devices for quick field determination of chemical properties; it includes a scanner (explained later), an electric heater, litmus compounds, a test procedures booklet, and an automatic chemical analyzer all fitted into a soft-plastic case.

By dropping a small chemical sample into the analyzer, an account of the molecular structure of the sample can be obtained within a minute. The account will be both printed on a screen and verbally reported by the machine. The information will be held for recall until destroyed.

Some compounds cannot be analyzed — General Products hull material, for instance.

The heater is a folding 1-liter beaker. Scientists often use it for making soup or coffee.

COPTER
(Wunderland Rotorcraft)

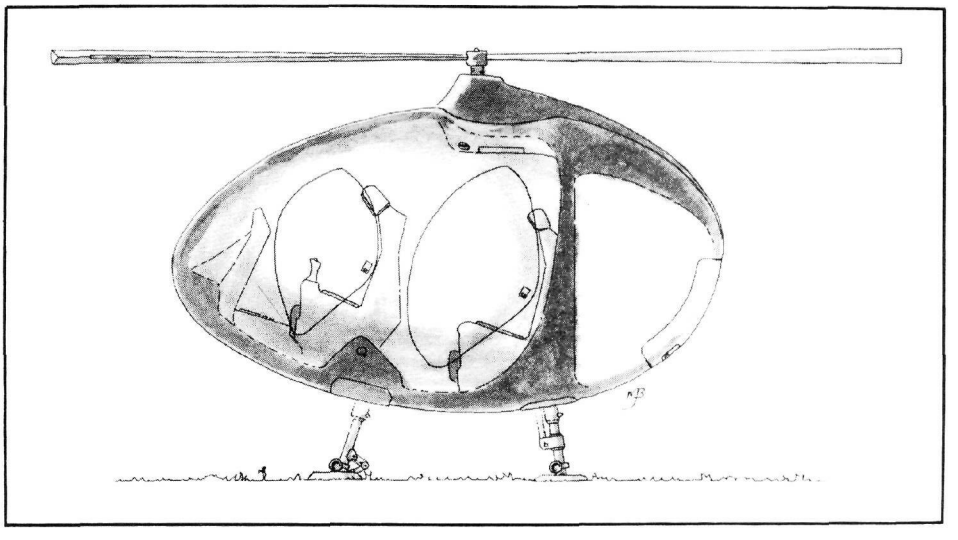
MAS: 34 (500 kg)
VOLUME: 4m x 6m x 2m
SPEED: maximum 500kph, cruising 300 kph
MAXIMUM ACCELERATION: 10 kph/im
ENERGY USED: 120/im
POWER SUPPLY: fusion 3 generator
APPLICABLE SKILL: Atmospheric Craft
COST: 8000 Stars
ARMOR: 10-point (rotor is unarmored)
HIT POINTS: 75

Location	*1D20*	*Armor/HP*
rotor blade	01	0/8 (.10)
generator	02	10/8 (.10)
luggage/storage	03-07	10/38 (.50)
gyroscopes	08-10	10/4 (.05)
passenger compartment *	11-20	10/57 (.75)

** pilot and passengers must attempt luck roll to avoid being hit.*

Racing archaic machines such as propeller-driven aircraft occasionally becomes popular. The two-seater copter illustrated has only a single rotor, and is gyroscopically-stabilized. On long races, supplies are packed in the cubic-meter storage area. The copter is difficult to control in unsteady air; it carries short-range sensors and navigation/communication gear. This copter's nominal ceiling is 6000m.

On Wunderland, a dangerous copter competition is the central component of the



triathlon; contestants run a 42km marathon to the copters, fly their copters directly over the always-stormy 61 00m crest of Mt. Steep, then land on the other side and swim the 8km straits of the Neversea.

HEROCYCLE
(Hero of Calcutta, Earth)

MAS 31 (375 kg)
VOLUME: 1m x 1.5m x 2m
SPEED: maximum 7000 kph; cruising 6000 kph
MAXIMUM ACCELERATION: 150 kph/im
ENERGY USED: 115/im
POWER SUPPLY: fusion 2 generator
APPLICABLE SKILL: Atmospheric Pilot
COST: 3000 Stars
ARMOR: 5 points
HIT POINTS: 80

location	*1D20*	*Armor/HP*
main body	01-10	5/80 (1.0)
controls	11	5/8 (.10)
sensors and communicator	12-13	5/16 (.20)
pilot	14-20	varies

A herocycle is meant for speed, maneuverability, and excitement. This racing model, a gleaming streamlined ovoid with black saddle, hand controls, and safety belt, carries one passenger, though a second can sit on the lap of the cyclist without greatly affecting the flight characteristics.

The herocycle comes only with manual controls, though a plug-in autopilot is available. Standard aboard it is a sonic fold (which may be tuned to provide sound from outside, at the cost of gusts of wind), a sturdy 2000 kilometer radar, and a traffic-alert communicator. Most governments also require a powerful EM-radiator to warn of the approach of this unpredictable craft.

This craft originally was meant to provide cheap transportation, but many planets ban the herocycle or restrict its use because of its dangerous speed and limited instrumentation — several notorious herocycle accidents have obliterated whole buildings on Wunderland.

MAPPER BOX
(Diamond Sutra Commune, We Made It)

MAS: 1 (2.3 kg)

DIMENSIONS: 8cm x 19cm x 40cm

ENERGY USED: .01/im passive; 1/im active

POWER SUPPLY: fusion 1 generator

SPEED OF OPERATION: passive, by triangulation from second angle, average of 40 seconds each location; active, by sensors from initial position, 50 seconds

GENERAL HIT POINTS: 20

COST: 225 Stars

The mapper box is a handy specialized survey device used to create quick topographical maps and other sorts of dimensional schematics. It has a passive analysis mode which requires two displaced sightings on a single point, or it can actively send out what amount to radar impulses from a single point, and create a line-of-sight study image from the data received. Either mode can be modeled in the device's holographic tank, or a 0.5 kg, 60-Star optional printer can reproduce the image in tri-dee presentation. A 200-Star attachment can buffer most sensordisks to produce a real-time terrain image of the neighborhood; the modification can highlight portions of the spectrum, such as infrared body heat.

When exploring caves, spelunkers often put 3-4 vibro sticks (10 Stars each, with linking cable) into the ground, thereby both mapping the path that they actually take and exploring into the surrounding stone for varying distances (limestone, for example, is registerable with a standard assembly to about 15 meters).

If a mapper box is required to remember complex images for very long, or required to remember more than one final image, the owner should link the device to a MicroMind-equivalent computer with a dedicated memory bubble.

Mapper boxes can be linked to deep-radar sets, providing printed topographical maps from the deep-radar data.

McGRAW BEAMER CADDY
(Roulette Corp., Belt)

WEIGHT: 285 g

DIMENSIONS: adjustable to fit the beamer

ENERGY USED: spring-operated

POWER SUPPLY: various memory plastics

SPEED: 1/10th second

COST: 15 Stars

This quick-draw device can be fitted to either arm, presumably hidden by the loose shirt or jacket sleeve of the wearer. When the firing hand is bent to receive the beamer, relays interpreting the forearm muscles automatically trip the beamer release, and the weapon is launched into the waiting hand. Normally a line is attached to the beamer: in case the wearer does not catch it, it remains at hand and does not bounce impotently across the floor.

MICROCUBE SUIT

WEIGHT: 200 g per MAS-point of wearer

VOLUME: human form; versions exist for Kdalyno, Kzinti, and Puppeteers as well

ENERGY USED: none

ARMOR VALUE: reflects visible light back in the general direction from which it came

COST: 225 Stars + 25 Stars per MAS point of wearer above MAS 1 5

The light-reflective microcube suit is a thin, form-fitting garment whose outer surface is composed of mirror-perfect microcubes, each only a few microns across. The suit covers the entire body except for the palms of the hands, the soles of the feet and the face. The microcube suit is nearly 100%-reflective to visible light. The mirrored microcubes are designed so that incident light rays striking the suit are reflected back in the direction of origin. Observers of microcube fabric will often see in the fabric a huge, bleary reflection of their own eyes.

If an explorer wearing a microcube suit is struck with a visible-light attack, the explorer's player should make a luck roll. If the roll is successful, the attack has bounced back to hit the attacker in a random location. If the luck roll fails, the beam has bounced back but will miss the attacker. If the attacker is a considerable distance from the defender the gamemaster should reduce the chance of success for the luck roll. An infrared or ultraviolet beam, or a visible light beam of 100 hit points or higher will not be reflected by the microcubes. If an infrared or ultraviolet beam, or any sort of kinetic attack does 5 or more hit points of damage to a microcube suit location, the microcube surface for that location has been burned or ripped away.

RESTRAINT FIELD PROJECTOR
(MaitresseAnna,Wunderland)

MAS: 2 (6.1 kg)

DIMENSIONS: 9cm cube; slightly protruding barrel

ENERGY USED: varies with setting; 0.04/im per point of MAS setting

POWER SUPPLY: any standard external source; not self-powered

GENERAL HIT POINTS: 15

COST: 20 Stars, plus 5 Stars per MAS point settable on the unit (a 20-MAS-point field generator costs 120 Stars)

The restraint field generator sends out a low-power directional beam which interferes with conscious mental control of the voluntary muscles; the target suddenly can no longer move or speak and must collapse, though he or she remains conscious and has full feeling everywhere. Restraint fields are known to be similarly effective against all Known Space species, except for Bandersnatchi.

Many restraint field generators are in production; they are used as guard devices, in police work, in animal control, as invisible fences, and in many other applications. All generators project a steady trip-beam. The restraint field takes effect instantly and the effects last as long as the individual is in the field. Once removed, the former target tingles everywhere and recovers full physical functions in MAS x1 impulses. Some mystics use the restraint field as a meditation aid, but doctors have been quick to advise against prolonged voluntary exposure,though captives have been subject to the field for several weeks without subsequent effect.

Just like a stunner, a restraint field generalor is set to affect a certain maximum MAS of target; targets more than 4 MAS points above the selling feel nothing and treat the field as if it is not there. There are no legal or physical limits upon purchasable MAS sellings. The cone of the field also expands at the same rale as that of a stunner: 5cm AL 5m, 50cm at 50m, 100cm at 100m and so on. After 100m the Mas-effectiveness of the beam diminishes from the selling at the rale of 1 point per 10m.

Normally restraint field generators are set in multiple, crisscrossing lanes of fire. Explorers must determine for themselves the optimal position of the devices.

ROCKET
(Oaxaca de Terra)

WEIGHT: 7.5 kg
VOLUME: 1 5cm x 30cm x 60cm
SPEED: maximum subsonic, 500-600 kph; cruising 200-300 kph
MAXIMUM ACCELERATION: 20kph/im; varies with modifications and chemical mix
ENERGY USED: chemical fuel cells -drained in 5 minutes at maximum acceleration, lass approximately 1 5 minutes at cruising speed

POWER SUPPLY: dual fuel cells
APPLICABLE SKILL: Personal Flyer
COST: 500 Stars; plus 1 5 Stars per fuel cell
ARMOR: none
HIT POINTS: 20

This tricky device is used primarily in personal competitions, often for prize money. Considerable training and skill (in Athletics as well as Personal Flyer) is necessary to strap on a rocket and not immediately wind up splattered on a mountainside; not only must the user be able to delicately judge the use of his rockets, but he must use his body as a rudder for steering.

Competitors normally wear a full helmet and a body-covering suit of frictionless armor.

SCANNER (Pocket)

WEIGHT: 13.5 g

VOLUME: 0.5 x 7 cm cylinder

ENERGY USED: 1/day of constant operation

POWER SUPPLY: battery 6/1/1.75g/R

SPEED OF OPERATION: constant information update

COST: 1 Star; a unit which writes is 1.2 Stars

A pen-sized device whose read-out can be adjusted to give a color-intensity indication of any particular portion of the EM spectrum. It can warn of dangerous radioactivity if so adjusted, and if it is held with its cap toward the horizon, it can be a directional device. This version is not intended for serious scientific work, though vastly more sophisticated versions exist.

SEARCHBEAM (Portable)

WEIGHT: 400 g

VOLUME: 1 5 x 50 cm cylinder

ENERGY USED: 2/im

POWER SUPPLY: 3600/2/0.9kg/R

LENGTH OF OPERATION: 30 minutes

COST: 2 Stars

Searchbeams are powerful flashlights which can illuminate a 6m-diameter circle at 1000 m. Vehicular and larger, mounted searchbeams have settings allowing for wider diameters of illumination.

SLEEPSET

WEIGHT: 2 kg main unit; 50 g sleepset

VOLUME: 30 x 40 x 70 cm main unit

ENERGY USED: 1/im, mostly used to run timer, failsafe, and convenience circuits rather than the actual sleep moderation itself.

POWER SUPPLY: ship, building or city generator

COST: 20 Stars

A form of sleepset existed as early as the mid-20th century in the Soviet Union. It was in widespread use by the end of that century. The sleepset induces an alpha rhythm simulating that of the deepest of sleeps, thus eliminating the need for the other lighter levels of sleep. Originally it was thought that this device was dangerous because it eliminated the level of sleep in which the most dream activity occurs. Later, it was discovered that the dream state acts independently of the sleep cycle, and the machine was widely distributed.

In the Ringworld era, sleepsets have advanced to technological levels greatly exceeding those of the 20th century. Every hour spent under the sleepset acts as four hours of normal sleep, but emotional and physiological agitation results if the device is used for more than a few nights in a row. The state of consciousness induced by a sleepset is coloquially-termed 'Russian sleep,' after the original manufacturer, Moscow Motors.

Sleepsets come as sleepset earmuffs, sleepset sunglasses, sleepset headbands, archaic looking sleepset helmets, sleepset nightcaps, sleepsets with built-in radios which will turn on the moment the sleepset turns off, and in many other modes. Some sleepsets come equipped with dream suggesters.

All sleepsets require a massive, somewhat energy-expensive unit regulating the sleep state. This unit attaches to the sleepset by intercable. Sleepsets timers can be set for periods from 10 minutes to 3 hours. Some people rig their sleepsets to allow them to sleep for longer, but none are designed to be used that way.

Dream suggesters are microcomputers inserting a predetermined emotional tone into the sleeper's dreams. Dream suggesters cannot suggest specific scenarios. A person buying a sleepset equipped with a dream suggester must sign a no-fault contract preventing lawsuits for bad dream experiences.

SPY BEAM

WEIGHT: 750 g

VOLUME: 15 x 25 cm ovoid

RADIUS OF EFFECT: 30 cm at 100 m

ENERGY USED: 0.1/im

POWER SUPPLY: battery 2500/1/.625kg/R

RANGE: 300 m uninterrupted; up to 1 m of steel

COST: 55 Stars

The term spy beam is now a misnomer. At one time the device emitted a beam which bathed the target in ultrasonic vibrations. Using the interference produced between the spy beam's emission and the sounds in the affected area the device accurately reproduced voices and other noises in the area. This active type of spy beam was so easily detected, even by dogs and cats, that it has been completely replaced by the effective passive receiver which uses no beam at all.

There are many physical designs for spy beam projectors. All feature a projecting conical antenna.

The spy beam can pick up and enhance up to three sounds within the target area; additional sounds are unintelligibly melded together. If a particular sound is entered in advance, Louis Wu's voice for example, the spy beam can be put on a search mode, and will search for that sound. When the spy beam has found the sound it will zero in on it and dull the background noise.

The spy beam will also accentuate two distinct sounds which are directly interactive with the subject sound, like voices conversing with a subject or a machine operated by the subject. If there are more than two interactive sounds the gamemaster will choose those which are broadcast.

The spy beam has a manual search mode also, allowing the user to selectively zero in on sounds within the area, and the sounds interacting with them. The spy beam can be set to pick up sounds within any particular frequency range, blocking out other noise — human voice, ground vibration, high-frequency emissions, etc.

The spy beam recorder can save 100 hours of sound for later analysis by computer search: such computer analysis takes about 1 5 minutes.

Spy beam emissions cannot penetrate General products hulls, GP hull material, or scrith.

STASIS SHIELD
Galactic Survival Ltd., Wunderland

WEIGHT: 650 g

VOLUME: inactive 500 cc, small egg with handle; active glistening 2 m x 1 m x 5 cm plus handle

ENERGY USED: 20 energy units to erect field

POWER SUPPLY: battery 200/20/55g/R

ARMOR VALUE: impenetrable

SPEED OF OPERATION: framework unfolds in 10/im; stasis shield in place 6/im later

COST: 100 Stars

Though stasis fields are nearly impenetrable, they cannot be maneuvered or fought from. There is a minimum MAS for objects placed into stasis, a MAS too large to allow articulated stasis armor. Stasis shields, therefore, are quite useful.

When inactive, a stasis shield consists only of a small egg of memory plastic, its handle, and a sliding red button and a sliding blue button.

When the blue button is pushed to first position, the memory plastic is activated, and the shield's spidery framework folds out to a concave ellipse, 2 x 1 m, with the handle and generator remaining in the center. When the blue button is pushed to second position, the stasis field activates in the shape of the framework after the framework has been erected.

When the red button is pushed to first position, the stasis field collapses; if pushed to second position, field and framework both collapse. If only the framework was expanded, then either push of the red button collapses the framework.

Any other button command or combination of commands has no effect. When both framework and field are collapsed, both buttons return to initial position.

The stasis shield can protect all hit locations from a particular direction. Any location being used to direct fire in the direction covered by the shield (and the head of the user of the shield if he or she wishes to see in that direction) will be vulnerable to attack. The gamemaster must decide whether the shield covers a location.

The stasis shield reflects in a random direction all incoming energy attacks which hit protected locations. The cone of fire of a wide beam weapon, such as a sonic stunner, may overlap the shield and hit an unprotected hit location.

The stasis shield will deflect primitive weapons and projectiles, but the impact is transferred through to the arm of the explorer holding the shield. For example, an explorer holding a stasis shield is hit by a cannonball, the stasis shield is blocking the path of the cannonball. The stasis shield deflects the cannonball, but its energy is transferred to the explorer, knocking him down and probably doing some damage to him. The gamemaster must resolve the results of each situation. Projectiles probably do some percentage of their normal damage at least to the explorer's arm holding the shield.

As a failsafe, if the stasis shield is damaged in any way while it is not in stasis form, the stasis field cannot be turned on.

TRI-DEE RECEIVER

WEIGHT: 2.5 kg

VOLUME: 0.25 cubic meter

ENERGY USED: 1/im

POWER SUPPLY: generator

COST: 30 Stars

The tri-dee receiver collects and projects incoming tri-dee signals. On Known Space planets almost every house or apartment has a tri-dee receiver. The holographic projection by a tri-dee receiver is much better than that of a tracy, and of course much larger and life-like.

TRI-DEE TRANSMITTER

WEIGHT: 3.2 kg

VOLUME: 0.3 x 0.5 x 25 cm, plus memory-plastic antenna

ENERGY USED: 0.5/im

POWER SUPPLY: generator, battery (3600/1/.9kg/R), or memory-plastic solar collector

RANGE: 2000 km microwave, 120 km general broadcast

This portable device broadcasts from prerecorded memory bubbles or live events from the tri-dee recorder. The transmitter consists of a small backpack containing circuitry, AV inputs, a memory bubble reader, and memory-plastic microwave and broadcast antennas.

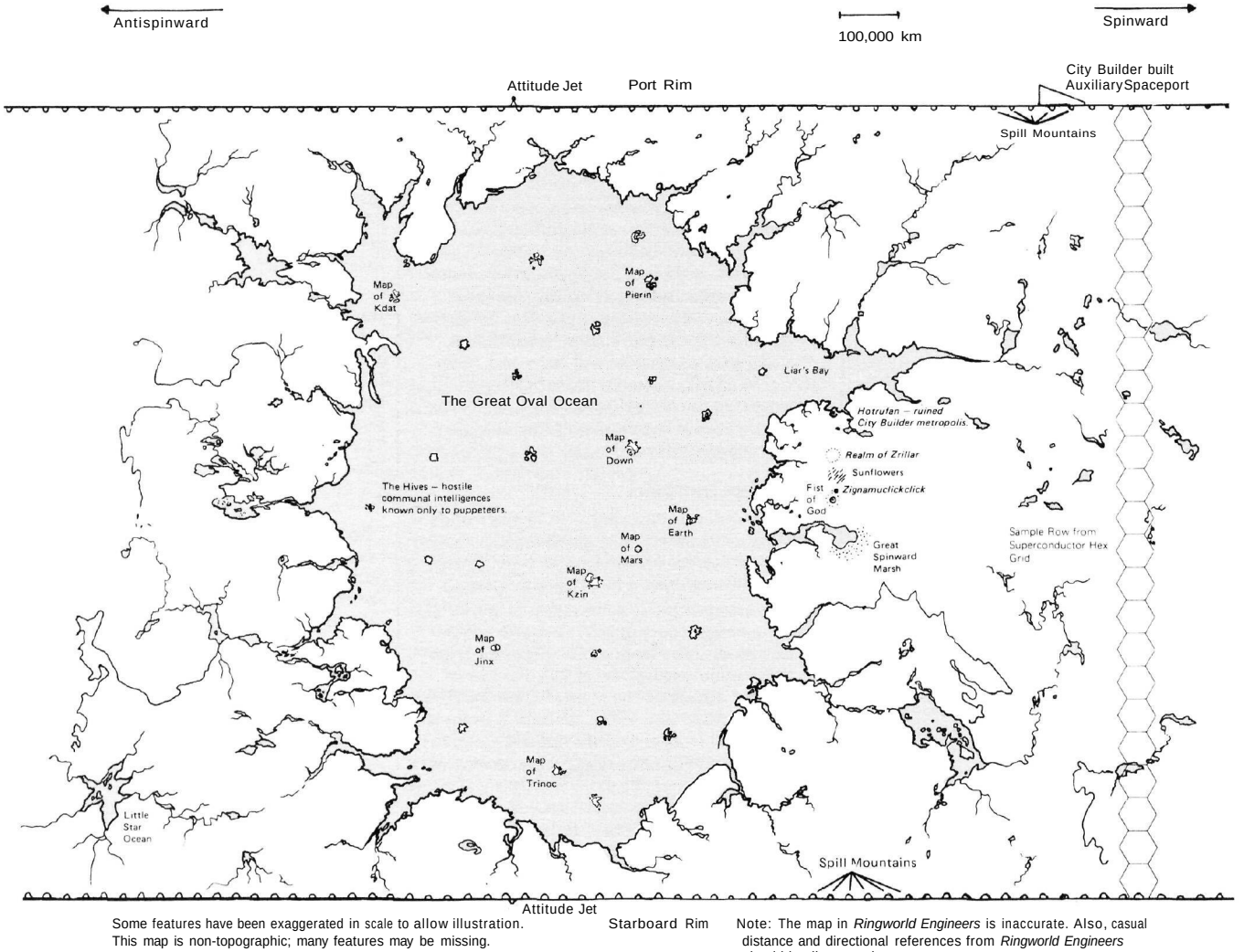
5040 VAN
(Volvo Motors, Earth)

MAS: 54 (2700 kg)
DIMENSIONS: 4m x 5m high x 8m long
STANDARD CREW: 1 pilot
PASSENGER CAPACITY: pilot and 6 passengers
CARGO SPACE: 80 cubic meters
SPEED: maximum — lightspeed (hypothetical), cruising — 500 kph at 1 atmosphere, no hyperspace capability
MAXIMUM ACCELERATION: 3 gees
ENERGY USED: 450/im at cruising speed
POWER SUPPLY: fusion 3 generator
APPLICABLE SKILL: Reactionless Drive
COST: 17,000 Stars for standard model; 22,540 Stars for the 5040-EL, which has grapples, an entertainment center, and leather seats

These all-purpose utility vehicles perform general maintenance work in space, ship-to-ship transport of personnel and materials, and as emergency vehicles. They are lightweight, however, and can resist only about 6 atmospheres of pressure.

GREAT OVAL OCEAN

And Island Maps Of Worlds



Some features have been exaggerated in scale to allow illustration. This map is non-topographic; many features may be missing.

Note: The map in *Ringworld Engineers* is inaccurate. Also, casual distance and directional references from *Ringworld Engineers* should be discounted.

UNSS Calatorie de Soare

The Calatorie de Soare (ker-ler-to-REE-ye de swar-re, or Sun-Chaser) originally was a military cargo ship; it supported sweeps against Kzin minor-house raiders three centuries ago. Blessed with the nearly-immortal General Products hull, the vessel was refitted several times, the last time being in 2845 as a UN research and deep-space exploration vessel. The work was done by the venerable Timisoaro Upholstery Co.

Selected Internal Assets

Stasis Shields

Alone of the four ROMANIA-class survey ships, the *Calatorie de Soare* contains an experimental stasis shield net. Stasis shields were derived from stasis blimp technology, and at first were simple hand-held, collapsible, impenetrable body shields. Under a UN Sciences contract, the labs of Timisoara Upholstery developed a system of selective stasis shields useful for protection of starships.

The stasis shield mechanism generates an interlocking grid of stasis-field 'shields' just beneath the skin of the GP-3 hull. Full use of the system completely costs the *Calatorie de Soare* with shields, except for the hyperdrive engine along the spine of the ship, the fore and aft thrusters mounted across the ship's belly, and a scattering of armored conduits and equipment mounts. Full use of the system is energy-expensive, costing nearly 200,000/im.

But the shield grid also can be applied selectively. For instance, transparent portions of the hull can be protected by such stasis shield grids. This mode costs much less energy.

Even full use of the stasis shield grid cannot protect exterior-mounted equipment: the probe launcher, various sensor and communications arrays, and the two vans.

Legs

Confronted by hostile warships, a survey ship is under orders to flee. Though it lacks weapons and depth of defense, the ROMANIA class carries very powerful engines; its excellent acceleration allows it to outrun most possible foes. To use the maximum 35-gee acceleration for more than a few impulses requires that passengers and crew put themselves in stasis cells. Hypothetically, the *Calatorie de Soare* could start from the center of Sol and reach hyperdrive distances in less than three UNS days.

Intraship Transport

This starship was designed with few corridors. Because of its length, almost all interior movement is axial, by pneumagnetic tube. Transport booths connect a few key locations.

The pneumagnetic tube supports spherical pods in a magnetic cushion. Focused magnetic fields propel these pods at 20m/im. Adhering to the Benign Environment Control law of 2777, and accepting the Human Rights Office codicils of 2801 and 2804, the tube system is programmed to take exactly the same amount of time to travel to any destination from any location, no matter the distance. On the *Calatorie de Soare* this travel interval is 15 impulses. This standard lapse time allows free impulses in which to reroute obstructing pods.

Access to several locations is restricted. Survey scientists may never visit or even know the location of the main or auxiliary bridges. And certain crew members and scientists may never meet one another, though this is rare.

Each of the pods is a 4m-diameter sphere. A conventional pod has one 1.5m-wide door. It is equipped with its own gravity generator, limited-duration life system, and magnetic field focusing machinery. During travel the pod will align its attitude and adjust the strength of its gravity to be consistent with the orientation and strength of the gravity of the destination: passengers always arrive right side up. The *Calatorie de Soare's* pneuomagnetic system uses six conventional pods. The system has one medipod on standby which includes a lift-belt stretcher, minidoc, various medicines and drugs, plastiskin, etc. It also has one alien environments pod which, with an hour's preparation, can be furnished with any combination of atmospheres and gravities up to 20 gees.

Transport booths are located in the main and auxiliary bridges, the sick bay, the amphitheater, the captain's cabin, the main airlock, and the mess. The transport booth is the fastest way to travel, but these booths are intended for use by crew only during emergencies; the custom aboard the *Calatorie de Soare* is that only the Captain uses transport booths at other times. Access to the main and auxiliary bridges and to the captain's cabin is code-restricted.

Ship Layout

The *Calatorie de Soare* employs standard human orientation: the flattened part of the cylindrical hull is the 'bottom' of the ship. The hyperdrive engines, main generators, life system tanks, emergency batteries, and other machinery runs almost the length of the spine of this spaceship, surrounded by the deuterium fuel-water supply tanks. Below this assembly is the living quarters deck, three huge cargo bays, the bridge, sickbay, the gym and simweb deck, the amphitheater, the stasis deck, and the garden. Toward the aft of the ship are the science tiers, auxiliary bridge, and the observation deck.

UNSS CALATORIE DE SOARE

(General Products; Timisoare Upholstery, Earth)

TYPE: ROMANIA-class attack transport (modified)
HULL: GP-3; hullmetal hatches
DIMENSIONS: 150m cylinder with hemispherical ends; 35m diameter with flattened belly
PROPULSION: reactionless thrusters; quantum I hyperdrive
SPEED: lightspeed (hypothetical); 150,000 kph nominal cruising speed
MAXIMUM ACCELERATION: 35 gees; ship-interior gravity nets counteract accelerations of up to 30 gees (with considerable strain)
ENERGY USED: 600,000/im full acceleration; total ship consumption about 720,000/im
POWER SUPPLY: one 2M-4 generator; three fusion 6 generators; many off-net dedicated fusion 2 and 3 generators
CREW: navy crew of 10 (three senior officers); nominal civilian science cadre of 20 (two senior scientists)
APPLICABLE SKILL: Reactionless Drive, Hyperspace Drive
TOTAL COST: 1.74 million Stars
ARMAMENT: none
ARMOR: General Products hull; supplementary experimental stasis shield net for hatches and locks; hatches are 30-point hullmetal.
HIT LOCATIONS: if stasis shields are up, vessel is invulnerable to Known Space ship-transportable weapons. If stasis shields are down and the attack is with a visible-light laser or nuclear device, a D20 roll result of 01 strikes a random transparent section of the hull. If the stasis shields are down and the attack is with nuclear devices or with any weapon other than a visible light laser, a D20 roll result of 20 strikes a random hullmetal hatch. It is possible for nuclear attacks to differentially damage different portions of the ship.
Possible Transparent Section: Personal Staterooms (1-20), VU Room, Science Decks (1-6), Mess, Garden, Gym, Amphitheater, Observation Deck, Cargo Station.
Hullmetal Hatches Possibly Unguarded By Stasis Fields: Van Dock 1, Van Dock 2, Main Airlock Hatch, Auxiliary Airlock Hatch, Sensors, Communications Array.

Ship's Computer: Model UN: 1590 Sirius Thinkers (Jinx)

SUBSYSTEMS: 30 (15 fixed/15 optional)
FUNCTIONS PER SUBSYSTEM: 20
SPEED:10
FIXED SUBSYSTEMS (optional functions available): autodoc (3), administration (6), autopilot (5), communications (2), emergency (11), engineering (8), life system (1), probe control (11), security (0), ship's log (2), sensor (5), ship's defense (11), stasis shield operator (13), tri-dee imager (4).
OPTIONAL SYSTEMS (optional functions available): auto chef (0), 10x library (5), recreation (5), simweb (6), translations (7), weapons (6).

This model was custom-designed and -built for the refitted ROMANIA-class ships. It is not commercially available, but Sirius Thinkers designs and builds computers to any specifications for a reasonable cost.

The fixed and optional subsystem sections refer to 'optional functions available' — the number of freely-assignable functions for each subsystem. Most of the free subsystem functions never need to be assigned. The other functions have default assignments. Any ship's officer can reassign default functions. The UN: 1590 computer has capacity for 10 library subsystems.

The average ceiling height on all decks is 3m (about 10 feet). Between each deck runs a 1m-high crawlway containing hundreds of conduits, ship plumbing and wiring, auxiliary generators, and other machinery.

Ship-normal gravity is 1 gee; 'down' is toward the flattened part of the cylinder. If possible, the captain matches the ship-normal gravity to that of whatever planet the crew will explore, to better prepare them.

The Bridge Deck

ROMANIA-class survey ship designers sandwiched the main bridge between the forward and the central cargo bays, oriented perpendicularly to the long axis of the hyperdrive shunt. Gravity on the Bridge deck varies from ship-normal: 'down' on the main bridge is toward the observation deck.

In addition to the main bridge room, the Bridge deck also contains the captain's and the executive officers' quarters, and the control center for cargo bay operations.

BRIDGE: The main bridge has stations for six crew members, though only two are routinely on-duty here. To the front of the crew stations is a sophisticated tri-dee imager. The large space allows large, detailed projections of planet surfaces, strange spaceships, etc. Other equipment on the main bridge includes a transport booth, minidoc, survival packets of food and water, and auxiliary life system, and a fusion 4 generator.

The auxiliary bridge is found on the Living Quartersdeck.

Living Quarters Deck

The LQ deck lies just below the hyperdrive/fuel tank assembly. Ship-normal gravity is always found here. The deck contains 28 individual rooms, a mess hall, the main airlock, docking facilities for the two vans, a sickbay, the huge variable-use room, the auxiliary bridge, and personal storage lockers.

CREW ROOMS: the average individual stateroom is about 16 square meters. Each room comes equipped with environmental controls (including variable gravity), sleeping plate, bath facilities, limited computer access (shipboard communications, recreation, library), and a clothing outlet and disposal chute.

SICKBAY: contains a megadoc which can simultaneously treat four patients; such megadocs have six complete sets of body parts for transplants. Everyone on board assigns his or her organs to the bank in the event of death.

VARIABLE-USE ROOM: *a* place for large gatherings of the ship's crew, the VU room can be filled with water and used as a pool; it can be used for many types of games by alternating gravity strength, orientation and/or environment. General health regulations prohibit so-called 'revolving gravities' duels.

MESS: a common mess serves the crew and scientists; senior staff have autochefs in their staterooms. The mess seats 20 at one time.

MAIN AIRLOCK: the main airlock is rarely opened; usually scientists and crew take the pnuemagnetic tube directly to one of the vans. The main airlock contains an emergency locker with food, water, assorted batteries, three stun pistols and three hand beamers, a minidoc, and a dozen vac suits.

VAN DOCKS: two exist, handling one model-5040 van each. One dock is only accessible through the main airlock, The other can be reached directly by pneumagnetic tube address.

AUXILIARY BRIDGE: hard against the Observation deck is the auxiliary bridge, nestled defensively in the center of the ship. Auxiliary capacity is identical to that of the main bridge, except that the tri-dee imager is inferior in projection size. Its controls are normally slaved to those of the main bridge.

STORAGE LOCKERS: a corner of this deck is devoted to personal storage lockers. The tube provides access only to the cramped locker corridors. Small hoverdollies aid in the transport of materials to and from the lockers. Each member of the crew receives the use of one locker with six cubic meters of storage capacity. In addition, there are ten double-sized lockers which the captain can employ for special storage. Each locker contains a temperature control; individual locker gravities are not variable.

Amphitheater Deck

The amphitheater is located toward the nominal 'front' of the ship, beneath the Living Quarters deck, and uses ship-normal gravity orientation. Built for good acoustics and audience comfort, it is used for general assemblies, video entertainment, theater productions, etc. The amphitheater is accessible by pneumagnetic tube or transport booth.

Exercise and Simweb Deck

Immediately below the amphitheater, this deck provides for the physical conditioning and rationed simweb training of the crew. Gravity conditions are ship-normal. The exercise room contains much physical training paraphernalia, and several kinds of showers. The simweb room contains ten simweb cocoons, a minidoc, and an auxiliary computer.

Stasis Deck

Located below the Exercise and Simweb deck, this level contains six 42-cubic-meter stasis cells; four large stasis cells (avg. 144 cubic meters); and one 42 cubic-meter restricted-access stasis cell. The gravity on this deck is set to 0 gee; it automatically reverts to ship-normal when someone visits the deck.

Each stasis cell has an individual stasis field generator. Each stasis field is outside-time-programable, from 20 minutes to two years. Only the 6-hour setting is stable and will not require additional expenditure of energy to maintain the field.

Garden Deck

This deck grows fresh garden items to supplement autochef fare, but it is mostly a place for quiet relaxation. The garden was designed with many alcoves and sonic dampeners, so that strollers here have as much privacy as possible. Gravity in the garden is set at one gee, but is oriented so that 'down' is toward the hyperdrive shunt.

Science Decks

There are seven science decks — the Observation deck and two tiers of three decks each. The upper tier lies above the Living Quarters deck, just aft of the hyperdrive shunt/fuel tank assembly. The lower tier lies below the Living Quarters deck, just behind the aft cargo bay. The Observation deck lies perpendicular to the science tiers, domed by the aft end of the GP hull.

UPPER TIER: the uppermost deck is commonly used as a lounge. Each of the other two decks contains two labs. Normally during hyperdrive not much research is done. During explorations, however, the labs bustle with activity.

LOWER TIER: this tier operates much like the upper, but its four labs are brought into use only after the upper tier is working to capacity. The lowest deck, the zoology deck, has hundreds of animal cages, environment chambers, creature handling facilities, etc.

Observation Deck

This deck is used for visual observations. The clarity of the GP hull material is outstanding. It is useful for astronomy, even though the hull material blocks most forms of energy. During hyperspace transfer the hyperspace blind spot it continuously monitored.

Mounted externally, and also operated from this deck, are extensive sensor arrays, and the probe launch rack.

Cargo Bays

There are three huge cargo bays, nominally termed the forward, central, and aft bays. Each bay is compatible with the cargo bay of the JinxHaul shuttle. Three JinxHauls can simultaneously dock with and load or unload these bays. In addition, for especially lengthy voyages, three full shuttles can dock to the outside and remain attached during hyperflight.

In the *Calatorie de* Soare, the forward bay contains parts, ship stores, and enough metal and hydrocarbon ingots to independently sustain a complement of 30 adults for seven years. The normal tour of duty for a survey ship is an outward voyage of not more than six UNS months, approximately one UNS year spent studying a system, and then a return voyage. (No one has ever field-tested how long this starship class could sustain real-time life, but models indicate a median probability of 3.6 UNS centuries. The stasis fields, of course, allow a theoretical survivability of many millennia.)

Two Explorer Survey Ships are stowed in the central cargo bay. These small ships actually transport survey teams to the surface while the *Calatorie de Soare* remains in orbit, continuing to conduct planet-wide and star system scans. The central bay is also a manufacturing center — various parts-processing machines dot the bay floor. The gravity of the bay is zero gee, except when actively used. The gravity is oriented so that 'down' is toward the hyperdrive shunt.

The aft bay contains six Cystems Inc. base-station tins. A 'tin' is a huge, semi-circular container that holds everything needed to erect a planet-side manned station. Once emptied, the container itself is used as the main building. It holds construction foam, two minilabs, two flycycles, two versatraks, communications, food processors, and other equipment.

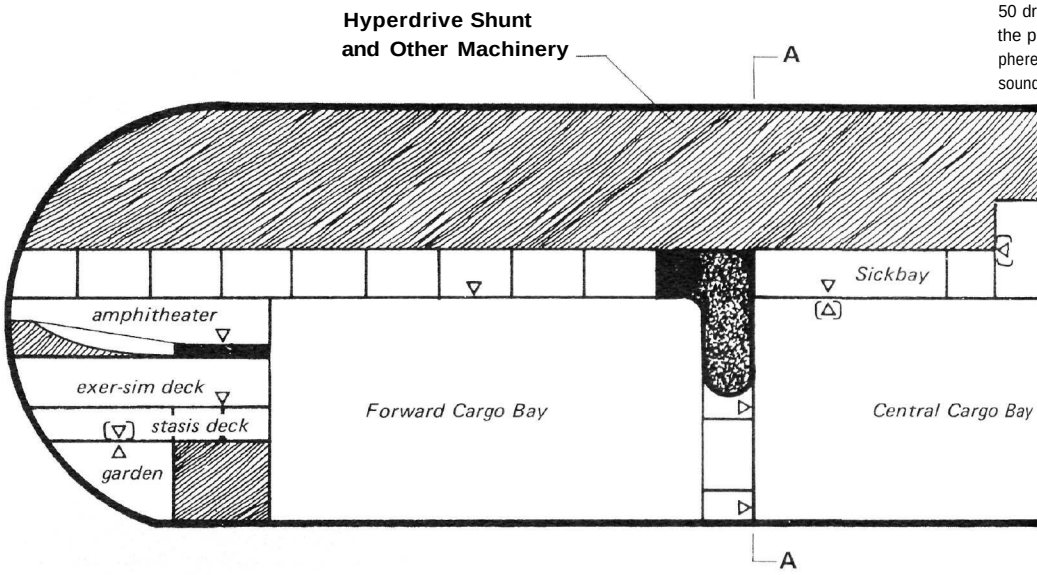
The stasis-protected base-station tin is simply dropped onto the surface of a planet; a manned Explorer Survey Ship with the station crew follows it down. One crewman then uses the base-station tin's feeble gravity polarizer to reposition the tin. When the survey leaves the planet, the base-station may continue to record data for future expeditions or forward it to a hyperspace relay station, or the whole station simply may be abandoned. Base-stations are almost never recovered and reused on another planet.

UNSS Calatorie de Soare

Use this schematic for reference only.

Hyperdrive Shunt and Other Machinery

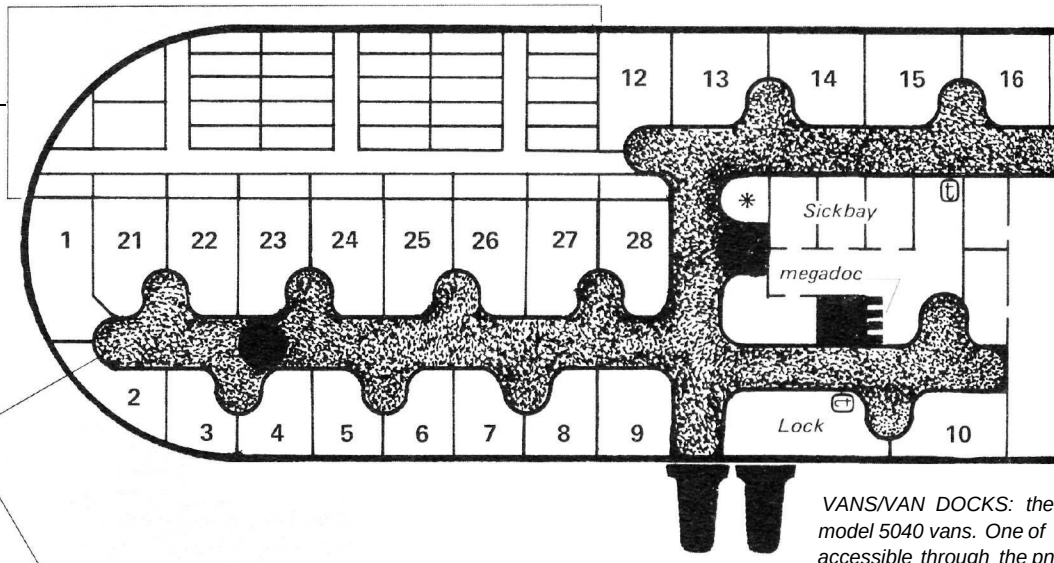
SIDE VIEW



0 — *indicates the locations of the ship transfer booths.*

Crew Storage Lockers

TOP VIEW



LIVING QUARTERS DECK

CREW ROOMS: each of the numbered rooms on this diagram is used as living quarters by one of the crew members.

Pneumagnetic Tube

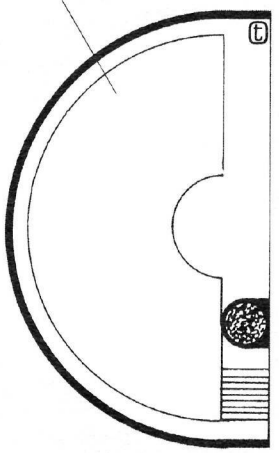
AMPHITHEATER: this deck is used for general assemblies of ship personnel. The dotted portion is formed of an inclined sheet of memory plastic which forms to body contours.

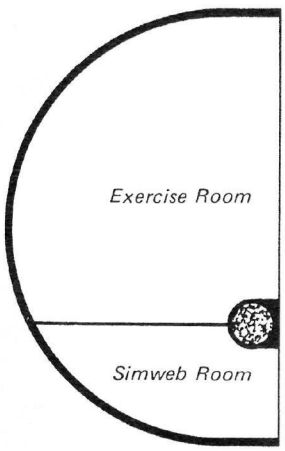
VANS/VAN DOCKS: the model 5040 vans. One of accessible through the pn

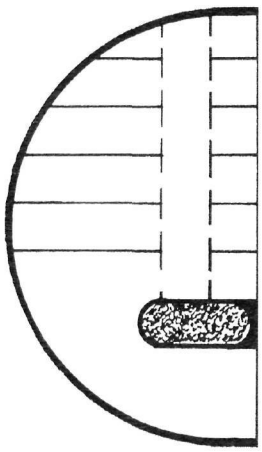
V — indicates the normal orientation of the gravity field in that area.

indicatesthatagravityfield oriented in this direction can be used in this area but is not normally in operation.

this is the location of the ship's main computer. Access is strictly limited to the Captain or or the Executive Officer.



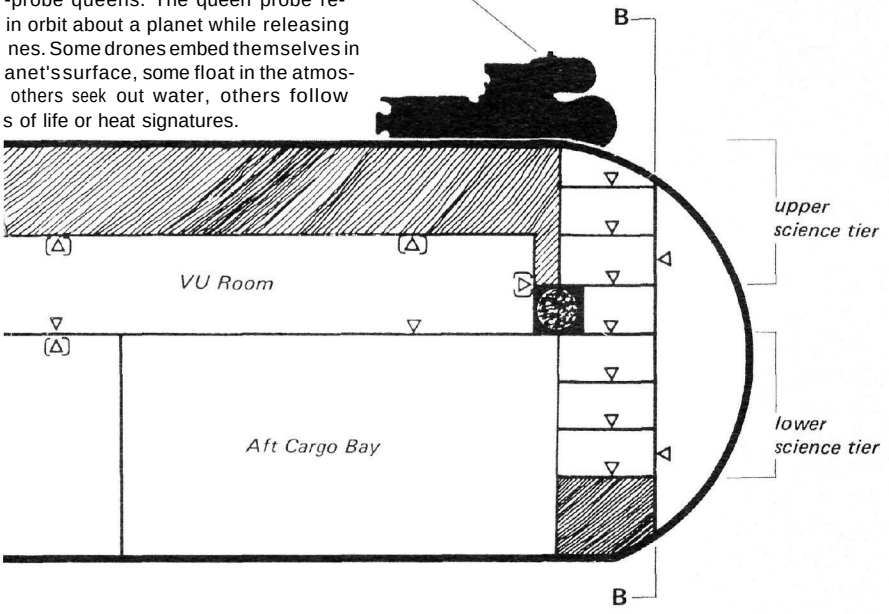


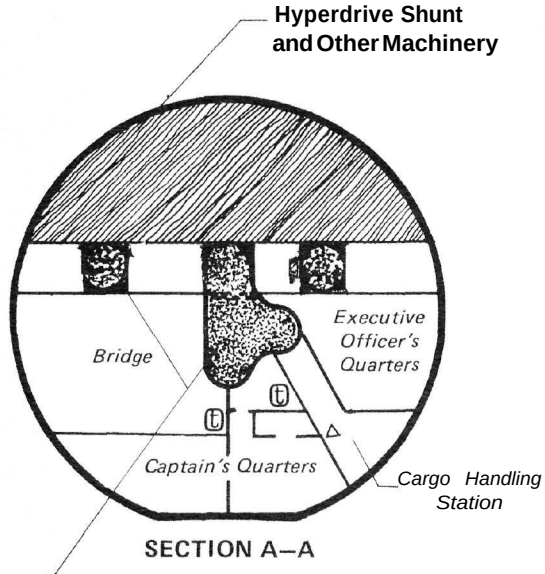


0 4 8 12 16 20 meters

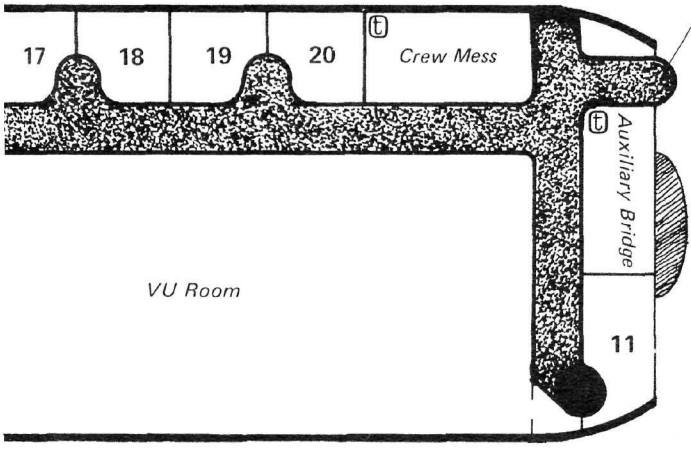
AMPHITHEATRE **EXERCISE AND SIMWEB DECK** **STASIS DECK**

E LAUNCH RACK: this assembly is
ally-mounted. It carries three system
;, three hyperspace relays, and nine
-probe queens. The queen probe re-
in orbit about a planet while releasing
nes. Some drones embed themselves in
anet's surface, some float in the atmos-
others seek out water, others follow
s of life or heat signatures.

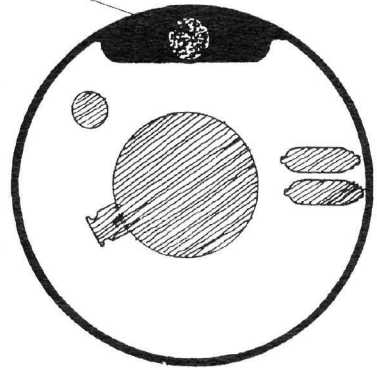




SECTION A–A



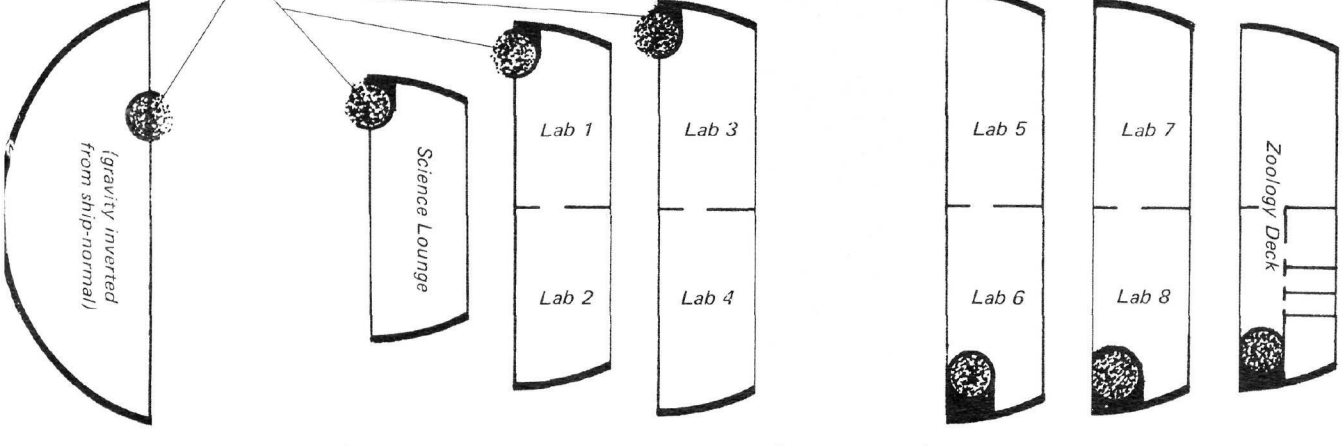
Pneumagnetic Tube



SECTION B-B
OBSERVATION DECK

e are two Volvo
he vans is directly
umagnetic tube.

Pneumagnetic Tube



GARDEN

UPPER SCIENCE TIER

LOWER SCIENCE TIER

TOP VIEWS

Hyperspace, Singularities, and Hyperspace Travel

In the field dynamics of the generalized hyperspace-time continuum, or *C-field,* there are mathematical singularities. These represent regions in hyperspace which hyperdrive pilots must not attempt to traverse. One such "gravity well" singularity surrounds each sufficiently large, concentrated mass in the Einsteinian (normal space) universe. The dominant singularity of a typical solar system is that produced by the central star. Only outside of hyperspace singularities can ships travel safely at well-defined, faster-than-light rates: quantum I, 3 days to the light-year, and quantum II, 1.25 minutes to the light-year. Quantum I is the first stable excited state of the C-field, and QI ships can be visualized as wave/particle packets moving at constant speed through it. The ground (or rest) state of the hyperspace continuum, quantum zero (Q-zero or Q_0) is the speed of light, *"c"* — unattainable using either normal drives or hyperdrive. General relativity (G-field) theory is used to describe the Q-zero spacetime continuum; even in the Ringworld era, the complex theoretical mathematics of hyperwave/hyperspace are not adequately understood.

Within the boundary of a local hyperspace singularity, spacecraft are limited to sublight velocities. Ships in hyperdrive that come too far inside the gravity well of any massive object (0.01 Earth masses and up) permanently disappear into hyperspace, and any ship attempting to pass into hyperspace while still too deep in a gravity well will vanish. (Most Known Space hyperdrive-equipped craft have failsafe systems to help prevent disappearance, but these systems occasionally malfunction, or are sometimes defeated by the obstinance of frustrated pilots.) Within a singularity the position-matrices of the C-field take on imaginary values. The physical meaning of this result has been interpreted in various ways (some quite bizarre) over the centuries. A common view holds that when a ship in hyperspace hits a normal gravity-gradient singularity, the hyperdrive jumps into some as-yet-unreachable level of hyperspace, taking the whole ship with it. The atoms of the ship are then strewn along its path until nothing is left but the hyperdrive field itself.

In any case, no ship that has vanished into the "blind spot" has ever returned to Known Space.

Practicalities of Hyperspace

To navigate a safe course in hyperspace, the pilot uses a psionically-operated device called the mass indicator (mass sensor, mass pointer) — a transparent sphere with a number of luminous colored lines radiating from its center. These lines, each representing the hyperspace manifestation of a normal-space gravity well, usually appear blue, green, or red to human pilots. Travelling through hyperspace, the luminous lines sweep slowly outward and across the curvature of the transparent sphere, lengthening and brightening as the ship nears each singularity. (In a quantum I ship, the lines take hours to move perceptibly, but in a quantum II ship the pilot can actually watch the lines slowly change in length.) Experienced pilots derive much information about the nature of individual masses causing the singularities from the subtle nuances of thickness, shape and color of mass-indicator lines. It is easy to distinguish a white dwarf, for example, from a normal star.

Due to the psionic nature of the mass indicator's operation, a living pilot is always required for hyperspace travel.

The size of a particular solar system's hyperspace singularity determines the minimum distance (from any star or planet in the system) for safe hyperspace exit or entry. The mass, radius, and density-gradient of the object creating the main gravity well (usually a star) are the primary factors which fix the distance to the hyperspace boundary zone — the "edge" of the local singularity. The formulas to exactly compute the safe distances are complex, marginally comprehensible only to specialists in advanced theory of hyperwave statistical field dynamics. They include a myriad of minor factors (composition, temperature, spin, charge, magnetic fields, etc.), indeterminancies, and higher order terms. Even a precise formulation of the hyperspace laws yields an inexact result — in the form of a probability distribution. For each gravity well there is a statistical shell in which hyperspace entry/exit becomes increasingly dangerous. In explored sections of Known Space, safe distances are established empirically rather than theoretically — mainly by extensive measurement of the hyperwave link cutoff radius from each particular inhabited star. Double and multiple star systems have more complicated hyperspace boundary surfaces. Such values are tabulated.

Hyperwave penetrates somewhat farther into a star's gravity-well singularity than is considered safe to travel using hyperdrive. For normal stars the difference is ten to twenty percent. This region of marginal safety is known as the "forbidden zone" of each solar system.

For unknown systems, most pilots rely on the mass indicator and hyperwave probes. However, many "rule-of-thumb" formulas give valid order-of-magnitude estimates, like astronomy's mass-luminosity law, applicable in most situations (above certain minimum densities, etc. for normal stars as well as for dense white dwarf stars and superdense neutron stars.

Known as the Hyperspace Approximations, all hyperspace pilots must learn them and their implications before ever piloting a ship. Pilots of experimental quantum II craft should allow a 30% greater distance than these formulas allow for hyperdrive entry or breakout.

Low-mass, extremely high-density objects can also cause disappearances. A dense-enough object can be less massive and still flip a ship out of the universe. Such objects, though rare, are most dangerous, because they show up on the mass indicator only for an instant. The most likely outcome of an encounter with such an object is the sudden disappearance of the ship's hyperdrive motor.

If a ship in hyperspace hits an extremely-high-gravity gradient (such as that of a mini-blackhole or a superpowerful gravity generator), the motor wraps space around itself and takes off at some higher level of hyperdrive, shearing off superconducting cables, motor mounts, etc., so cleanly that the sheared ends have mirrored surfaces. The motor disappears entirely from the housing, leaving no exit hole. The ship which once contained the motor is precipitated abruptly into normal space, otherwise intact. Since it is impossible to track ships through hyperspace, intercepting a ship or precipitating it out of hyperspace is impossible unless its course is known in advance, can be guessed, or can be computed accurately by independent means. It is a relatively easy task, however, to track ships before they enter hyperspace: the well-known cases of pirates precipitating ships out of hyperspace have usually involved spacecraft departing inhabited systems, rather than approaching. It should be noted that Puppeteer-scale technology and resources would be needed to build a large asteroid- or Mars-scale gravity generator; however, mini-blackholes, though rare, do exist in the Known Space universe and have been used for piracy.

Entering Hyperspace

Entry into hyperspace under normal conditions can occur with any real-space velocity vector, even zero. Usually this vector is chosen to give optimum deceleration with respect to the destination gravity well, consistent with the ship's capabilities, payload, length of voyage, etc.

The field of a quantum I or II hyperdrive shunt motor wraps around the surface of the ship — the effect depends on physical contiguity and does not project out to some uniform radius beyond the ship in vacuum; thus it is not possible, for example, to drag a nearby ship into hyperspace with yours unless there is a substantial physical contact/connection between them, and unless, the total mass, looking upon the ship as payload, does not exceed the permissible payload-mass limit of the hyperdrive motor being used — think of it as like trying to pull a trailer with a Volkswagen. Fuel consumption increases, as does strain on the hyperdrive, and beyond a certain limit the motor cannot pull the mass at all. Each ship has a maximum payload. If a ship tries to haul a too-massive object (for example a 300-foot-diameter section of scrith

pipe), it risks burning out or turning to slag the hyperdrive unit, or disappearing into the blind spot (it the object is sufficiently massive and the ship is sufficiently close), or losing the hyperdrive if the density of the object is too high.

Objects not directly touching the surface of the ship when it goes into hyperspace stand a good chance of being left behind, especially if the velocity vector of the object differs slightly from that of the ship. This includes explorers in spacesuits floating outside the ship, or even explorers in an open airlock who are not directly touching the sides of the ship — long thin tow-lines are typically sheared off.

The Tnuctip Hyperdrive

This hyperdrive (used by the ancient Slavers) requires a normal-space velocity of 0.93 lightspeed to permit entry into hyperspace. It is distinct from the Outsider hyperdrive, and in fact its operating principle is not known to Ringworld-era Known Space civilizations. Its jumps through hyperspace are governed by the hyperwave uncertainty principle, and do not obey the fixed 3-days-to-the-light-year quantum I rate. Slaver ships equipped with the tnuctipun drive could only estimate their journeys' durations, jump-to-jump. "Luck more than skill, decided when a hyperspace ship would make port." The psychological effect of compressed exposure to the blind spot during a jump is equally severe, perhaps more so, when using the Tnuctip hyperdrive as compared to the Outsider drive.

If a ship is resting on the surface of a planet or other massive object, and if — despite all common sense and fail-safe systems — someone decides to switch on a hyperdrive shunt, there may be an explosion as the ship and/or motor vanish. Because of the physical contiguity, a modest radius surrounding the ship may be wrenched into hyperspace along with the ship (the radius depending on the maximum capability of the quantum shunt); and in any case the normal matter at the outer zone reached by the field may be vaporized — heated to plasma temperatures by the shock effect. Nearby objects protected in stasis might be safe unless they are wrenched along into the blind spot by the departing ship — under normal conditions objects in stasis fields can be taken into hyperspace as if they were normal cargo.

Exit from Hyperspace

A ship's entry velocity vector is preserved upon exit from hyperspace, relative to the star of departure.

During hyperspace flight small masses are of essentially no concern. However there is a possibility (nearly negligible) that, for an instant as a ship drops out of hyperspace, it may be too close to a small mass, even another ship. The emerging ship, or even both objects if the other is not much larger and moving with a similar velocity may then vanish. Although this may have happened once in Known Space history, the odds against such an occurrence are enormous. Since no vanished ship ever has returned, the question of just what happens to such vessels must remain open.

Encounters in Hyperspace

Encounters in hyperspace do not occur in Ringworld-era Known Space since it is impossible to see or detect another ship during hyperspace flight if both are in hyperspace; in the event of a collision or near miss, both ships would be destroyed, be lost in the blind spot, or be precipitated into normal space without their hyperdrives. So far such an improbable event has not happened.

The wild tales of hyperspatial beasts and monsters which circulate throughout Known Space are necessarily suspect. Any ship destroyed by such a beast could leave no survivors to tell such tales.

The Hyperspace Approximations

H_R is the approximate radius of safe entry into hyperspace.

M is the Mass of the object creating the gravity well.

R is the effective Radius of the object creating the gravity well. (R in km gives result in km; R in units of sun's radius gives result in solar radii.)

Mass of Sun = 1.99 x 10^{30} kg

Radius of Sun = 6.96 x 10^5 km

7. *For normal stars to 1.2 solar masses:*

$$H_R = 10^4 R$$

NOTE: The factor 10^4 is roughly the same as the ratio of the size of an atom to the size of a nucleus.

2. *For white dwarf stars:*

$$H_R = 10^4 MR$$

Typical mass range for white dwarf stars: 0.2-1.4 M_{sun}

Typical radius range: 5,000-20,000 km

NOTE: For white dwarfs, the radius *decreases* with increasing mass.

3. For Neutron Stars:

$$H_R = 10^4 M^2 R$$

The neutron star mass limit is about two solar masses, but the radii are only about 10 km! Like white dwarf stars, the radius decreases with increasing mass.

NOTE: For black holes, the Schwarzchild radius (the event horizon) may be substituted for R, although no sane hyperdrive pilot would approach a black hole within hundreds (or thousands) of times the H_R!

4. For normal stars more massive than $1.2M_{sun}$:

$$H_R = 10^4 \frac{R}{\sqrt{M}}$$

NOTE 1: for normal supergiants above 5-10 M_{sun} the relation becomes:

$$H_R = 10^4 \frac{R}{M}$$

NOTE 2: Red giant stars are not "normal" and obey a more complex relation.

Examples

CASE 1: Normal Stars up to 1.2 solar masses

THE SUN

$$H_R = 10^4 R$$
$$= 10^4 \ (6.96 \times 10^5) km$$
$$= 6.96 \times 10^9 km$$

The Approximation gives a comfortable safety margin for Sol, whose actual boundary zone is about 5-1/2 light-hours (6 x 10^9km) in radius. Sol's hyperwave relay stations are just over 5 light-hours from Earth, in the so-called "forbidden zone."

A RED DWARF

Mass = 0.1 Msun; Radius = 0.25 R_{sun}

$$H_R = 10^4 R$$
$$= 10^4 \ (0.25)(6.96 \times 10^9) km$$
$$= 1.74 \times 10^9 km$$

This is a little more than the average distance from Sol to Saturn.

CASE 2: White Dwarf Stars

If Sirius B were an isolated star, what would be its HR?

Mass = 0.09 M_{sun}

Radius = 0.022 R_{Sun} = 15,300 km

$$H_R = 10^4 MR$$
$$= 10^4 \ (0.98 X 1.53 \times 10^4) km$$
$$= 1.5 \times 10^8 km$$

Puppeteers and other cautious hyperdrive pilots will generally breakout no closer to a white dwarf than twice the computed HR value.

CASE 3: Neutron Stars

BVS-1 has a mass of 1.3 M_{sun} and an effective radius of 10 km. Compute its HR.

$$H_R = 10^4 M^2 R$$
$$= 10^4 \ (1.3)^2 \ (10)$$
$$= 1.7 x \ 10^5 km$$

Although the theoretical maximum limiting HR for neutron stars is less than the distance from the Earth to the Moon, hyperdrive pilots are rarely willing to approach closer than 1,600,000 km (a million UNS miles), due to *C-field* fluctuations and other hazards usually associated with these objects!

CASE 4: Normal Stars more massive than 1.2 M_{sun}

SIRIUS

Mass = 2.35 M_{sun}

Radius = 1.8 R_{sun} = 1.25 x 10^6 km

$$H_R = 10^4 \frac{R}{\sqrt{M}}$$

$$= 10^4 \frac{(1.25 \times 10^6)}{\sqrt{2.35}}$$

$$= 10^4 \frac{(1.25 \times 10^6)}{1.53}$$

$$= 10^4 \ (8.17 \times 10^5)$$

$$= 8.17 \times 10^9 \text{km}$$

It is often possible to 'breakout' of hyperspace even closer to Sirius because of *C-field* constriction caused by the white dwarf Sirius B.

VEGA

Spectral type AO; 58 times more luminous than Sol.

Mass = 3 M_{sun}; Diameter = 2.7 UNS miles

First, convert the units:

$$2.7 \times 10^6 \times (1.609 \text{ km/mile})$$

$$= 4.3443 \times 10^6 \text{km}$$

To get the Radius, divide by 2:

$$2.17215 \times 10^6 \text{km}$$

Then,

$$H_R = 10^4 \frac{R}{\sqrt{M}}$$

$$= 10^4 \frac{(2.17215 \times 10^6)\text{km}}{\sqrt{3}}$$

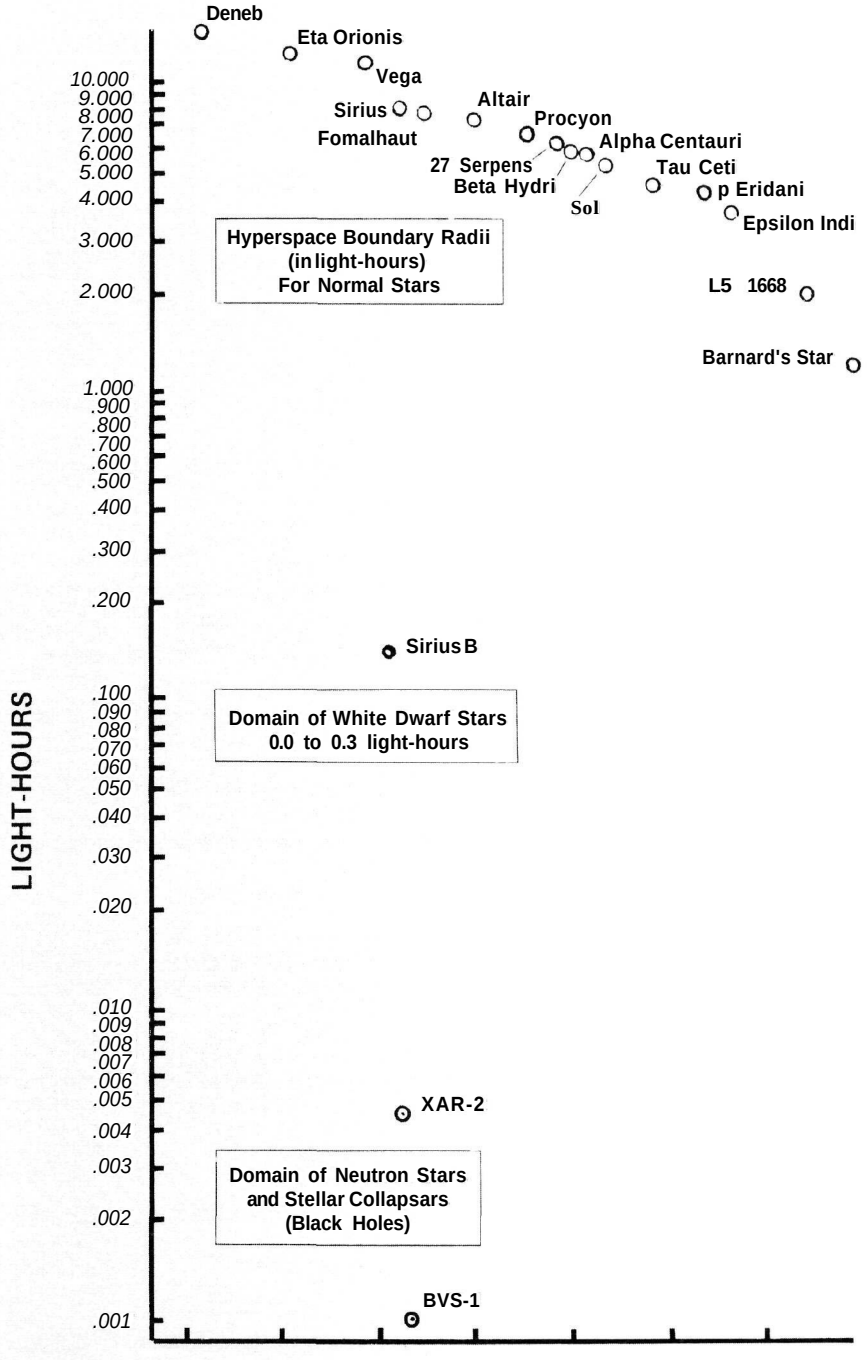
$$= 10^4 \frac{(2.17215 \times 10^6)\text{km}}{1.73}$$

$$= 10^4 \ (1.26 \times 10^6)\text{km}$$

$$= 1.26 \times 10^{10} \text{km}$$

Using the distance-time comparison table, we note that this is about 11 light hours.

HYPERSPACE BOUNDARIES FOR SELECTED KNOWN SPACE STARS

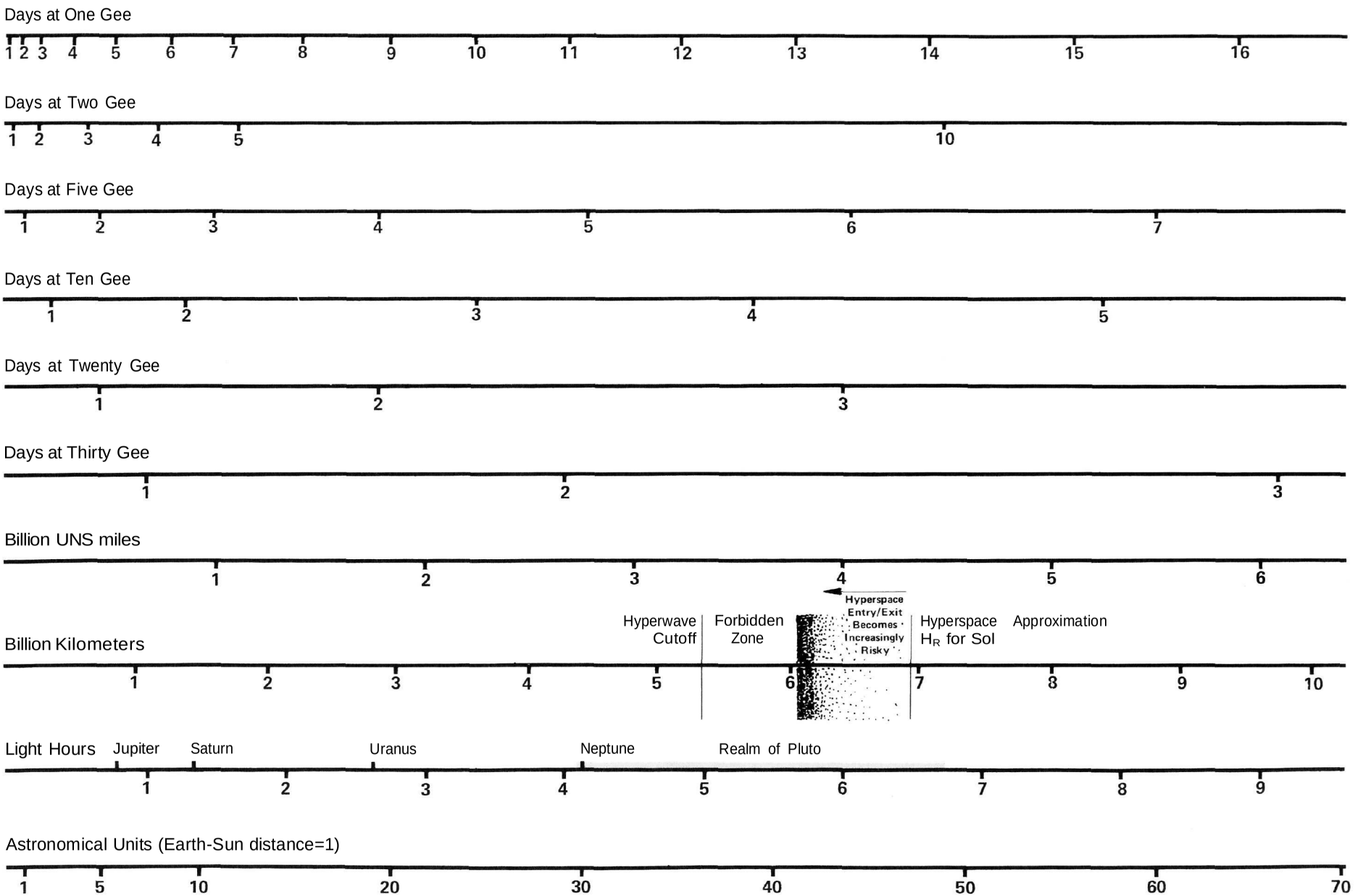


Spectral type	O	B	A	F	G	K	M
Apparent Color	violet-white	bluish-white	white	yellow-white	yellow	orange	red
Surface Temp. (degrees Absolute)	50-30,000	21,000	11,000	7,500	5,800	4,800	3,400
Luminosity (Sol=1)	10^5	1,000	25	8	1	0.4	below 0.2
Typical Mass (Sol=1)	50-20	10-5	3	2	1	0.6	below 0.1
Typical Radius (Sol=1)	20	6	3	2	1	0.8	below 0.5

Average stellar parameters for normal main-sequence stars only.

DISTANCE-TIME COMPARISON TABLE

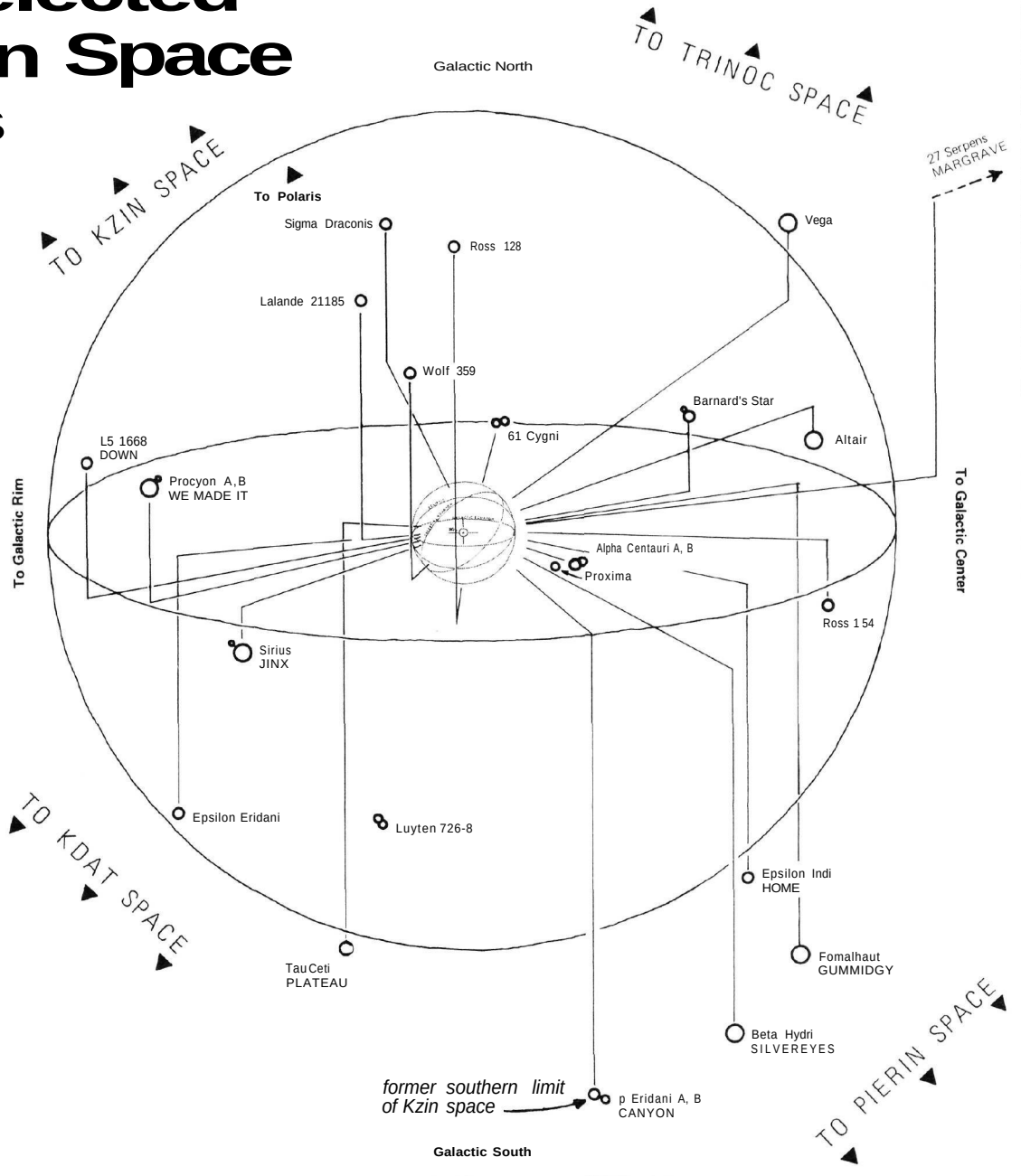
Computations made from the center of Sol.



Relative Positions Of Selected Human Space Stars

Selected Light-Year Distances From Sol

Alpha Centauri	4.3
Altair	16.0
Barnard's Star	6.0
Beta Hydri	21.3
Epsilon Eridani	10.7
Epsilon Indi	11.4
Fomalhaut	23.0
L5 1668	12.3
Lalande 21185	8.2
Luyten 726-8	9.0
Procyon	11.3
p Eridani A	22.0
Proxima	4.2
Ross 128	10.8
Ross 154	9.4
27 Serpens	34.7
Sigma Draconis	18.2
Sirius	8.7
Tau Ceti	11.8
Vega	27.0
Wolf 359	8.1



IMPORTANT NOTES: Many nearby stars (mostly low-luminosity stars) have been omitted and some vectors are foreshortened or slightly shifted for clarity of illustration. Some stars that appear close together on this diagram (e.g. Beta Hydri and Fomalhaut) are not close together in space.

Luyten 726-8 (also known as UV Ceti A-B) lies almost directly between Sol and Tau Ceti at a distance of 9 light years from Sol.

Alpha Centauri lies in the galactic plane. 61 Cygni lies just 2° above it.

SELECTED HUMAN SYSTEMS AND GOVERNMENTS

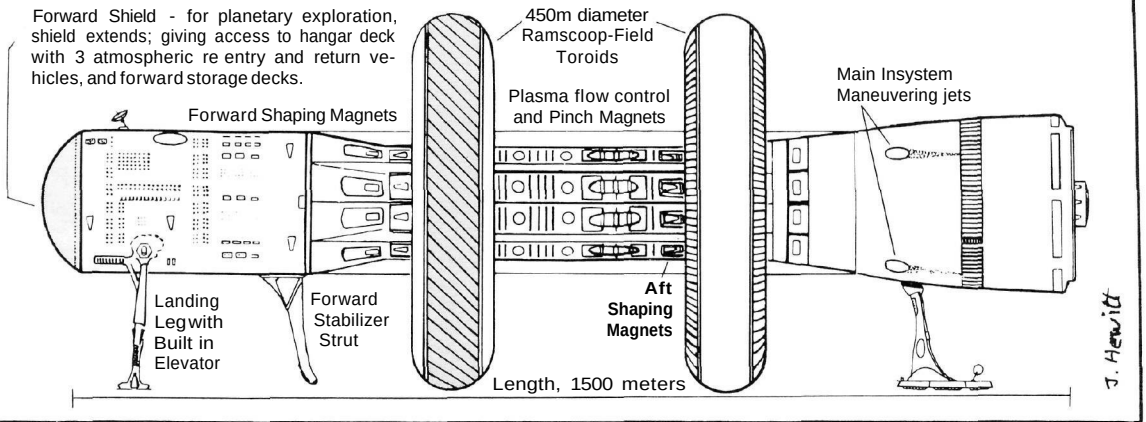
Name	*Primary Star*	*Gravity (Earth Normal = 1)*	*Length of Day (UNS hours)*	*Population in System (millions)*	*Number of Moons*
Belt	Sol	negligible	varies	1,200.0	many
Canyon	p Eridani A	0.45	27.1	8.5	0
Down	L5 1668	1.15	28.7	620.0	1
Earth	Sol	1.00	23.93	18,500.0	1
Gummidgy	Fomalhaut	0.95	18.25	19.0	1
Home	Epsilon Indi	1.08	23.17	825.0	1
Jinx	Sirius A	1.78	96.00	2,100.0	0
Margrave	27 Serpens	0.87	21.0	0.45	0
Plateau	Tau Ceti	0.81	29.7	105.0	0
Silvereyes	Beta Hydri	1.04	32.2	172.0	2
We Made It	Procyon A	0.59	20.4	950.0	1
Wunderland	Alpha Centauri A	0.61	26.7	3,250.0	1

City Builder Ramship

Forward Section — Life-support, complete passenger/crew accommodations.

Central Section — Ramscoop/accumulator systems.

Aft Section - Main fusion Reaction motor and exhaust cavity.



Ringworld Vehicles

BALLOON TRAM (Spill Mountain People)

MAS: 20 (152kg)
DIMENSIONS: balloon is a 10m-diameter elongated sphere
POWER SUPPLY: stores enough alcohol for three journeys up and down the mountain
SPEED: 15 kph average
ARMOR: none
APPLICABLE SKILL: Atmospheric Craft
GENERAL HIT POINT: 10 (balloon), 40 (car)
HIT LOCATIONS:

roll 1D20	*results*
01-17	Balloon
18-20	Car (each passenger receives a luck roll to see if he or she is hit)

The Spill Mountain Folk use tethered ballon trams to haul cargo up and down the sheer surfaces of Spill Mountains. Two cables are used for each route, one for descents and the other for ascents. Cars suspended beneath the hot-air balloons are made from fiber and hardwood strips, a trade staple for lower-altitude species. For the downward trip the lift of the balloon is set to be slightly less than the weight of the cargo and vehicle, allowing the car to lightly descend. Lever emergency brakes can keep speeds under control, but mostly the operator varies the rate of burn to vary the lift, thereby going faster or slower in either direction. Lift for the balloons is provided by hot air generated by an alcohol jet-burner in a rigid frame over each car.

Skilled Spill Mountain Folk drivers keep the cars to a rigid speed limit — no living hominid remembers a runaway car — mostly to minimize wear on the hardwood pylons which bear the weight of the cables.

At the bottom of the line are interchanges for reversing the car or transferring the car to another route. Spill Mountain Folk man the upper stations; local lowland hominids run the lower stations. Occasionally a lowland hominid with breathing equipment makes the long journey up to a Spill Mountain city.

The Spill Mountain Folk take pride in their balloons; each is differently and beautifully decorated. The trams are often run in caravans or processions; the vision of seemingly-unending strings of huge multicolored balloons drifting slowly up and down the sheer Spill Mountain, disappearing into and reappearing from the mists above, is never forgotten.

DIRIGIBLE (Wind Walkers)

MAS: 42 (1038kg)
DIMENSIONS: 10m x 30m smoothly-tapered lozenge with 5m x 12m cabin suspended beneath
ENERGY USED: 3/im
POWER SUPPLY: solar collectors; storage batteries can propel the craft for maximum of eight hours
SPEED: 70 kph maximum; 50 kph cruising
MAXIMUM ACCELERATION: 2 kph/im
ARMOR: varies; usually none
APPLICABLE SKILL: Atmospheric Craft
GENERAL HIT POINTS: 100 (body) 20 (rudders), 80 (average cabin)
HIT LOCATIONS:

roll 1D20	*result*
01-12	Body: small individual cells containing helium are punctured; when 50 hit points have been lost, the craft can no longer stay in the air.
13-15	Rudders: craft cannot be maneuvered; this is mainly important in landing, for the propeller also can be used to situate the dirigible.
16-20	Cabin: make Luck rolls to see if passengers or crew are hit.

City Builders sold such dirigibles to many subject species. The Wind Walkers exchanged personal service for them; Machine People enclaves bought dirigibles with exotic goods and foodstuffs. In marketing massive airships, the City Builders found a use for helium, an otherwise useless by-product from their fusion generators; these sales also made dependent buyer-species wishing to keep their dirigibles flying. The isolated City Builders still continuing such policy might see explorers arriving in stasis blimps (which require no helium) as a threat to a carefully-established status-quo.

These huge football-shaped airships are common in some regions. When the superconductor plague destroyed more advanced vehicles, City Builders remnants also began using these energy-efficient craft. Thin, feather-light solar collectors coat the upper surface of the airship body, yielding enough power to propel it slowly and to operate auxiliary systems — searchlights, cabin lights, kitchen equipment, and so on. Battery banks near the rear of the craft store enough power to operate the dirigible throughout the Ringworld night. For every two hours of full sunlight, the batteries recharge enough to provide one hour of propulsion.

Beneath the dirigible body hangs the cabin, often finely decorated and well-furnished. The standard cabin is 5m x 12m long; at its rear is an outboard propeller driven by a light electric motor. The front end of the cabin, the forwardmost 3 meters of length, is the pilot's cabin in which all the controls required to fly the ship are located — only one pilot is required. The rest of the cabin is broken up according to the needs of the passengers or the cargo. Since the cabin is usually manufactured by the buyer, the cabin and the body of the craft often provide an interesting cultural contrast; the embellished, painted, wood-and-metal cabin hanging under the streamlined synthetic dirigible body.

Smaller personal solar-powered balloons are common near City Builder enclaves. They resemble the huge dirigibles, but of course generate and use less power. The pilot usually hangs from a harness below the balloon with the engine and propeller attached to a rigid frame hanging down behind him or her. These smaller craft have enough battery power to run the propeller for one hour of flight in darkness.

HYDROFOIL
(Boat People)

MAS: 37 (660kg)
DIMENSION: 2m x 4m long; fan at rear rises 2m above the deck of the boat
POWER SUPPLY: 160 liters of alcohol in a tank; range of 1600km
SPEED: 180 kph maximum; 140 kph cruising
MAXIMUM ACCELERATION: 20 kph/im
ARMOR: 2 point hood over engine
APPLICABLE SKILL: Aquatic Vehicle
HIT LOCATION:

roll 1D20	*locational hit points*	*result*
01-15	50	Boat Body: hydrofoil must take heavy damage before it will sink, though it can be capsized by a heavy blow.
16	10	Right Foil: destruction of the foil halts the craft.
17	10	Left Foil: destruction of the foil halts the craft.
18	5	Engine: each point of damage to the engine slows the craft by 20%.
19	5	Propeller: each point of damage to the propeller slows the craft by 20%.
20		Crew: no damage to the boat; have crewmembers' players make Luck roll for them: each getting a failed roll takes full damage.

Primitive by Known Space standards, this small hydrofoil is the Boat People's best craft for quick travel across a very large world. While moving, semi-submerged foils support the craft, allowing it to skim across the water at high speeds. When there are noticeable waves, the hydrofoil's speed must be greatly reduced. An internal-combustion engine drives a large vertical airfan at the back of the boat. Frequently the shallow, plant-choked lakes and rivers of Ringworld make (impossible the use of deep-drafted, submerged-propeller-driven vessels. An aluminum and cured-leather hood protects the engine from the spray, and a screen protects the propeller. Usually nothing protects the driver and passengers, who must resign themselves to being doused.

Typically the hydrofoil has a single operator and 1-3 passengers. In a pinch it carries about 1400kg of passengers and cargo. The Boat People disdain rails and other restraining devices: a player must make a successful DEX x2 roll the first time that his explorer experiences hydrofoil acceleration, or his character is thrown overboard.

HYDROGEN-JET FIGHTER
(Ringworld Kzinti; some Machine People)

MAS: 41 (946kg)
DIMENSION: 4m body length; 1 m body width; 4m wingspan
POWER SUPPLY: burns hydrogen; liquid-hydrogen tank is good for six hours of flight
SPEED: 400-700 kph cruising; 1200 kph maximum
MAXIMUM ACCELERATION: 50 kph/im in air; 10 kph/im taking off
CEILING: 20 km
ARMOR: 2 points; 3 points over fuel tank
APPLICABLE SKILL: Atmospheric Craft
GENERAL HIT POINTS: 100
HIT LOCATIONS:

roll 1D20	*result*
01-06	Tail/Engine: hits to this location cause an explosion 60% of the time which destroys the craft.
07-12	Fuel Tank: hits here cause an explosion 100% of the time destroying the craft.
13-18	Cockpit: pilot must get a successful Luck roll or take the rolled damage.
19-20	Nose: sensors or controls take damage.

These volatile devices were invented by Kzinti living on the map of Kzin in the Great Oval Ocean; Machine People on the coast of the ocean soon adopted the craft for purposes of status and commercial exploitation. The pilot of a Kzinti-jet-fighter must be highly skilled to fly the plane and to protect the quick-to-ignite fuel tank. Combat can be deadly to the pilot whose plane is hit by a single shot. Most of the craft are designed to automatically separate the cockpit and nose from the fuel section if the latter is hit; most of the light armor which the planes carry is in the form of a thick heat shield directly behind the pilot.

The Kzinti and the Machine People relish both the danger involved in flying hydrogen-fighters and the high performance which the planes afford.

The fighters look much like mid-20th-century jet fighters from Earth. The single engine is at the rear of the plane. Directly in front of the jet engine, separated from it by a thick fire-wall is the fuel tank. The tiny pressurized pilot's compartment lies between the wings, separated from the fuel tank by more armor and some machinery. In the narrow, tapering nose of the plane lies the pressurization equipment and occasionally primitive radar gear.

The fuel tanks are coated with a tough, flame-resistant substance which protects the fuel from heat and impact, but if this outer coating is breached the plane will explode, usually killing the pilot.

The Kzinti mount light machine guns in the wings of the fighters which fire 3 exploding bullets per impulse each doing 1 D8 to a random hit location if they hit.

SCRITH REPULSER LIFT PACK
(City Builders and friends)

WEIGHT: 1.5kg
DIMENSIONS: 6cm x 10cm x 15cm
ENERGY USED: 15/im
POWER SUPPLY: generator, equivalent to fusion 1

SPEED: 165 kph maximum; 120 kph cruising
MAXIMUM ACCELERATION: 10 kph/im
ARMOR 1 point
HIT POINTS: 20
APPLICABLE SKILL: Personal Flyer

Faster and more efficient than the terrestrial lift belt, these flyers will be coveted by explorers. The City Builders use repulsor-packs for quick travel between buildings at different altitudes and for quick transit across cities when the walks are jammed. City Builder police always wear repulsor packs or similar devices. In most floating cities it is illegal to fly a repulsor pack (or any other type of personal flyer) without a license.

SKYSLED
(Spill Mountain Folk)

MAS: 26 (250kg)
DIMENSIONS: boxy 4m x 6m
ENERGY USED:
POWER SUPPLY: City Builder solar collector tube; battery stores enough power to operate the craft through the night
SPEED: 60 kph cruising; 90 kph maximum
MAXIMUM ACCELERATION: 5 kph/im
ARMOR: 2 points
APPLICABLE SKILL: Atmospheric Craft
GENERAL HIT POINTS: 40
HIT LOCATIONS:

roll 1D20	*locational hit points*	*results*
01-10	40	Body: no result until severe damage; then craft may disintegrate understress.
11-13	8	Right Scrith Repulser Track: damage causes sled to lose altitude and stability; destruction causes it to fail.
14-16	8	Left Scrith Repulser Track: damage causes sled to lose altitude and stability; destruction causes it to fail.
17-18	4	Collector Tube: loss of the tube cuts the craft's flight time to 9 UNS hours, and only an outside power source can recharge it for similar additional periods.
19-20		Crew: make Luck rolls to see if riders each take damage.

Before the Fall of Cities, skysleds were the most common transport used by the Spill Mountain Folk. Few of these powerful MAGLEV devices still operate in the Ringworld era, for the Spill Mountain Folk relied on the City Builders to supply and repair the sleds and the compact, powerful solar generators which power them. Those few sleds which remain in operation have not needed parts or major repairs in a millennia — a sparkling operating record perhaps due to the thin air in which the devices are used.

Skysleds are plain-looking vehicles — like topless metal boxes (often the front panel of the box is glass) with tracks of scrith repulsors along the bottom, and a single propulsion unit at the rear. Around the lower edge of the sled runs an ultra-efficient City Builder solar collector tube, which can provide enough power to run the scrith repulsors and the thruster while generating enough excess to keep the sled moving for an entire night. The controls for the craft are located on the floor; the pilot must sit on the floor to operate the vehicle — Spill Mountain Folk don't use chairs.

A skysled owner is a person of high rank among the Spill Mountain Folk. Usually the remaining sleds belong only to the tribal chieftains, and seldom does more than one sled remain at any given mountain.

Skysleds are still stored on some spaceport ledges, kept in perfect condition by the vacuum of space. The explorer who brings one or more of these back over the rim-wall will be apt to gain friends among the Spill Mountain Folk.

STEAM YACHT
(Boat People)

MAS 63 (6288kg)
DIMENSION: 12m by 30m
POWER SUPPLY: Wood-burning steam engine; wood storage varies depending on distance to be traveled and nearness of next convenient wood supply
SPEED: cruising 30 kph; maximum 50 kph
MAXIMUM ACCELERATION: .5 kph/im
ARMOR: 4 points below deck; 2 points above deck
APPLICABLE SKILL: Aquatic Vehicle
GENERAL HIT POINTS: 400
HIT LOCATIONS:

roll 1D20	*locational hit points*	*results*
01-04	240	Forward Below Decks: make Luck roll to see if any crew is hit.
05-08	240	Engine Room: possible loss of speed and/or maneuvering; make Luck roll to see if any crew is hit.
09-10	120	Engine: possible loss of headway; serious damage prompts 50% chance of fire.
11-13	160	Chieftain's Cabin: make luck rolls to see if any crew is hit.
14-15	80	Stack: serious damage prompts 50% chance of fire.
16-17	80	Pilot's Cabin: possible loss of steering; make Luck rolls to see if any crew is hurt.
18	40	Rudder: serious damage causes loss of steering.
19-20	120	Deck: make Luck rolls for any crewmen or passengers; damage may include loss or supplies or cargo.

Boat Person chieftains often live aboard opulent steam-powered yachts of many length and designs. On this one, the chieftain and his famly live in a large cabin at the rear of the main deck. Directly in front of the single smokestack is a small cabin in which lives and works the pilot. The forward area below the main deck is a low-ceilinged common area used for storage and shared by the yachts crew (usually three to four) and the servants of the chieftain. The rear below-deck are is the engine room — always scalding hot and stacked high with wood.

The ship is propelled by dual paddle-wheels powered by a massive wood-burning steam engine. Though slow to start, these yachts have formidable power and, given time, can work up quite a bit of steam.

Among the Boat People a chieftain's status is measured by the opulence of his yacht — the fineness of the wood hull, the firmness of the construction, the size and power, etc. Chieftains fill their yachts with exotic trade goods and treasures gained on travels taken by their tribesmen. Greedy explorers might wish to plunder these yachts, while prudent explorers might wish to offer the chieftain a gift, adding slightly to the splendor, and thereby gain his friendship.

Two male Agamans survey the landscape to find an appropriate place for a call stick.

The Agaman in the rear holds a ceremonial dagger; planted beside a call-stick, such a dagger summons the clan to war.

SPECIAL SECTION

AGAMANS

Use this section to guide the independent creation of intelligent species. There are three general subsections: (1) a background discussion of the species (physiology, culture, history, environment), one complete enough to answer obvious questions; (2) a selection of technical items (from spaceships to domesticated animals), items showing how the species is able to live as described; (3) an introduction of members of the new species to the explorers. All the subsections should be complete enough that gamemasters can use the information quickly and confidently, fertile enough that new adventurers can spring from the information, and exciting enough that the players enjoy the experience.

These desert nomads may be found astride the same types of desert beasts they have ridden for millennia — or crewing armored fighting vehicles. They take technical artifacts as tribute from a few subject species; the devices they accept uniformly are simple and nearly unbreakable. Such technology does not require much coordination between groups. The accompanying drawing shows one Agaman holding a call-stick (*dis'ah],* a straight piece of wood planted at a trail juncture or other prominent place to request assembly of the clan to a pre-arranged site. The objects at the top are husks of *shapir,* a yellow-white gourd which decays to a nearly-weightless shell; these then are attached to the call-stick to wave in the winds and snare the eye.

As a species, Agamans are aggressive; other species living near Agaman homelands are likely to be vassals — or to be continually chivvied and raided. The desert-dwelling Agamans hate moist climates (where they are prey to many fungus diseases) and refuse to colonize their subject states. They do appreciate the fodder and other loot which wetter climates produce. Periodically, bands of Agamans sally forth from the desert to inspect their subjects, exacting tribute and sniffing out signs of rebellion.

Agamans are found in two great deserts on Ringworld, and in several smaller (planet-sized) macro-regions. Since the superconductor plague and the Fall of Cities, both the wastelands and the Agamans have increased: the increased powers of the Agamans some hold as fulfillment of the legendary compact made with God by Najid the Signer: God incised a stone with a mystic sign — Najid's testament prophesied that this would grant dominion of the Arch and all who live beneath it to the sons of Najid.

To Agamans of the faith, the descendants of Najid are purer and more holy, but a millennia of wars, migrations, conquests, and pilgrimages have blurred those bloodlines beyond understanding. Ritual adoption to the family of Najid is central to *Najidat* — the dominant religion of conquest which controls the largest Agaman empire, and at least two of the smaller ones. This faith evolved since the Fall of Cities. A few non-Agamans have been adopted and raised to Agaman status. This has occurred when political need forced cross-species ceremonial marriages; it is impious for Agamans to marry *azhogdim* ("made-animals-for-sins"), the status of non-Agaman hominids. There are reputedly two great heresies or schisms among the Agamans, but little more is known. The Agaman empires that do not practice *Najidat* worship a variety of generally-warlike deities, but some individuals are strict atheists.

It is unclear whether the Agamans evolved or were bred for their capabilities, but they are able to live in numbers where even small mammals are not much found. With their remarkable excretory/water-retention system, Agamans are perfect desert creatures, ranging and prospering in places worthless or inimical to other species.

Once Agamans domesticated the heaver, an event which occurred in historical times (though before the Fall of Cities), their armies could form and dissolve in demonic waves. The endless deserts from which the Agamans came were impenetrable defenses: those who entered found nothing but death, for this desert folk have no cities or farms to strike at, and own little of value.

The homeland deserts of the Agamans are rocky wind- and water-cut landscapes where topsoil long ago turned to sand. Portions of these wastes are utterly arid, for no true water tables exist on Ringworld; where it never rains, even the Agamans cannot live permanently. But most wastelands get 10-20cm of rain yearly; the lack of an aquifer layer means that the water cannot be stored, and must quickly evaporate beneath the fierce sun. Agamans and other desert-dwellers tend to live in or near hills or mountains where moisture can exist a little longer.

Description and Behavior

The average Agaman is tall and slender; his body is solid with muscle and bone, and has very little fat. He has long, sharp-nailed fingers, a nearly noseless face, an ichthyosed skin with thick horny scales, and a crest of hair atop his skull. He is colored like the desert, in tans and dark brown, sometimes with a startling jet of iridescent red or blue as a prominent birthmark. His bearing is sometimes rigid, sometimes incredibly fluid; there is always something wild and remarkable about the species, whether seen stalking through the night, or squatting to devour a kill.

Agaman babies are carried to term in about one UNS year; to accept the greater weight and size, the pelvis of the Agaman female has rather widened and deepened, making the female slower than the male at a dead run. In return, babies can accept solid food at birth; Agaman mammaries frequently do not develop and rarely lactate. Agamans are particularly long-lived; ages of 200 UNS years are not uncommon.

Agamans wear little or no clothing, though warriors routinely use belts, pouches, packs, hats, and projectile-proof clothing. Most Agaman males become warriors, as do some females; these standing armies are supported by

the tribute exacted from neighbor species and the marginal lands between them. Agamans most honor self-sufficiency, not communion or specialization. Agaman females tend to become child-bearers, negotiators, or traders (mostly importing fodder), but whether the Voice of a clan, a tribe, or a nation proves to be male or female is of no social or political importance.

Agamans at peace or in the deep desert group themselves in blood-related clans within fixed territories. The range of a clan may be a rough square or circle several hundred or more kilometers across; the population density within the range may be one Agaman per 1-100 square kilometers, depending on the forage.

These gatherer-nomads fill their stomachs with insects, cactus, small trees, fungus, animals, and so on. They certainly have food preferences, but they commonly evaluate food by how much gas it causes the eater to expel: food is not salty, sweet, or sour — it is well-behaved, mischievous, or belly-swelling.

Agamans are characteristically taciturn and haughty. They glory when king or clan launches fierce war upon City Builder enclaves, Machine People expeditions, incautious caravans, rival Agamans, or any other foe. Healers are known as *dodedj,* the twice-fallen; in Najidat mythology, Healers are trickster-like villains — their hubris caused God to sever the Arch from the world; it was they also who established the curse of science and caused the other hominids to fall from pre-Najidat grace. Even non-Najidat Agamans detest and suspect Healers and kill them. A sentient identifiable as a Healer may be slaughtered on the spot. But strangers who are not afraid, or who obviously have strength of arms and who yet do not churlishly threaten probably will not be slain; they will be robbed of course. There is no tradition of chattel slavery among the Agamans; where the Agamans wander, slaves die.

The Agaman empires continue to expand and grow in might. Some of the greater empires have instituted programs by which their deserts are enlarged. The Agamans are a force of the future, even as the City Builders and Healers are forces of the past.

Characteristic		Average	
STR	3D6+6	16-17	Move: 4m/im for males
CON	2D6+6	13	3m/im for females
MAS	2D6+8	15	Average Hit Points: **28**
INT	2D6+6	13	Action Ranking: 4
POW	3D6	10-11	
DEX	3D6+3	13-14	
APP	2D6+6	13	

weapon	*attack%*	*damage*
Jet Rifle *	75%	3D10
NAX Gun *	75%	1D8+3
Sword	50%	1D8+1

** does double damage on a special success.*

SKILLS: Archaic Melee Weapon 50%, Athletics/Ride Heaver 80% or Ground Vehicle/Land-Ruler 80%, Heavy Weapon (Projectile)/Jet Rifle 75% or Heavy Weapon (Projectile)/NAX Gun 75%, Repair 30%, Ringworld 15%, Strategy 10%, Theology 15%.

ARMOR: Agamans soldiers usually wear 10-point fabron armor over their chests and abdomens; helmets are sometimes used.

location	*melee*	*ranged*	*armor /HP*
Head	19-20	20	0/8 (.30)
Left Arm	16-18	18-19	0/7 (.25)
Right Arm	13-15	16-17	0/7 (.25)
Chest	12	11-15	0/10 (.35)
Abdomen	09-11	07-10	0/8 (.30)
Left Leg	05-08	04-06	0/8 (.30)
Right Leg	01-04	01-03	0/8 (.30)

HEAVER

Heavers are large, thin-legged, desert-hooved riding beasts, so-called because of a characteristically-wild gait during which they rhythmically lower their heads toward the ground.

Over ten thousand Ring years the Agamans have bred heavers to a swiftness nearly unexcelled among non-flying Ringworld animals. Some herds of wild heavers still exist on certain massifs far to the interior of the great deserts, but most are domesticated, and the domestic heavers are of much greater speed. The heaver has exceptional stamina; desert journeys of 400-500 kilometers can be completed routinely within a few days, though the heaver must then rest for a least that many days again, and requires considerable water, 16-20 liters daily, during the trip.

The body of an individual heaver resembles that of a wiry horse, but the head is short and flattened — something like a rabbit's head without the ears. The heaver is quadrupedal, hermaphroditic, and its short fur normally is a salmon color, though many characteristic colors and markings exist. Foals are carefully tended by the parent for about six falans, then the youngsters join the general herd and fend for themselves. These animals are intelligent and expert foragers, and they can chew and digest almost any kind of vegetable matter.

Heavers are prized because much of the wastes are boulder-strewn and ravine-cut; these lands are impassable to off-road ground vehicles. But heavers adeptly choose they right path, and rarely misstep. Heavers are reliable, intelligent, and amazingly sturdy. Their enormous speed makes them useful even in modern-style wars and, against primitive cultures, heaver cavalry is devastating.

To do much work, heavers need kilos of high-energy grains or shelled nuts. This is especially true of the cavalry mounts. The favorite native food of the heaver is the nut of the *pichol,* a small rugged tree resembling the juniper; the 2cm-diameter nut, sweet and fragrant, rests within a strong, fibrous shell rather like a coconut's.

Characteristic		Average	
STR	4D6+12	26	Move: 15/im
CON	2D6+6	13	Average Hit Points: 45
MAS	4D6+18	32	Action Ranking: 3
POW	2D6	7	
DEX	2D6+12	19	

ARMOR: 1 point skin

HIT LOCATIONS (melee and ranged)

Location	*1D20*	*Armor/Average HP*
Head	19-20	1/14 (.30)
Left Fore Leg	17-18	1/11 (.25)
Right Fore Leg	15-16	1/11 (.25)
Forequarters	10-14	1/16 (.35)
Hindquarters	05-09	1/16 (.35)
Left Hind Leg	03-04	1/11 (.25)
Right Hind Leg	01-02	1/11 (.25)

weapon	*attack%*	*damage*
Kick	15%	1D6+3D6

SKILLS: Forage 75%, Observe 50%

Selected Agamans Artifacts

Agamans Heavy Gun 54
Air Still 53
Bi-Runner 54
Fabron 54
Flywheel Power 54
Gansdedj 54
Heretical Saddle 53
Jet Rifle 53
Land-Ruler 54
NAX Gun 53
Voicebox 53

The following technical items are used in the expanding Agaman hegemony of *Aj Dieer* ("granite faith"), the largest Agaman kingdom, and stronghold of Najidat. This nation, occupying a great sweep of desert fringed by subject satrapies, can be placed anywhere convenient for your campaign.

The acquisition of fabron armor revolutionized Agaman warfare, for it made common looters invulnerable to hand-held projectiles or laser weapons. When fabron was tailored for heavers, Agaman cavalry was once again useful in war. Hand weapons, such as the jet rifle, were developed to penetrate fabron, but these are bulky, and automatic fire is impossible except on special mounts. Even against jet rifle-equipped foes, the quick-moving Agaman cavalry is capable of charging at speeds which enable it to close with infantry before more than a couple of volleys are fired.

Heaver-mounted, NAX-gun-armed warrior clans patrol and police the Agaman hegemonies. Land-ruler units patrol both alongside the cavalry and on their own.

Threats, such as the presence of high-tech strangers in a satrap, are met with promptly and brutally. If an Agaman patrol cannot quickly capture an intruder, it radios for help, and breaks off combat, but shadows the foe. Within hours, a substantial veteran force, heavily-armed, begins to converge with the intent of slaughtering the intruders.

The Agamans make a dangerous, bloodthirsty enemy. They should probably be used sparingly.

AIR STILL

WEIGHT: 120 grams (empty)

DIMENSIONS: 2x3x7cm (folded)

HIT POINTS: 5

This is a pocket-sized water separator for desert climates, developed centuries ago. To use it, unfold the still so that the liter-sized receptacle jar rests beneath the sail of the 20cm circular filter (be sure to anchor the still with stones). An airtight tube leads from the interior of the filter to the jar. The device separates any moisture from the air which passes through it, and its own weight sends the intercepted water into the jar. The amount of captured water depends on the actual water content of the air and on the force of wind; the device works much more quickly when large amounts of air can be sent through it. On an average desert day with 10 kph of breeze, the still separates about a liter of water every 2-3 hours. The captured water is pure, warm, and tasteless. The still action is molecular and requires no power. Hundreds of uses are required before the still loses its efficiency. Larger stills exist; the Agamans think it ludicrous to carry them without special reason.

VOICEBOX (Standard Design)

WEIGHT: 900g

DIMENSIONS: 9x10x18 cm

MAXIMUM RANGE: 100km in open country

ENERGY USED: variable; max. strength costs 1/minute

POWER SUPPLY: 200/.2/200/N battery

HIT POINTS: 9

The Agaman voicebox is a tactical range two-way radio. Pre-tuned wavelength randomizers for a clan or an otherwise established tactical unit keep that unit's voiceboxes on a preset pattern of varying frequencies, allowing reasonably secure in-clear conversations. Overvoice between units receives as white noise; because of the limited range, only concentrating fairly large forces risks much interference.

Optional headphones and throat mike are intended mainly to coordinate assassinations and other guerrilla-style activity. In major operations, various command levels may have their own sets of pre-tuned randomizers. When comlaser or microwave equipment is not handy, the variable output of the units allows them to be used as low-power comlinks which are not easily detected.

HERETICAL SADDLE

The traditional saddle was merely a shaped felt-like pad stuffed with heaver fur and belted round the girth of the animal. There were as many designs and decorative schemes as there were Agaman clans and saddlemakers. In the last few ringyears, however, several chiefs among the border clans have introduced a radically-different design created by Hanging People technicians. These captives, who were methodically collected and brought together in a concentration camp hundreds of kilometers from the nearest tree, created at dictation a bizarre concoction.

The heretical saddle is made of leather or plastic, with conventional stirrups and cinch. Several rings and straps are built in to hold gear, and the back of the anatomically-curved back-rest is not only armored, but acts like a pack frame to carry additional gear. There is a mounting niche for a voicebox; a three-liter-an-hour air still is built in, as are adjustable arrangements for rifle and sword scabbards. Most importantly, the eight fodder boxes fold like a bandolier over the withers. Each fodder box carries three kilos of pichol nuts — enough to fully satisfy the heaver for three days of hard riding, or four to five days of ordinary traveling. This saddle is quite heavy, and its use shortens the heaver's life substantially, partly because, in order to give the animal the stamina to carry the saddle, they are given strength-enhancing drugs.

JET RIFLE

WEIGHT: 5 kg, + 1 kg per 12-round clip

DIMENSIONS: 1.3m long, 8cm at widest point

ENERGY SUPPLY: chemically-powered projectiles held in large forward-curving clips, 12 projectiles per clip

DAMAGE DONE: 3D10 (6D10 if special success is rolled in an attack)

RANGE: 50/150/300 meters; maximum range 1000 meters

APPLICABLE SKILL: Heavy Weapon (Projectile)

ARMOR: 5

HIT POINTS: 10

The Agaman jet rifle is a military weapon. It has a light plastic stock, a telescopic sight with built-in starlight scope, a long heavy bar barrel, and a thick, clumsy-looking projectile-clip between the firing button and forward grip. The projectiles are self-propelled — each is a tiny rocket, 2x5cm, tipped with an armor-piercing shaped-charge explosive. The weapon fires one round per impulse; it takes an action ranking to replace an empty clip.

The jet rifle's barrel must be frequently cleaned, or the accuracy of the weapon is progressively affected: in extended fights, subtract 50 meters from range effects for each clip fired without cleaning. Cleaning solvents are kept within the hollow plastic stock. Each clip fired requires one additional action ranking to clean off the increasing deposits.

The exploding charge makes horrible wounds in flesh; the projectiles are designed to penetrate light steel plate or fabron armor. Agamans use jet rifles when fighting each other, or against armor-using cultures or species. Against unarmored enemies, the NAX gun is far superior.

NAX GUN

WEIGHT: 1.5 kg barrels and chamber; 1 kg per cylindrical magazine

DIMENSIONS: 70cm long (barrel is 12cm wide; magazine is 2x30cm flat cylinder)

ENERGY SUPPLY: chemically-powered projectiles held in magazines of 120 each.

DAMAGE DONE: 1 D8+3 (2D8+6 if special success is rolled in an attack)

RANGE: 70/140/350 meters

SKILL: Heavy Weapon (Projectile)

ARMOR: 2

HIT POINTS: 6

The NAX (an Agaman acronym) gun is used against foes lacking body armor. The weapon has eight 40cm barrels and a large magazine. Much of the gun (though not the barrels or firing mechanism) is plastic.

The gun fires 10 shots per impulse. It can be aimed at a single target, in which case 1D10 rounds strike that target per impulse in which a successful attack is made. The gun can be traverse-fired across an area, in which case 1D10 hits (-1 hit per extra target) are divided up among the potential targets. For example, if 4 targets are being fired at, and the firer's player successfully hits, 1D10-3 is rolled and the hits are divided as evenly as possible among the targets. If zero or fewer hits are received, no one takes damage. If the shots cannot be divided evenly, make luck rolls to determine who takes the extra hits, the extra hits.

If a special success is rolled, the first bullet does double damage, but the others do only normal damage.

It takes 2 + 1D3 action rankings to remove and replace an empty magazine.

FABRON

WEIGHT: 2 kg per square meter of cloth (a full suit weighs 8-10 kg)

ARMOR: 10-point armor vs. most types of attacks

Fabron is an extremely-tough, Kevlar-like synthetic used as armor by the Agaman soldiery as harness material for their mounts, wheel protection on land-rulers, and even tent material (despite its weight). It is coarse, resembling tentcloth or canvas. It can be produced in any color desired.

Fabron not only protects against projectiles, explosions, and lasers, it also effectively blocks radiation of body heat and the sound of heartbeats and of small movements: it is good protection not only against weapons but against detection by quick sensor scans (given time, or course, a starship computer can distinguish between huddled small animals and heat pockets at the edge of the sheets). Because of heat reflection, the Agamans only wear fabron chest and abdomen armor, but they routinely carry larger sheets with which they cover themselves for a few minutes to escape detection, especially from flying vehicles. When the call comes, all the marksmen crawl under their fabron and lie motionless; as a fire-fight progresses, they gradually move free of the loose fabron.

As effective as it is, fabron as the Agamans use it is of minor importance in a large-scale engagement in which chemical or nuclear explosives are employed.

GANSDEDJ, or Loot-Raft

MAS: 13 (82kg)

DIMENSION: 1.7m x 3.8m long; 67cm thick

ENERGY USED: 155/im

POWER SUPPLY: fusion generator

SPEED: passive towed device

MAXIMUM LIFT: 1600kg

ARMOR: none

APPLICABLE SKILL: Athletics/Ride Heaver

GENERAL HIT POINTS: 45

The loot-raft is a heaver-towed design which is the equivalent of a wagon or travois which never touches the ground. Built-in microcircuit controls compensate for various loads, wind strengths, and land slopes. A nicely-conceived sub-routine even learns the gaits characteristic to the heavers currently pulling the thing, and accelerates or decelerates within set limits to compensate the ride; this also makes it possible for the animals to stop without being smashed by a still-moving load behind them. The Agamans term for loot-raft is *gansdedj,* which approximates to "traceless and sneaky."

LAND-RULER (armed and armored ground vehicle)

MAS: 64 (6.5 metric tons)

DIMENSIONS: 5m long x 2.5m wide x 2m high)

SPEED: maximum 200 kph; cruising 80 kph

ENERGY SUPPLY: flywheel-battery weighing 2000 kg carrying 3,000,000 points of energy, and providing up to 60/im

ENERGY COST: 20/im at full cruising speed; 60/im if moving in excess of that. This gives the land-ruler about 40 hours of endurance at normal speeds, and no more than 14 hours at top speed.

CREW: 9 — driver, co-driver, gunner, and up to six passenger-gunners in the rear compartment.

SKILL: Ground Vehicle

ARMOR: armor plate over most of the vehicle, double-thickness fabron wheel-protectors, armor-glass viewports

location	*1D20*	*points*
Right Rear Wheel	01-02	20/20
Left Rear Wheel	03-04	20/20
Rear Compartment *	05-08	40/50
Right Center Wheel	09	20/20
Left Center Wheel	10	20/20
Flywheel	11-12	50/20
Weapon Mount *	13	30/15
Right Front Wheel	14-15	20/20
Left Front Wheel	16-17	20/20
Front Compartment *	18-20	40/30

* make successful luck roll to avoid injury if compartment penetrated

The land-ruler is an Agaman reconnaissance vehicle commonly deployed along the outer edges of Agaman deserts and wastes. Its power supply is a synthetic-material flywheel spinning at high velocity contained in a heavily-armored jacket. The spin is tapped for kinetic energy, powering the vehicle by a system of belts and shafts.

The rear compartment is sometimes open, with seats and railings, and the riders there can either fire from within the vehicle or dismount and deploy individually. At the very front of the rear compartment (mounted over the driver's head) is a niche and firing post for a top-mounted Agaman heavy gun (described below) with a wrap-around gun shield.

This vehicle normally patrols roads as an independent unit, or acts as part of a mobile reserve stationed more deeply within the arid homeland of the empire.

At a minimum, a land-ruler carries a 100-km range radio, an infra-red searchlight, flares, emergency provisions and water, and spare parts.

AGAMAN HEAVY GUN

WEIGHT: 50 kg, including mount

DIMENSIONS: 30cm x 40cm x 2m, not counting 1m-diameter gun shield

ENERGY SUPPLY: chemically-powered projectiles, 800 to a belt

DAMAGE DONE: 3D10 (6D10 if special success is obtained on an attack)

RANGE: 50/150/300 meters

APPLICABLE SKILL: Weapons Systems

ARMOR: 30 points with gun shield, 8 points without

HIT POINTS: 15

This eight-barreled automatic weapon fires the same rocket projectiles as the jet rifle, but at a higher rate — 6 projectiles per impulse. If aimed at a single target, and a hit is obtained, roll 1D6 to see how many rounds actually strike home. If sprayed across an area, the hits are divided up among the potential targets, and subtract one from the 1D6 for each target beyond the first. Thus, if 3 foes are targeted by a heavy gun, 1D6-2 is rolled to determine how many hits are divided up among them. Zero or less indicates no one is hit. If more than zero but less than the number of targets, randomly determine who is hit.

These weapons are regularly mounted on land-rulers, but are also found in static mounts in rare Agaman fortifications.

BI-RUNNER

WEIGHT: 205 kg

DIMENSIONS: 50cm x 1m high x 2m long

SPEED: maximum 250 kph; cruising 80 kph

ENERGY SUPPLY: flywheel battery weighing 66 kg carrying 100,000 units of energy, and feeding up to 8/im.

ENERGY COST: 2/im at cruising speeds, 8/im when moving in excess of that. This gives the bi-runner about 14 hours of endurance at normal speeds, dropping to 3.5 hours at top speed.

CREW: 1, plus 1 passenger

APPLICABLE SKILL: Ground Vehicle

ARMOR: 20-point armor plate over much of vehicle, plus 10-point fabron wheel-protectors and 5-point plastic windscreen.

location	*1D20*	*points*
Rear Wheel	01-04	10/10
Flywheel	05-10	20/5
Driver/Passenger*	11-15	5/varies
Steering Mechanism	16	20/5
Front Wheel	17-20	10/10

* roll randomly to see which one hit if both are present

The bi-runner is a two-wheeled motor vehicle, much like a motorcycle. Sometimes Agaman security forces replace their heavers with it.

FLYWHEEL POWER

The major Agaman source of propulsion is their flywheel device. This consists of a tapering disk of synthetic material held in an armored compartment, mounted on ball-joints to allow it to swivel freely, and connected to the rest of the vehicle with a complex series of gears and chains. The kinetic energy of the flywheel, which spins in a vacuum, is transferred to the vehicle's wheels, or whatever needs power, and gradually spins down from this tapping.

Agaman technology cannot build flywheels with a smaller mass than 10 kg. Each kilogram a flywheel weighs permits it to store up to 1500 units of energy.

The great advantage of the flywheel is that it can be recharged by muscle power. A simple attachment inserted into the gear joints permits a user to crank the flywheel up to greater speeds with his own arms or legs. This attachment is geared to increase torque as the flywheel goes faster and faster. A character thus cranking up a flywheel can store up a number of energy units equal to his own STR every action ranking. A gear attachment has been manufactured for attachment to heavers, allowing these beasts to so 'wind up' the flywheel, but this is rarely used, at least partly because Agamans using vehicles do not have heavers as readily available.

Essentially, the flywheel and its attachment make up no more than an extremely advanced windup toy. Explorers encountering the Agamans may derive some amusement from this fact.

Scenario: estimated 1+ sessions play time

The Sand Eaters

This short scenario can be connected to the adventure provided in the gamemaster book of the *Ringworld* box, or it can be fitted in as an isolated adventure occurring anytime in a campaign. Gamemasters presenting the adventure as written will need at least one photocopy of the ransom site map, and one photocopy of page 42 of the *Ringworld* gamemaster book.

Skreet makes an attractive victim, both because his is physiologically limited in his current environment and because he is a sympathetic character, but the kidnapee could as easily be anyone in the expedition. Similarly, Skreet's life support limitation gives a time limit for the adventure, but the Agamans could announce a deadline of a day or two, and accomplish the same effect. Since the adventure must have a viewpoint, it is written as though it begins at the original crash site in the *Ringworld* box scenario.

A player may operate or adopt Skreet as his or her own explorer, but that player should understand that there will be little for Skreet to do after the initial encounter.

Allow the explorers full use of their technology: if the problem can be resolved only through successful negotiation, it is immaterial how much equipment is stacked about, even in the combat situation described below.

If a Kzin or Puppeteer explorer is prominent among the explorers, probably no scenario adjustment will be necessary; neither species will be much good at face-to-face negotiations, though a Kzin could be impressive at a distance.

Situation

As it crashed, the explorer starship smashed through a great desert under the sovereignty of an Agamans khan. He dispatched servants to learn the secret of such destruction, to bring evidence and plunder to him, and to spread news of his glory and power. The Agamans dutifully followed the enormous gashes across the desert and far into the fertile, well-watered hills beyond. After much study of the activity at the crash site, Per-najid, the leader of the Agamans party, concluded that the explorers were only a kind of hairy City Builder, and that City Builder devices could be expected to fail again as they had before, and that there was no wonder in the thing falling from the sky except that it fell harder than tales of old reported.

Since any kind of City Builder could be dodedj or puppets of dodedj, the Agamans sent an intermediary, a Ghoul who was instructed to ask for gifts. Because many are wandering scavengers, Ghouls in folklore have little use for devices; an exclamation often heard on the Ring can be translated as "give metal to a Ghoul" — it is foolish to give value to someone who doesn't appreciate or want it. When the Ghoul emissary returned to the Agamans with nearly a kilo of worked and shaped metal, the neatness of the parallel to the saying caused the stolid Agamans to roar with laughter and swear that no Healers could be among such idiots as those who had accidentally buried their skycraft. The Agamans concluded that clever hominids could extort or steal almost anything from such folk, and crafted a plan.

Background

It has been 50 days since the starship crashed. The ship has been patched and repaired as well as possible, and raised from its watery tunnel. The ill-fated marinex expedition has been dispatched, and apparently is lost. But while the fate of those explorers remains uncertain, the expedition lingers at the original site. Now that the starship is secure, the life-science specialists enthusiastically collect and study Ringworld zoological and botanical specimens.

Have the players make luck rolls for their explorers. Those who receive successful rolls witnessed an interesting meeting a few weeks after the starship crashed. A shy Ghoul came on foot to the expedition site; in an easily-translated Night Hunter dialect he demanded gifts in return for the damage which the explorers had inflicted upon the world. When pressed, the Ghoul said that cruel Agamans had sent him, and that he must return with something or be killed. Watching him whine and grovel, those explorers getting successful Psychology rolls perceive him to be in genuine fear for his life. Suggest the trade goods from page 42 of the *Ringworld* gamemaster book as a cheap gift, and show them the list. The Ghoul can ask what his present is, and reject non-metallic items as inappropriate without indicating that the basis of choice is metal. Then close the incident by saying that the Ghoul is satisfied and grateful, and that he departs.

The Ghoul's name is Radek; make a note of him. If the explorers stay in the neighborhood, he may repay their act of kindness at a later date.

Radek

Contact specialists have made successful visits to several local Herder tribes who have been driven into the hills by Grass Giant pressure. Many wandering families of Ghouls have also been encountered; their chief interest has been to make sure that the aliens understand that the Night People have eternal claim upon hominid corpses.

These encounters can be played out; in both cases the gamemaster's strategy should be to make the local area familiar. Unless you make special preparation, keep the actual play time of such visits to a few minutes.

The Okobijon Herder Tribe

This tribe is about 140 strong; nearly half are under 20 UNS years of age. Hordes of incredibly-speedy children zoom around the camp. Read the Herder essay and give the explorers a party. Parties can include party games, like obstacle races and rope tugs-o-war. Wakbreath can speak for the tribe. He is fast-talking, manic, and acutely jealous of his new wife, Alurde. By human standards, she is young and pretty; if she can, she'll make a play for one or more of the human explorers — variety is her spice of life. Wakbreath's job at tribal parties is make sure that every jar of beer is of decent quality. Consequently, he may be asleep early during the proceedings. He may wake up later, of course.

Taxmil & Tros' Ghoul Family

Wife (Tros), husband (Taxmil), son, daughter, husband's brother, wife's mother, and an older female friend make up this group, who with other such groups circulate among the local Herder camps watching for the flutter of the traditional white flag — which means in effect "hominid corpse here: please come and eat it." Sometimes the tribe or clan lights a big smoky fire if several folk have died. The Ghouls are honor-bound to make all haste to the source of a big fire; consequently Ghouls throughout the region know of the downed starship, though they do not know exactly what it is.

One of the expressions the anthropologists sometimes hear is "give metal to a Ghoul." If one of the explorers who met the ghoul emissary of the Agamans gets a successful Anthropology roll, he deduces that the locals would think that giving a metal gift to the Ghoul emissary was ridiculous.

Prominent in the conversation of Ghoul and Herder is a third species, whom they variously call desert demons, ghost men, Agamans, or (venomously) sand eaters. At first, some among the crew believe that the species is merely an anxiety projection, prompted by the long-term encroachment of the spinward desert.

Have Search rolls made for any explorers who have been on watch on the starship bridge; successes indicate that they have noted (and check-referenced in the ship's log) peculiar sensor readings showing life forms which appear and dissolve without pattern, though several such images are persistently found within visual range of the starship.

Explorers seeking visual corroboration of the sensor readings sometimes do see lithe hominids racing on foot for cover, and then disappearing from view as though swallowed up by the earth.

Explorers who pursued the elusive, scaly hominids have been fired at with projectile weapons. Expedition anthropologists have cautioned against pursuing this species, but have failed to make contact themselves, nor have the beings done more than observe. Explorers may feel uneasy, or pass off the situation as typical of hominids.

THE KIDNAP

Though invaluable while planning repairs and rebuilding the wounded starship, Skreet now has little to do. The death of Gregor Lopez, Skreet's friend and patron, has left the dolphin disconsolate; the present pathetic condition of the ship's drives thwarts his plan to study piloting; Skreet's art now seems to him shallow and escapist; the new night sky above fails to intrigue him. Skreet's one pleasure now is to slide into his walker suit and trek down to the new freshwater lake formed by the crash-landing. Following a regular route which his walker treads have now turned into a narrow road, Skreet drives his walker into the lake until the suit is well-submerged, then opens the hatch and swims out. These new waters, unformed and bland, still hint of the seas of Earth. Skreet asks himself, what are the seas of Ringworld like? If there are human-like walkers on the land, arc there dolphin-like finfolk in the oceans? Skreet would like to know very much.

As he rolls on his walker treads toward the lake a dozen kilometers distant, he puts the suit on automatic and dreams of strange encounters. Mounted on or in Skreet's unit is a 30-point stunner, a sonic knife, a corn-disk, and a sensordisk, a dolphin-specific minidoc, and a hullmetal shield with which to fend off large amorous mammals. Skreet looted a few components from his walker to help repair the ship; as a result, his life support system is not good for more than about one full Ringworld day; if necessary, use this information to increase pressure upon dawdling explorers.

SK'KRREEETL "SKREET" A'AIKKRLLLA, male Dolphin, self taught artist and glactographer, age 26 UNS years.

STR 19	*melee*	*ranged*	general hit points: 40	
MAS 26	18-20	17-20	Head	2/12
CON 14	16-17	15-16	Left Fin	2/10
INT 12	14-15	13-14	Right Fin	2/10
POW 11	09-13	08-12	Forebody	2/14
DEX 13	04-08	04-07	Hind-body	2/12
APP 13	01-03	01-03	Flukes	2/10
EDU 16	action ranking: 4		general HPs lost:	

Speed: 5m/im swimming; 4-12m in walker suit (land)

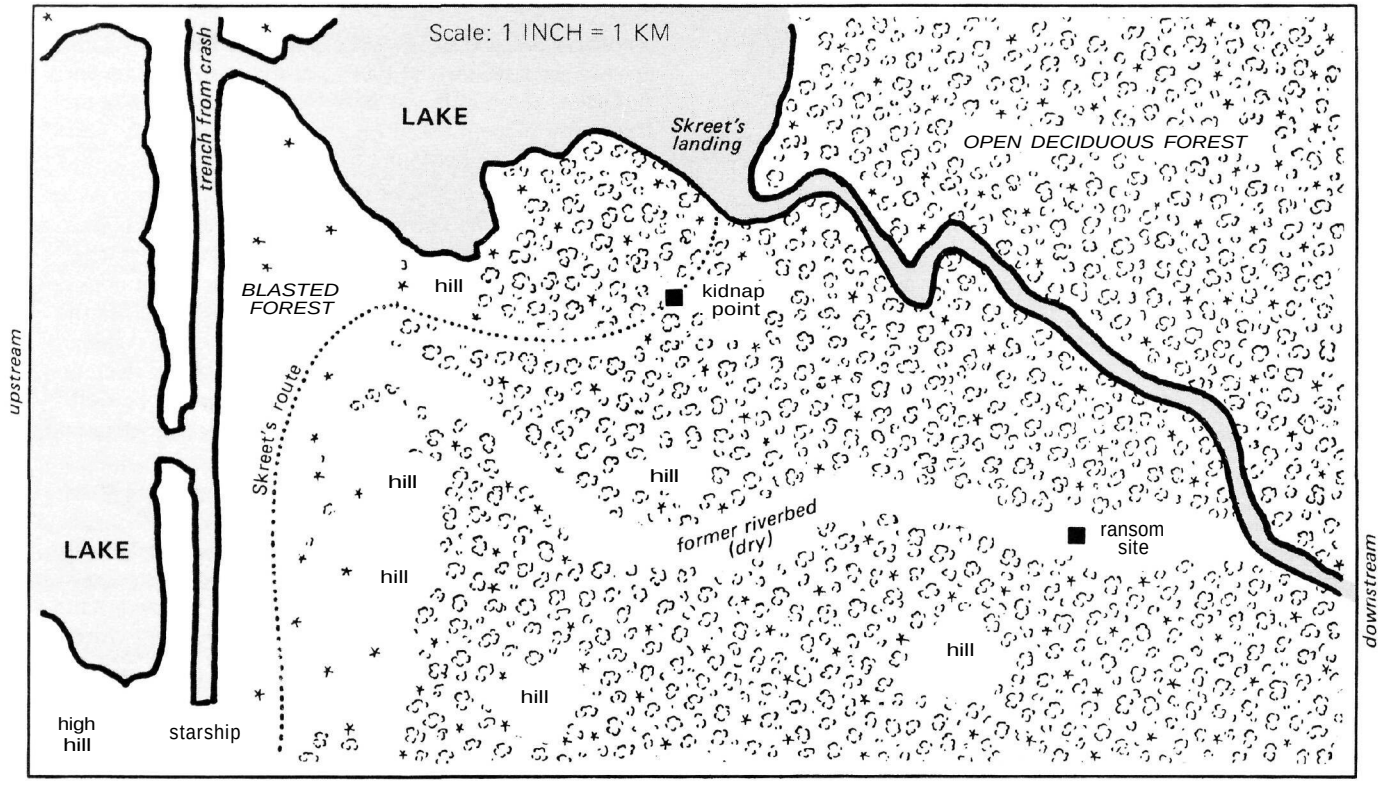
weapon	*skill*	*range s/m/l*	*damage*	*energy*
Head Butt	68%	melee	1D10	
Stun	84%	melee	special	
Stunner	03%	20/40/100	*	1-30/im

**unconsciousness*

NOTES: the Dolphin's stun attack works only on creatures within 1m range and with MAS 2 or less, knocking out the target. The Dolphin's stunner is mounted on his walker suit, and is unavailable to him unless he is in the suit.

ARMOR: 2 points over entire body, from thick skin and a layer of blubber.

SIGNIFICANT SKILLS: Athletics/Swim 500%, Astronomy/Astrodynamics 62%, Astronomy/Galactography 45%, Astronomy/Navigation 45%, Computers/Software 43%, Ground Vehicle/



Walker Suit 39%, Heavy Weapon/Stunner 03%, Fine Arts/Holography 78%, Mathematics/Topology 66%, Own Language/Dolphin 65%, Reactionless Drive/Thrusters 02%, Second Language/Interworld 24%, Stun 84%, Unarmed Combat/Head Butt 68%.

SPECIAL ABILITY: psionic projection and rotation or enlargement of pre-existing tri-dee and holographic images, within 11 meters of his head. He may re-angle, distort, or enlarge the still image, or slightly adjust its color. It is impossible for Skreet to do this under pressure of time or in a tense situation, though this meditative skill is integral to his art.

PHYSICAL DEFECT: transplant-resistant

ROOT MAXIMUMS: Agility 32%, Communication 25%, Knowledge 28%, Perception 25%, Technical 25%.

SKREET'S WALKER SUIT
(Hands of the Sea, Inc., Earth)

MAS: 40 (850kg)

DIMENSIONS: approx. 3m sphere mounted on treads

ENERGY USED: 75/im cruising; 120/im maximum

POWER SUPPLY: fusion 2 generator

SPEED: 4m/im cruising, 12/im maximum

APPLICABLE SKILL: Ground Vehicle

GENERAL HIT POINTS: 50

HIT LOCATION TABLE:

roll 1D20 melee and ranged	*location*	*armor/hit points*
20	auxil. equipment	per item *
15-19	bowl	5/10**
14	left arm	7/5
13	right arm ***	7/5
07-12	pedestal	10/25
0406	left tread	10/10
01-03	right tread	10/10

** Skreet's comdisc, stunner, sensordisk, etc., are carried here. Roll randomly to determine which one is hit.*

*** Once the bowl is destroyed, hits to this location directly damage Skreet.*

**** this arm can reach the hullmetal shield.*

A walker suit is a Dolphin-specialized vehicle which lets the single occupant move about on land while staying within water. Life-support abilities of the suits vary with the external environment; a walker suit on Earth could draw from the air and earth, and keep its occupant alive indefinitely; a walker suit on Luna could keep its occupant alive for 1 -2 weeks.

Lost in fantasy, Skreet does not notice the Agamans' trap. The ambush is a rather crude affair; the Agamans have been impressed with the vagueness of the expedition's security, and they have not put much ingenuity into kidnaping Skreet. If Skreet is being played, allow his player a Luck roll. If successful, Skreet glances up from his revery and notices a large cloth, hanging like a canopy from the tree branches above the road. Ask the player what Skreet does. If Skreet does anything but immediately spin about and head for the starship at top speed, immediate capture results. If Skreet does react correctly, then the Agamans chase him down on their heavers and perform the same operation: the difference is that the starship learns of his problem a few minutes earlier.

The Agamans drop a log just in front of the walker suit, and another just to the rear, imprisoning it (dead wood is easy to find around the crash site). While the walker's automatic systems deal with this unprecedented event, the cloth canopy drops and covers the entire walker. The cloth is the fabron cover for their MAGLEV loot-raft. The fabron also effectively blocks a comdisc call for help to the starship. Some of the Agamans systematically jam the walker treads with branches and rocks, then lever Skreet and walker suit onto the *gansdedj,* while others immobilize or disable Skreet's outside mechanical arms. Fabron cover left on, the walker is lashed in place, the lift compensation of the gansdedj is engaged, and remount heavers tow off the whole assembly. It takes about two minutes to get underway.

If Skreet's player succeeds with the Luck roll and the decision, Skreet retreats along his road. Thirty meters back, more logs fall to entrap him, buckets of paint splash against sensors and bowl, and heaver-mounted Agamans sweep down with the fabron. The effect is the same, but Skreet may be able to contact the starship.

Preparations

The Agamans can't escape from flycycles and starships, but they don't need to. Given the *gansdedj's* automatic

aerodynamic compensation, they can move poor Skreet fast; they need only three minutes to reach their destination.

With reference to the accompanying map, the Agamans make their stand in a dry portion of the former riverbed where the builders of the Ring sculpted a pit-drain into the scrith. Its shuttered grate (approximately 4cm mesh) is scrith as well. The walls of the drain-pit are nearly vertical (or scrith for several meters up) and about six meters deeper than the riverbed floor. The drain bottom is about 30 meters across. The *gansdedj* carries Skreet to the bottom, where he and his walker are unloaded.

A being of a different species, Twerant of the Night Hunters, steps gingerly onto the gansdedj and rides it down with the Agamans. She carries a satchel. She crawls off the vehicle and onto the dangerously-slick scrith, and moves far away from the Agamans, who unload Skreet and his walker. They remove the fabron cover but do not free the dolphin or his vehicle. Skreet's position inside the scrith drain makes it impossible for him to contact the starship, though dispersion may make it possible for him to talk to anyone within a few hundred meters. If Skreet can actually see someone in the air, the comdisc will function perfectly.

The Night Hunter carefully crawls back across the scrith grate and onto the walker. With black adhesive tape she methodically attaches three jars to the bowl of Skreet's walker. The jars are filled with an oily semi-solid which begins to visibly melt; she is careful not to jostle the containers. She then tapes some sort of battery-powered electronic device (which has a prominent antenna) near to the jars, and runs electrical cable from the device to the jars. Each line terminates in a small coppery capsule. Poor Skreet can see a clock-like dial ticking away some interval of time: there is no telling just what the clock means.

The Agamans lower a rope and haul up Twerant. Many of the Agamans then crawl under fabron covers on the riverbed floor to disguise themselves as rocks; more of them enter the open forest on either side of the dry river and there pretend to be rocks also. There are 28 Agamans around the site. Two of them and the Night Hunter sit in the open, about half-way between the drain-pit and the flat sandy place marked on the map. There they wait patiently for the explorers to come.

Per-najid, the leader of the Agamans, is patient. As he sits in the open he knows that the explorers will come for their friend when they dare; the wet-thing which the Agamans hold for ransom is of high status, for it does no work and wears an impressive amount of metal. If the Hairy-City-Builders never dare come near, the Agamans can slaughter the wet-thing or dump it into the river, and take its metal back to the great khan, who will be well-satisfied with the gift of metal and the tales accompanying it.

Along with Per-najid sits his lieutenant, Emegri, who has no holy blood but is exceptionally wise. Both are content. With them cowers the female Twerant, the Night Hunter explosives expert, who fears that she will never see her family again.

Four radio-equipped scouts watch from vantage points several kilometers from the ransom site; another four walk strings of heavers through the trees close to the new river-course. With Per-najid and Emegri sitting unarmed in the open, that leaves 18 marksmen defending the point of exchange. Four have NAX guns; the rest have jet rifles. All have had ample time to sight-in on the sandy area where they anticipate that negotiations will be held; so long as they do not move, treat their fire toward that locale as short range, no matter how far away they arc, but apply standard range modifications otherwise.

Photocopy the accompanying map, marking your dispositions on one and give the other to the players, or simply draw the setting on the table-top.

Another Way for the Explorers to Learn of the Kidnap

The Agamans send a messenger (a random Night Hunter captive) to the starship, who informs the explorers that the might Sand Demons wish to be relieved of a metal-bound wet-thing which they have in their possession. The explorers are warned, if they refuse to heed the demands of the invincible desert dwellers, that the Agamans will dispose of the slimy, finny thing. After delivering the message, the Night Hunter describes the "hard water" — he has never seen ice — which the Agamans have had taped to Skreet's walker. Any explorer benefiting from a successful Chemistry roll hypothesizes that the explosive is nitroglycerin. The messenger further says that the wet-thing is held at a point in the dry portion of the riverbed, and that he can take the explorers there.

Once his message is delivered, this gaunt, knock-kneed Night Hunter pleads with the explorers for sanctuary. His name is Farad. He says that he is but a prisoner bent to the will of the Agamans. He swears that if the explorers do not save him, then his beastly owners will surely eat him. Explorers receiving successful Psychology rolls judge that Farad tells the truth.

PER-NAJID

The leader of the Agamans party, Per-najid has served his Khan for more than a UNS century, and never failed a task with which he was entrusted. He is a skilled fighter and an expert swordsman, and has remarkable perseverance. If this ransom fails, he will immediately began to hatch a new plot.

Sometime in the next 10-15 Ring years, Per-najid expects to die. Before he does, he plans to undertake a quest to find the Original Stone, the great rock upon which God inscribed the Granting Sign and then hid away to protect against azhodgim defilement. Placid in his faith, never-failing in his skills, negotiations with him will be a formidable task for any Known Space being.

PER-NAJID, male Agamans, trusted fighter for the Great Desert Khan, age 127 UNS years

	melee	*ranged*	general hit points: 30	
STR 20				
MAS 16	19-20	20	Head	0/9
CON 14	16-18	18-19	Left Arm	0/8
INT 13	13-15	16-17	Right Arm	0/8
POW 12	12	11-15	Chest	10/11
DEX 15	09-11	07-10	Abdomen	10/9
APP 11	05-08	04-06	Left Leg	0/9
EDU 0	01-04	01-03	Right Leg	0/9

Speed: 4/im Action Ranking: 4 general HPs lost:

weapon	*skill*	*range s/m/l*	*damage*	*energy*
2H Sword	85%	melee	2D8+1D6	---
1H Sword	140%	melee	1D8+1 + 1D6	---
Jet Rifle	90%	50/150/300	3D10	*
NAX Gun	60%	70/140/350	1D8+dx10*	

* *fires chemically-powered individual projectiles.*

ARMOR: 10-point fabron over chest and abdomen hit locations.

SIGNIFICANT SKILLS: Archaic Melee Weapons/2H Sword 85%, Archaic Melee Weapons/1H Sword 140%, Athletics/Ride Heaver 70%, Athletics/Run 50%, Bargain 45%, Debate 65%, Emergency Treatment 30%, Ground Vehicle 13%, Handgun (projectile) 26%, Heavy Weapon (projectile)/Jet Rifle 90%, Heavy Weapon (projectile)/NAX Gun 60%, Hide 80%, Observe 60%, Orate 48%, Own Language 65%, Psychology 65%, Ringworld 18%, Search 50%, Sneak 85%, Strategy 45%, Theology 20%, Weapons System 20%.

ROOT MAXIMUMS: Agility 35%, Communication 24%, Knowledge 13%, Perception 26%, Technical 25%.

EMEGRI

A clansman of Per-najid, Emegri is noted for his canny evaluations of both Agamans and azhogdim. Emegri privately says that he finds little subtle difference between Agamans and azhogdim; he believes that God chose the Agamans because their physiology allowed them to remain pure. Someday, when the deserts have covered the world, he thinks that God will appear amid the Najidat and bring them all to the paradise of the Arch.

EMEGRI, male Agamans, trusted fighter for the Great Desert Khan, age 87 UNS years

STR 14	*melee*	*ranged*	general hit points: 21	
MAS 10	19-20	20	Head	0/7
CON 11	16-18	18-19	Left Arm	0/7
INT 17	13-15	16-17	Right Arm	0/7
POW 9	12	11-15	Chest	10/8
DEX 13	09-11	07-10	Abdomen	10/7
APP 17	05-08	04-06	Left Leg	0/7
EDU 0	01-04	01-03	Right Leg	0/7
Speed: 4/im	Action Ranking: 4		general HPs lost:	

weapon	*skill*	*range s/m/l*	*damage*	*energy*
Thrown Dagger	60%	STRx2**	1D4+2	
1H Sword	60%	melee	1D8+1	——
Heavy Pistol	70%	10/40/120	1D10+2	
Jet Rifle	120%	50/150/300	3D10	*

** fires individual chemically-powered projectiles*

*** maximum range in meters*

ARMOR: 10-point fabron armor protecting chest and abdomen hit locations.

SIGNIFICANT SKILLS: Anthropology/Cultural 45%, Archaic Melee Weapons/1H Sword 60%, Archaic Ranged Weapons/Thrown Dagger 60%, Astronomy 15%, Athletics/Climb 45%, Athletics/Ride Heaver 65%, Bargain 85%, Debate 50%, Emergency Treatment/Agamans 72%, Handgun (projectile)/Jet Rifle 120%, Hide 90%, Listen 77%, Observe 90%, Orate 106%, Own Language 85%, Psychology 130%, Search 90%, Speak 105%, Strategy 67%, Unarmed Combat 33%.

ROOT MAXIMUMS: Agility 27%, Communication 34%, Knowledge 17%, Perception 10%, Technical 30%.

TWERANT

Yesterday Twerant was setting excavation charges for a new building in her city. Then the Agamans came, and demanded someone of her skills; the city leaders gave her to the overlords for "as long as their worships shall desire." With her husband and children hostages to her obedience, the Agamans took her antispinward for an entire day, riding their heavers at breakneck speed through the broad valleys. Terrifyingly, they made her bring more than a kilogram of nitroglycerine. Though it was frozen and packed in ice (therefore in a more stable form), the longer the ride took, the more frequently she feared that the next stride of the heaver would excite the stuff or the blasting caps and blow away the Agamans, herself, and the landscape to boot. For the moment, she is safe. But she dreads having to disarm her bomb; by then the nitroglycerine will have melted to liquid form, and will be very dangerous to move.

TWERANT NI'K OPOVV, female Night Hunter, explosives technician owned by the city of Bilgjak, age 39 UNS years

STR 10	*melee*	*ranged*	general hit points: 24	
MAS 13	19-20	20	Head	1/8
CON 11	16-18	18-19	Left Arm	1/6
INT 14	13-15	16-17	Right Arm	1/6
POW 9	12	11-15	Chest	1/9
DEX 15	09-11	07-10	Abdomen	1/8
APP 11	05-08	04-06	Left Leg	1/8
EDU 10	01-04	01-03	Right Leg	1/8
Speed: 4/im	Action Ranking: 4		General HPs Lost:	

ARMOR: 1 point fur

SIGNIFICANT SKILLS: Astronomy 10%, Bargain 23%, Chemistry/Explosives 35%, Emergency Treatment/Night Hunter 15%, Engineering 29%, Fast Talk 11%, Ground Vehicle/Animal Buggy 41%, Hide 35%, Observe 30%, Own Language 70%, Physics 20%, Repair 10%, Second Language (local Herder dialects) 30%, Sneak 40%.

SPECIAL ABILITY: with 4 meters' movement, Twerant can leap horizontally up to 5 meters and leap vertically up to 3.3 meters.

ROOT MAXIMUMS: Agility 19%, Communication 25%, Knowledge 24%, Perception 20%, Technical 29%.

THE NEGOTIATION

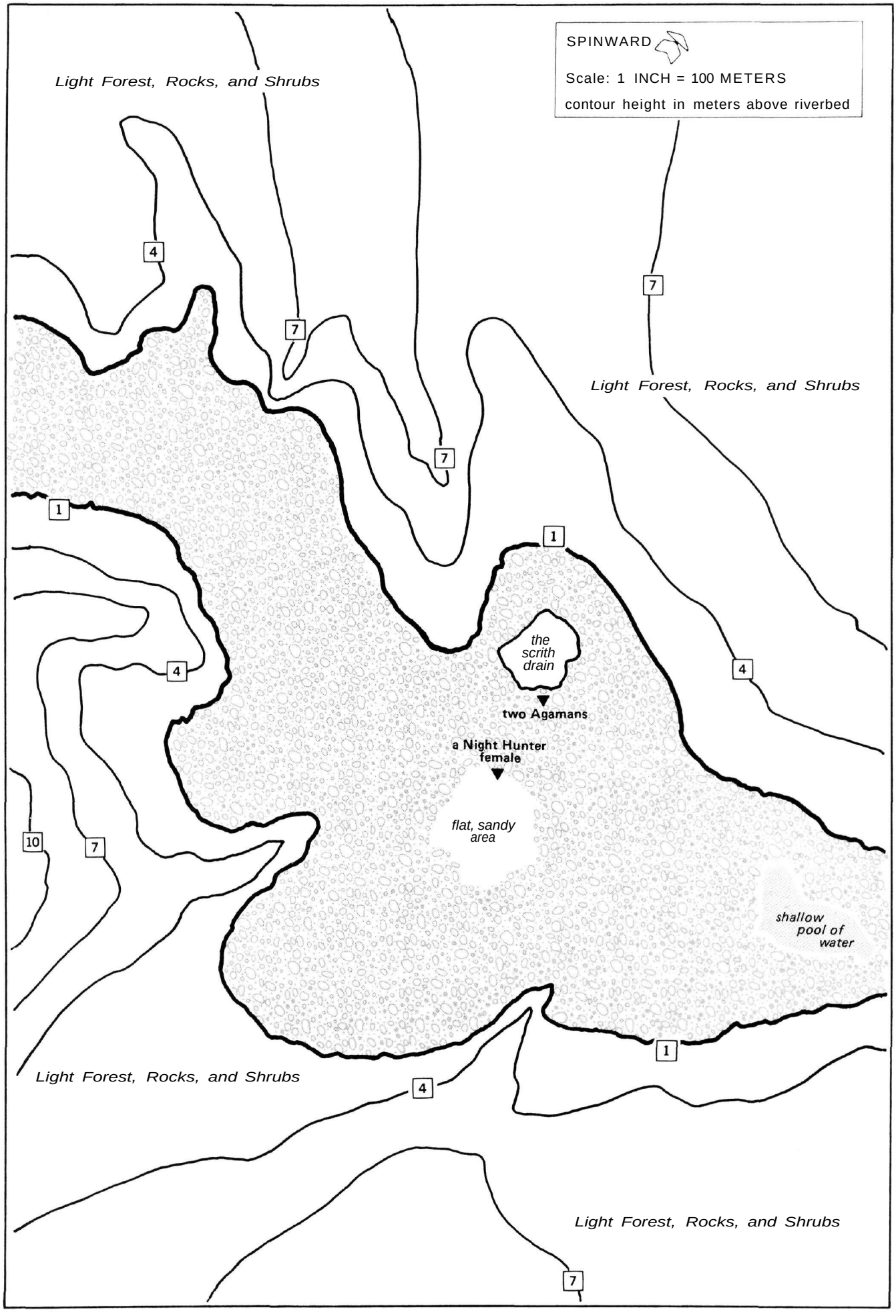
These Agamans are of those border clans which have adopted enough technology to be considered almost anti-Najidat by the deep-desert brethren. For centuries the border Agamans have encountered technologies superior to their own; with rare exception, they find a policy of boldness, surprise, persistence, and non-negotiation to be personally, socially, and theologically satisfying. Over time, azhogdim dependence upon social organization and technology proves to be too elaborate to easily defend, and the fallen-into-science species discovers that it is cheaper and more effective to give the Agamans the little that they really want.

Let the explorers make up any sort of response that they want: do they decide to move the starship there, to overawe the Agamans with its 100-point laser cannon? Do they rig a drone life belt with which to take a peek? Do a few brave explorers volunteer to scout the location? Does everybody pour out in a mob, with no plan at all? If there is no attack, Per-najid and Emegri will sit calmly beside their improvised call-stick and amusedly wait for the explorers to make a decision.

When the explorers do come, the Agamans send Twerant to greet them. She explains that Agamans always appoint servants to treat with strangers, and that she may not negotiate, but only convey messages between the explorers and the Agamans.

She will try to prevent the explorers from physically moving to where the two Agamans sit on throne-like boulders; if they confront the Agamans directly, the Agamans will laugh and ignore them for as long as the explorers persist. If the explorers become aggressive or insulting, the Agamans will walk away, first halting to draw a picture of the clock dial and to imitate a great explosion.

Twerant says that the Agamans have a scale built into a vehicle (the gansdedj), and that they will return Skreet unharmed in return for metals and technical devices


SPINWARD
Scale: 1 INCH = 100 METERS
contour height in meters above riverbed
Light Forest, Rocks, and Shrubs
Light Forest, Rocks, and Shrubs
Light Forest, Rocks, and Shrubs
Light Forest, Rocks, and Shrubs
4
7
7
7
1
1
4
4
10
7
1
4
7
the scrith drain
two Agamans
a Night Hunter female
flat, sandy area
shallow pool of water

SKULKING AGAMANS FIGHTERS

All the Agamans marksmen have the same weapons statistics; their action rankings and general hit points differ. For the limited purpose of this scenario, an Agamans stops firing when he or she has taken damage equal to one-third or more of his or her general hit points; he or she then attempts to move to the heavers and escape to a pre-arranged rally point many kilometers distant.

weapon	*skill*	*range s/m/l*	*damage*	*energy*
Jet Rifle	65%	50/150/300	3D10	self-powered
NAX Gun	75%	70/140/300	1D8+3 x10	self-powered

Jet Rifle User	1	2	3	4	5	6	7
Action Ranking	3	3	3	3	3	3	3
General HPs	27	30	27	24	33	28	36
Jet Rifle User	8	9	10	11	12	13	14
Action Ranking	3	3	4	4	4	4	4
General HPs	27	24	33	37	30	33	27
NAX Gunner:	15	16	17	18			
Action Ranking	3	3	4	4			
General HPs	30	27	30	27			

weighing an amount equal to the walker, Skreet, and the water in the bowl. If questions are asked by the explorers, or counter-proposals made, she will always go to the Agamans; she will never volunteer information on her own. Each time she goes to them, she abases herself before the Agamans, who appear to become more haughty and indignant with every question.

Per-najid and his friend are old hands at awing inferiors; examine every explorer statement or question for implications of status, superiority of species, and inarguable rightness of action, and whenever possible insult the explorers in a lordly fashion. Remind them that they are ignorant fools, and that the clock-bomb is necessary only because they are so stupid that the Agamans pity them, and have deigned to dramatize the situation in order that the explorers may learn of Agamans invincibility without being harmed.

If the explorers agree to the ransom, make them state just what they are giving up; have the Agamans accept some items as appropriate, and have them sneeringly refuse others.

Do not discuss the marksmen and gunners surrounding the site; if shooting breaks out, Per-najid and Emegri will move for cover without regard for dignity.

If the explorers threaten the Agamans, have one NAX gunner fire a warning volley; if they persist, have all four NAX guns open up. The NAX guns may not be effective against good protection; if the explorers then attempt to negotiate from a position of strength, warn them severely that the next attack will provoke the destruction of their friend and themselves. If they do attack, blow up Skreet and let the jet rifles fire at will. Fight without mercy until the result is clear, then bow to God's will like any good Najidat. These Agamans are sworn to the personal service of the great khan; none will surrender without taking damage equal to one-third or more of his or her general hit points.

The starship hull protects against both Agamans weapons, and its tracking and firing gear will quickly pinpoint all of the Agamans gunners. The 100-point mounted laser cannon is protected by 25-point armor; the weapon itself has 20 hit points. The airlock and the hatch both currently have 10 points of temporary protection.

If they are smart, the explorers can rotate the starship so that they can fire hand lasers through the clear portions of the hull, not exposing themselves at all. This tactic results in the death of Skreet, and earns the explorers considerable respect from the Agamans. But in a couple of days Agamans survivors return with the gansdedj and salvage the walker metal.

There is no way to electronically bollix the device controlling the explosives. Finding and jamming the control frequency simply detonates the nitroglycerine. Stress to the players that their explorers have no good way to calculate the characteristics of the device (Skreet's sensors are not built for that at all), and that the smartest thing to do is to keep all electronic activity far away from the ransom site.

Once the explorers give the Agamans what they want, the Agamans will be true to their word. They ride away with the control device and Twerant; in the equivalent of 8-10 UNS hours, they say, the device will no longer be functioning, and only the nitroglycerine need be removed — gently — from the walker. The Hairy City Builders, being great technologists, then should have no difficulty raising the walker out of the pit.

Once Skreet is safe, the explorers may be interested in revenge. Only if they thought of and were able to hide a beacon in the ransom will they be able to find the gansdedj — the Agamans will abandon it if the starship catches up. The Agamans party immediately splits up and rides like crazy in every direction. For three days thereafter searchers find 1D4 Agamans daily: some run, others rein up and watch with curiosity. None surrender without a fight. As captives, the little they say is designed to lead the pursuers far into the desert; as picked men, all will die rather than lead the explorers to the fabron tents of the Great Desert Khan.

The safest way to remove the nitroglycerine from the walker is tore-freezeit, with ice, liquid oxygen, etc. The explorers also will want to be careful of the blasting caps, which are as sensitive as fulminate of mercury. Depending on the method, disassembly and final rescue should not take more than an hour. If the explorers try to remove the liquid nitroglycerine by hand, each of the three jars requires a successful DEX x3 die roll, or it explodes, killing everyone in the pit. Frozen nitroglycerine can be safely moved.

Conclusion

Twerant will be turned loose 50-60 kilometers from the starship, and told to make her own way home. She will count herself very lucky.

Depending on what the explorers were silly enough to offer the Agamans, they may be able to chalk off the incident to experience, or they may be forced to attempt to pursue the gansdedj; such pursuit should require several adventures to resolve. If they pursue, make clear that the Agamans in general have no centers, installations, bridges, vehicles, or other property which they are not prepared to give up without regret. Strive to get the explorers in tangling pseudo-religious arguments with prisoners. It could be amusing to provide the explorers with a snivelling Agamans atheist who covets goods and misinterprets everything, or it could be interesting to try to convert some of the explorer guards.

Scenario: estimated 3+ sessions of play time

THE KALADIANS

1. Journey & Meeting

Introduction

This scenario is in three parts; presenting each part probably takes an average session of play. That time can easily be lengthened if the gamemaster presents the hunt of the haemonts, which is only mentioned, or creates other material. Players also may make surprising choices which could take additional sessions to resolve.

The scenario seems to give players a variety of choices, but in fact leads them through the main story in an apparently voluntary manner. Hints to the gamemaster are in the text. Read the entire scenario before trying to present it: understanding emphases, and alertness to catch-phrases is important; make any needed photocopies beforehand.

Throughout this scenario some familiar-seeming translated terms are used, such as transdisk, flak suit, and walkie-talkie. These technical items are conceptually familiar to the explorers, but they are unfamiliar with the actual operation of Ringworld models — finding on- and off-switches is not automatic, for instance; with a complex device the gamemaster may legitimately ask for several different rolls before the device functions. As they occur, stress such differences: it makes Ringworld a stranger place.

The Kaladian Ruins may be played as a sequel to the Catseye scenario in the *Ringworld* gamemaster book. If so, the explorers probably have no significant equipment. Without minidocs or other Known Space technology the explorers are in great danger, especially from the several fire-fights which break out in the scenario.

Gamemasters must handle the combat scenes delicately. The object is not to slaughter explorers — they are too important to treat lightly, and they are too hard to transport to Ringworld to kill casually: place them in danger which kills or damages them if they are reckless or stupid, but which is not so overpowering that it is certain to murder or maim them.

First, though the enemy shoots a lot, most of the shooters can be extras, not experts, who supply noise and background, but have no dice rolled for them. Secondly, damage can be adjudicated by rolling dice in secret and suppressing rolled damage to the level of wounds, not destruction. Thirdly, you could determine beforehand what happens, including who gets hit and for how much. A fourth method, that of following the rules completely, is often preferred by gamemasters who believe in total impartiality. Each gamemaster must determine his or her method or combination of methods.

Transition from the Catseye

Good King Arruprul has allowed the explorers their freedom. Although ("for the good of the people") he confiscated their marinex, flycycles, lifebelts, and weapons, he has allowed them to keep their personal gear, any human-specific medicines and docs which survived the adventure, and whatever else the gamemaster desires (though the less given out, the easier the scenario is to run).

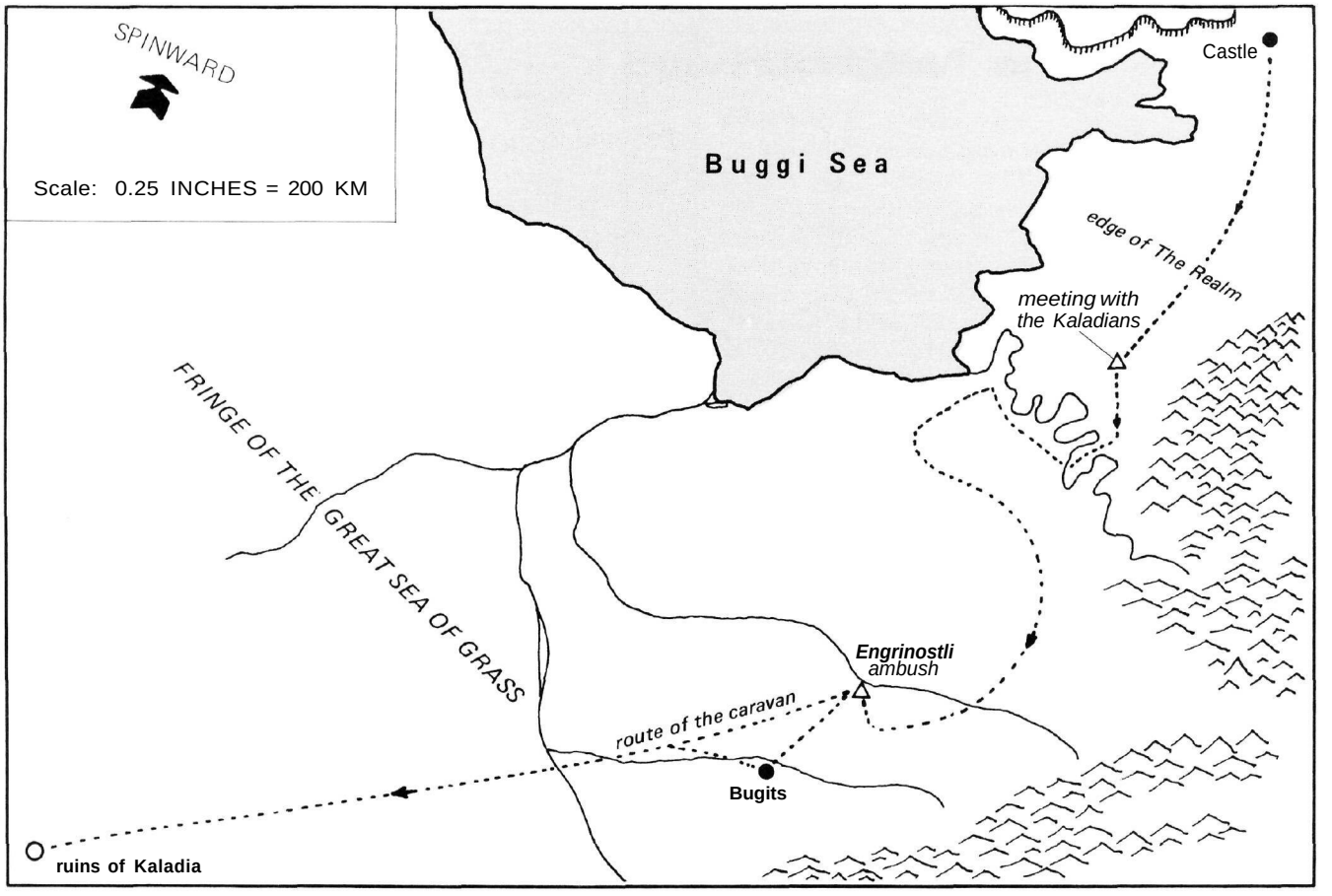
The king also gifts them with some archaic weapons. Each explorer may choose any two entries from the following list:

(1) — crossbow and 15 quarrels in a quiver
(2) — short bow and 25 arrows in a quiver
(3) — one-handed spear and medium shield
(4) — one-handed sword and medium shield
(5) — two-handed sword
(6) — two-handed axe
(7) — two-handed mace
(8) — three throwing daggers
(9) — two javelins

Appropriate belts, bindings, and scabbards are included. Statistics for the weapons are in the gamemaster book. Don't let the players see the ranges and weapon damage before they choose the weapons, unless at least one of the explorers has more than base chance skill with one or more archaic weapons — it is likely that he knows something about all of these weapons, at least by reputation. It is also likely that he has heard of slings. Since the explorers have a lot of walking to do, they'll also need a lot of time to rest; they might use some of it to develop proficiency with that difficult and invaluable weapon.

If the gamemaster wishes, the explorers can also receive one or two pack dak-daks. They will not move more quickly, but if they have a lot of gear, this small dispensation lets them take it with them. The endless confrontations between sophisticated explorers and balking pack beasts could be amusing. However, for the rest of this scenario it is assumed that the explorers walk: the gamemaster will have to develop his or her own theories about dak-dak behavior, traits, and tricks.

The explorers have plenty of time for weapons practice as they go. Grant each explorer ten percentiles to add to or divide among any appropriate weapon skill or skills. It is also possible that Arruprul or an aide may grant some teaching time, but the hours should be scant. After all, these lords have all they want from the handful of stupid aliens; those bizarre creatures need no more unless they have more to offer — it is the way of the Arch.



Generous King Arruprul provides crude but serviceable camping gear, blankets, a few weeks worth of dried food, and kindly lets the explorers keep their tempting wear-ever explorer boots that are always so shiny.

For three days the explorers are carried in dak-dak carts; then they arrive at the edge of the Castle Reaches, are let off, and must begin to walk through the rich agri-cultural territory of the Realm beyond.

The general direction of travel lies around the Buggi Sea, the narrow sea to the left (on which at present only fishing rafts are known); shown is an orientation map and a smaller-scale map. Walking at the healthy rate of 40 km daily, it will take a minimum of 1000 Ringworld days to get back to the still-downed starship some 40,000 km distant. (On the next page, a large-scale map shows macro-features of the superconductor grid area.)

After 1000km of walking - 25 days at 40 km daily - the crowded Valley People farms of the Outlands give way to long stretches of empty path which occasionally fork without any markers at all. The vegetation is brushy, with occasional gloomy stretches of forest. A few travelers are seen, but they flee from the trail and hide long before the explorers could talk with them.

It should be obvious to the explorers that they are going through apparently-abandoned wild country, where dangerous animals may live. The players should determine any schedule to stand watches. The gamemaster must be aware of any detection equipment, etc.

The opening scene is at night. Draw a diagram of the explorer's camp: locate their sleeping places, weapons, guard point, and fire (it is best to have a fire, so that everyone has the feeling that they can see). Determine who is standing watch.

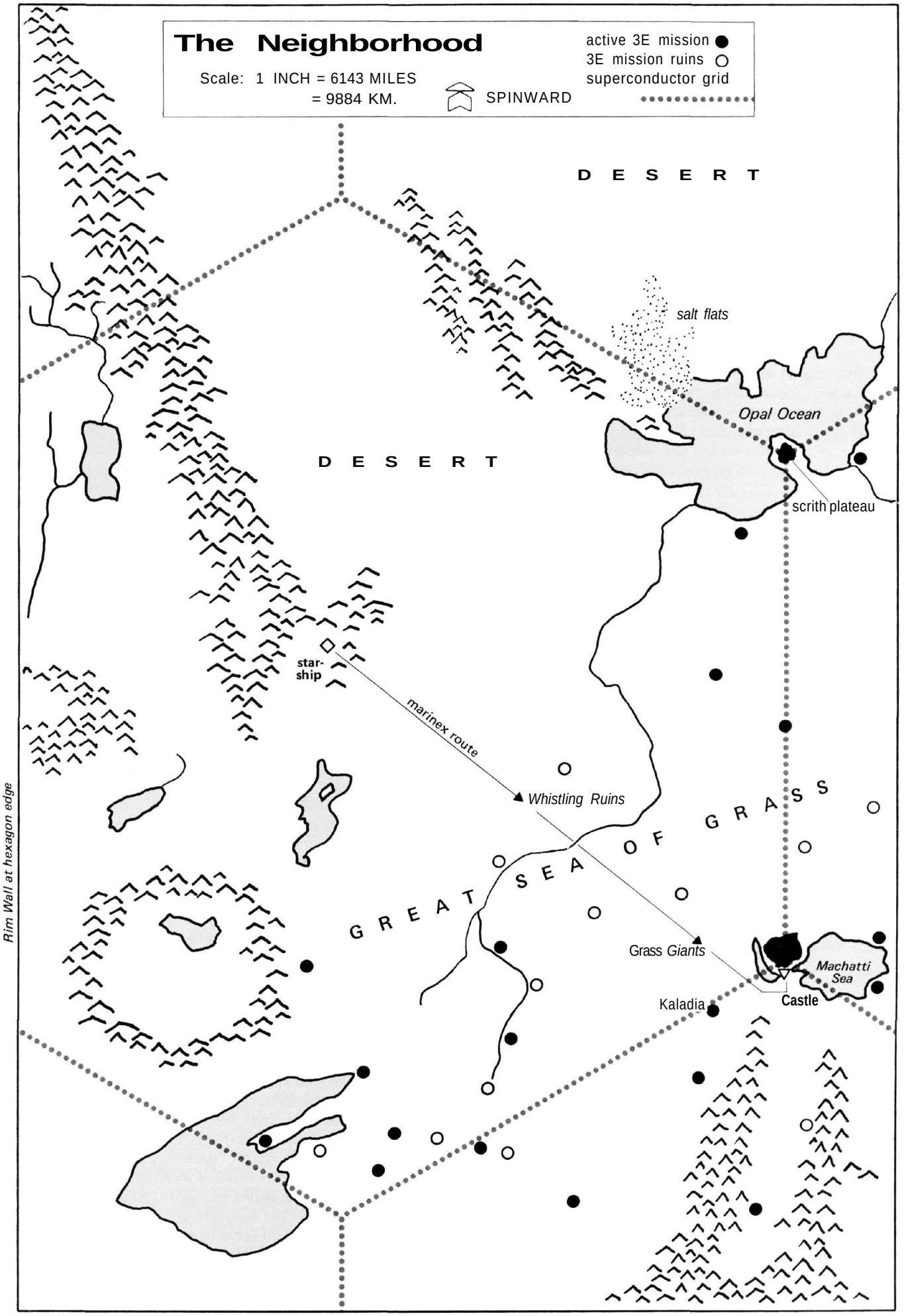
THE ENVOY

By Listen or by sensors, the explorer standing guard becomes aware of forms moving about in the brush beyond. More than one creature is apparently scouting the camp. They sneak within seeing range, surrounding the campsite. More wait quietly in the rear.

If the explorers foolishly open fire instead of negotiating, have the Kaladians return fire briefly (2D6+2 damage, 25% chance per explorer to be hit), then sink back into the bushes and disappear; keep the explorers up all night with strange noises and rustlings, then have it rain all the next day to make the sleepless explorers miserable. Bring the Kaladians back the next afternoon, perhaps in their boxcars on an open plain, and the explorers may be in a more hospitable mood. Treat the encounter as totally new, but remember that the explorers opened fire on someone without provocation, and use that incident as a rationale at some later time.

If the explorers make peaceful gestures, a single figure approaches the camp, waving a large frond-like branch overhead in a slow, figure-eight motion.

The envoy is a Valley Person. Unlike those whom the explorers have seen previously, this one is obviously from a more technically-advanced culture. She is about 180 cm tall, of thin hominid build, and has an old scar across her face which has closed her left eye. The pupil of her right eye glints red in the firelight. She wears a heavy flak suit and a light metal helmet which does not cover her face. A stout equipment belt girdles her waist, a metal box with antenna hangs from her shoulder, and a circular transdisk (much like a comdisc in appearance) hangs from a thong around her neck. No weapons are visible. Those explorers who receive a successful Search notice, unlike other Valley People they have seen, that this *cont. p. 66*


The Neighborhood
Scale: 1 INCH = 6143 MILES
= 9884 KM.
SPINWARD
active 3E mission
3E mission ruins
superconductor grid
D E S E R T
D E S E R T
salt flats
Opal Ocean
scrith plateau
star-
ship
marinex route
Whistling Ruins
G R E A T S E A O F G R A S S
Grass Giants
Machatti
Sea
Castle
Kaladia
Rim Wall at hexagon edge

THE KALADIAN-KITON FOLK

The Kaladians, now thousands of Ring years distant from their horticultural heritage, are part of a nomadic merchant branch of the Valley People. These folk arc traders roaming this part of Ringworld, mostly crossing or skirting a vast grassy plain nearly a million kilometers on a side. The Kaladians are organized into clans, each of which controls and is identified with a particular long-established trade route. Unlike their forebears, the Kitons have become omnivores.

The Kiton clan which the explorers have encountered is led by Uvugaru Mang. Usually the clan is called Kaladians, since one end of the route is at the ruined city of Kaladia. Clan families are organized by boxcar; crews are related by blood or ritual to the owner. Men and women are social equals, with superiority determined by the worth of their technical or mercantile skills. Half the boxcar owners are female.

The Kaladians are a gregarious and proud people. They state that the hundreds of thousands of agricultural Valley People surrounding the Realm once rode in proud machines too, but were condemned by Ohjomo the Just for engaging in rishathra with *yana.* Although Uvugaru Mang always says this with utter solemnity, all other clan members within hearing distance burst into laughter. No explanation is given; Malareet Igin hints that it is a religious secret.

The Kaladians wear bright clothing, considerable jewelry (mostly metal), and both sexes paint their skins with swirling patterns of color.

The quality of their technology varies. Their vehicles are patchworks reconstructed from sophisticated machinery. The MAGLEVs and solar panels show excellent workmanship apparently unachievable by the Kaladians in their boxcar homes, for many items are decidedly inferior. Their weapons fire slugs propelled by a chemical explosive contained within ceramic cartridges. They eat from primitive plastics which actually absorb greases and other contaminants. Small scavenger insects routinely harbor themselves within the boxcars and live there unmolested for generations. The Kaladians even use dangerously-exposed electrical coils for heating and cooking.

Seventeen boxcars, harboring about 200 individuals, arc in this clan's caravan. Most of the boxcars are combination house-gunboat-freighters. A few are specialized (refrigerators for perishables, vacuum seals to guard against explosions of bulk grains, etc.). One boxcar is not lived in — it's reserved for parties, feasts, and as a get-away when family squabbles become too intense. Childless adults and confirmed singles live in another — the only boxcar without petrifying numbers of children constantly underfoot.

KITON WALKIE-TALKIE

These have a maximum range of about 3 km before interference and non-reception render them useless. These primitive devices actually include vacuum tubes, which will break if the unit is dropped. Among buildings or boulders the useful range may be extremely short.

KITON BOXCAR

MAS: 71
VOLUME: 3,500 cubic meters
SPEED: 100 kph maximum speed
MAXIMUM ACCELERATION: 12 kph/im
ENERGY USED: 100/im empty, 250/im loaded
POWER SUPPLY: approx. 200 square meters of solar panels producing a maximum of 270/im; 4 serial storage batteries, 4 x 100,000/270/90kg/R each
APPLICABLE SKILL: Atmospheric Craft
COST: 2000 man-hours to salvage, assemble, and test
GENERAL HIT POINTS: 125

location	*1D20*	*armor/ hit points*
landing leg (roll 1D6 for leg)	01	5/5
belly	02-04	2/50
left or right MAGLEV (1D2)	05	5/30
area & door 1	06	5/10
area & door 2	07	5/10
area & door 3	08-09	3/15
area & door 4	10-11	3/15
door 5	12	5/15
solar panels right	13	0/15
solar panels left	14	0/15
left or right turret (1D2)	15	30/15
vertical stabilizer (rudder)	16	2/10
nose spoilers	17	1/5
sensors, spotlights, com gear	18	1/10
control and living quarters	19-20	5/30

Kaladians live and work in their boxcars. A typical boxcars' salvaged MAGLEVs, solar collector and converters, and hull come from different machines; much work has made the composite craft smooth-running and reliable, though the close quarters and continuous associations of the crew make for endless squabbles, frictions, curses, and fights, broken by weeping pleas, fits of shame, whining prostrations, and ribald guffaws. Everyone talks, talks, talks.

MAGLEV-powered machines, boxcars float a couple of meters off the ground, and usually run in caravans back and forth along long-used routes; they are tramp freighters plying Ringworld's enormous grassy plains. Their tree-top ceiling, poor radar, and sluggish handling characteristics confine them to daylight flight except along well-known, beaconed routes. See page 69 for the plan of a typical boxcar.

KITON TURRET GUN

MAS: 8 (including monitor; turret separate)
DIMENSIONS: 1.2 meters long; single barreled, belt-fed automatic weapon
ENERGY COST: ammunition, plus 2 units of energy per impulse when firing
ENERGY SUPPLY: ship's power
DAMAGE: 1D8+4 (four per impulse)
RANGE: 100/300/600 meters
APPLICABLE SKILL: Heavy Weapon
ARMOR: 30 point turret
GENERAL HIT POINTS: 15

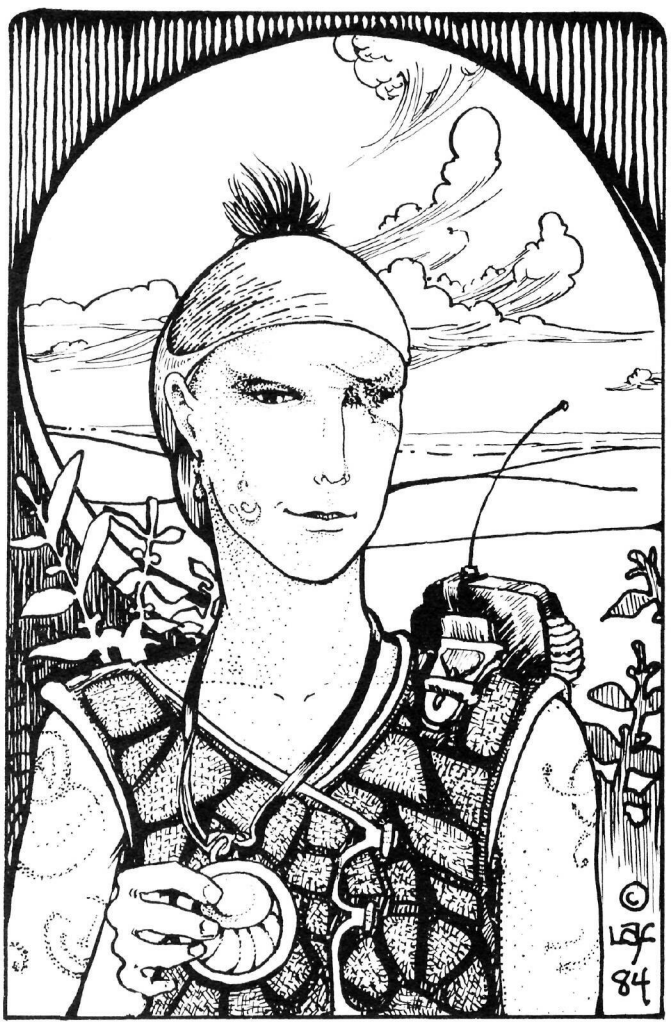
Each of a normal boxcar's twin turrets mounts one remotely-aimed and -fired gun; the turrets can fight independently. A turret rotates 360 degrees, and its gun aims out at any angle. Kaladians must trade for ammunition; most boxcars carry about 1500 rounds.

ASSASSIN BOLT

This throwing weapon is a piece of machined steel, with three wickedly-sharp 10cm blades at the head. A thin hasp acts as a handle and trails the head. The weapon is about 30cm long; it can be thrown with great force. Analysis shows fragments of scrith cast into the head for greater mass and accuracy. The Kaladians say that some Kiton tribes use a mechanical bolt-thrower something like a crossbow, and that at close range such bolts pass through wood, bodies, and steel. The Kaladians trade through intervening civilizations to get these expensive little death-dealers. Range — 20 meters; damage — 1D10+2; general hit points — 20; weight varies from 2-3 kilos.

GEFORZ

A traditional Kaladian alcoholic drink, each serving of *geforz* must be made fresh and must be served in a clear glass or cup. Pure alcohol is combined with the crimson juice of a tree fruit called *bakiko,* which resembles a pomegranate. When the proportion of alcohol to bakiko is 2:1 or more, the blood-red juice does not disperse, but hangs suspended in sheets and tendrils. When the proportion is less than 2:1, the juice disperses throughout the drink and assumes a pinkish cast. It is therefore possible to visually gauge the potency of the drink, and the Kaladians say that pink-drinkers are *prorgs* — wimps. Perhaps in consequence, most Kaladians appear to be addicted to alcohol.



Malareet Igin

KITON FLAK JACKET

All Kaladians wear flak jackets, which should indicate to the explorers that the Kaladians do not lead tranquil lives. The jackets are vests covering the chest and abdomen. Metal or ceramic plates are sewn within cloth pockets. The flak jackets uniformly stop three points of damage from projectile weapons.

KITON TRANSDISK

The transdisk is a translation device. It can learn a new language in 3-6 hours; it already knows all of the languages along the Kaladian caravan route. The technology which produces the transdisk is obviously very advanced, but the Kaladians have had to wire and strap their transdisks to large, heavy, and unsophisticated batteries good for about six hours of transdisk use before the batteries must be replaced.

text continued from page 63 —

woman's fingernails are cut short: she works with equipment and goods rather than with the soil.

If an explorer stands or comes forward, the envoy approaches, waving the branch and speaking in her native tongue (Valley People/Adult Female Social) and other local languages. She continues this until the explorers speak, whereupon her own transdisk will translate the language aloud, if the explorers spoke in a local tongue. If they spoke in their own tongue, or any other strange language, her transdisk makes only a squawk ("insufficient data"). The transdisk already knows all of the languages usually encountered along the Kaladian caravan route.

Once friendly communication is established, the envoy relaxes. She turns and locks a dial in her belt (disarming the explosives which are keyed to her continuing heartbeat), pulls a walkie-talkie from her shoulder, and calls to her fellows in a language which her transdisk does not translate. She identifies herself as Malareet Igin of the Kaladian branch of the Kaladian peoples and engages in casual speech, asking what this implement is, or what that symbol means. She continues in this vein for an hour or two, until she is able to understand nearly everything the explorers say. Once she is satisfied with the translation, she informs her clan, whom she says will now join the camp.

Within a few minutes, nearly a score of armed Kaladian boxcars glide into view. Spotlights flit everywhere. If nothing untoward occurs, then a cargo door opens on the side of one painted with sarkbestes engaging in "mating" battles, and the leader of the caravan, preceded by several armed guards (whose conspicuous sidearms are bolstered), descends to greet the explorers.

The Kaladian Way

The Kaladians regularly traverse a 5200 km route between the ruined city of Kaladia to the Valley People settlements on the fringe of the Realm, attending the larger open markets and making individual deals with larger farms and cottage manufacturers along the way. The caravan works as a unit for self-protection; there is no law and no police along the route, only different species and customs. One of the caravan's most profitable cargoes is the

transport of passengers and information; nothing else in existence along its route moves as quickly, as regularly, or as securely.

As a whole, the Kiton tribe deals in alcohol, compressed methane, foodstuffs, metal and plastic ingots and scrap, housewares, and hand-crafted luxuries. Wood, especially the hardwoods, is an important item for any deep-plains farming community. The Kaladians in particular trade machines and machine parts which eventually find their way all over the Realm in the form of taxes and tribute exacted from the Valley People. Kitons also hunt for food in the wilderness, and raid isolated Valley People settlements and nomad camps (as a folk, they have little concept of decency towards outsiders). Kiton radio equipment is not good; the tribe has never managed to establish a radio net which was not promptly destroyed by migration, stampede, scrap-seekers, looters, or storm.

DEALING WITH THE KALADIANS

After the leader and his friends descend, a crowd of onlookers gathers along the ramp. A dozen more figures, armed with rifles, line the top of the boxcar.

Uvugaru Mang, leader of this caravan, is friendly and communicative. If the explorers do not have transdisks, he generously supplies one to each. Raising both hands upward and extending his fingers, he pronounces a solemn speech.

"Honored wanderers, upon the plain of Dak-Daks Off-Season you are met by the Children of Ohjogo the Arch-maker. Like his hand, my peace and friendship reach across the silence. Well met, small ones. Greetings."

He then extends both open hands to the foremost explorer, grasps hands briefly and says, "My protection to you," then continues until all have been greeted. He grins widely, revealing missing teeth, and turns to his people with a flourish. He shouts, "The celebration feast!" A small parade of people from the boxcars bring out crude plastic tables, rather like redwood picnic tables with attached benches and umbrellas, and cover them with a variety of fruits and meats. Without ado, Uvugaru Mang, Malareet Igin, and others begin to eat.

"Can you contribute?" asks Malareet Igin. The explorers may or may not as they wish, with no consequences either way. The food is good for humans, and very tasty if the explorers have been going hungry or subsisting on trail food (if they have been eating well, the food tastes spiceless and greasy). The Kaladians squat on the ground, on tables and benches, or along boxcar ramps. They work to engage the explorers in conversation. They exhibit great interest, apparently hide few secrets, and generally are friendly.

The Kaladians soon realize that the explorers are not ordinary primitives, and ask why they walk. The Kaladians express interest in the explorer's desire for vehicles, but refuse to surrender or sell their own. Nor are they interested in going so far off their traditional route as to take them home (a round trip of 40 days even at boxcar speed).

However, after some private conversation with other clan leaders, Uvugaru Mang agrees to help the explorers get vehicles. "Bipeds like us are not made for walking," he says. "It is almost as bad as being a farmer. When Ohjogo the Rider met anyone in his travels he took pains to set them to mounted travel. We can do no less." He holds out his hands. "It requires a short adoption ceremony, then you will be as one of us. Will you do it? As clan members you receive fine weapons," as he brandishes his revolver, in design something like a Colt Peacemaker, "and the right to drive a boxcar!" If they do it, the explorers will be some 4000 km closer to their starship (as nearly as they can judge from what the Kaladians say), and have a chance to shorten their trip from years to weeks. Explorers receiving successful Psychology or Search rolls notice that many Kaladians roll their eyes, snort in disgust, or look amused at the announcement.

If the explorers agree, Uvugaru Mang returns to his group and engages in more animated conversation, impolitely out of earshot of the explorers. The others often glance over their shoulders towards the explorers, asking questions, then disagreeing or agreeing with smiles and warm looks. Then they disperse, calling out to still others, and a burst of activity occurs.

The Adoption

The ceremony need only be taken by one explorer, Uvugaru explains. If only one does participate, then to the Kaladians he is the titular leader of the explorers.

WOGGO

If the gamemaster desires, one child of the clan begins to attach himself to the explorers, bringing them delicacies when he can manage, telling them stories, and endlessly plying them with questions. Woggo's foot was crippled in an accident several years before, and with the death of his mother he has become an outcast. He is the equivalent of a 10- or 11-UNS-year-old child, intelligent, and perceptive. If the explorers kill time by playing strategy games such as chess or go, Woggo's quick comprehension amazes them.

As a kid, Woggo doesn't know much except that certain clan members (like Malareet Igin) have done heroic deeds, and the Uvugaru Mang likes to kick Woggo, and that everyone beneath the Arch is weak, stupid, crafty, or arrogant — except the Kaladians, who are perfect. The other clans of the Kiton are worse than outsiders, for these Kitons presumably know how a folk should behave, and wilfully refuse to do so. Woggo loves to tell stories about ambushes, treachery, spies, and assassinations; he plainly hopes the explorers are on some dark and cruel mission.

Since Woggo has no special knowledge nor important social ties, he can easily be turned into a permanent mascot for the explorers, or even an explorer player-character. Gamemasters should be alert for these kinds of characters as adventures unfold, so that no player must be without an active personality in a scenario — and so that the gamemaster does not have to grope for a rationale to allow introduction of a new explorer.

WOGGO, Kaladian-Clan Valley Person, 2 Ring years old

STR 8	MAS 5	CON 13	INT 14
POW 10	DEX 9	APP 10	EDU 0

General Hit Points: 18
Speed: 2m/im land
Action Ranking: 5

SKILLS: Hide 25%, History/Kaladians 15%, Listen 15%, Observe 20%, Own Languages/Valley Person 45%, Sneak 20%, Strategy 10%

The people circle around the spotlighted area; their clothes, though brightly colored, are still greasy from the feast, matching their pungent body odors. During the ceremony most clap rhythmically, but several have crude mechanical noise makers which punctuate the speech. Uvugaru Mang and a female, Navar Loday, lead the rites.

The couple relate a long story in the untranslated language. The only which the explorers recognize is the name Ohjogo. At some points the crowd bursts into laughter. The pair of leaders act out a story wherein they meet, show great happiness by laughing and dancing and singing, lapse into a tender embrace which turns into sexual foreplay, then break apart and sing a tearful lament.

In a few minutes the two turn towards the candidates. The explorers have been forewarned to answer affirmatively to all questions. Each explorer to be adopted is questioned by the leader Kaladian of the opposite sex. The questions are innocuous: "Are you here? Are you real? Is this your hand? Are you friendly? Are you kind? Will you help me?" and so on, until the candidates must take a short oath: "Do you swear to aid me, with fair words, in my suit?" The ceremony culminates when all participants nick a finger, spill their blood into a common cup full of liquid, and each sip. The drink is harmless; it tastes like orange juice.

"Now you are far-kin to us, and to be treated as all far-kin are treated. Welcome to the clan. Welcome to the family." Each new clan member then receives a belt carved with the face of Ohjogo, a revolver, six rounds of ammunition, and a sturdy sharp plastic knife, each in leather scabbards.

Festivities continue until everyone is stuffed. Gradually all the Kaladians wander off to bed. Venturesome explorers learn that the Kaladians chiefly like to eat, and that rishathra is not an important component in their culture.

JOURNEY

The explorers can now ride with Uvugaru Mang while following the regular trade path to Kaladia. During the trip, the explorers will witness the full range of human emotions exhibited between various clan members; if nothing has convinced them before, they should now believe that the Ringworld hominids arc human in every essential. The clan shares considerable knowledge of the route they follow, and convey rumors of that beyond, but explorers receiving successful reasoning or Psychology rolls will perceive that the clan has contempt for dirt-bound outsiders and desires to cheat them whenever possible. Any knowledge of matters other than trade and the routines tied with trade may be stereotypical or uninformed. Sometimes Kaladians seem to say anything that the explorers want to hear; other times, the explorers find themselves being persistently teased and laughed at.

Four days of stops and of uneventful travel across endless rolling plains. Explorer clan members can practice driving the boxcar (Atmospheric Craft/Kaladian Boxcar); for those with any Atmospheric Craft experience, the controls are simple and foolproof, and the speeds are so low that boredom and gusts of wind are the only enemies.

At one point a herd of haemonts is sighted; the boxcars turn to hunt them. Let the explorers maneuver the boxcars and fire Kaladian projectile rifles at the creatures. The clan members sometimes regard their efforts with amusement, encouragement, and patient tolerance; at other times the clanspeople swear at them and the children play cruel jokes. All in all, Woggo tells them, the clan would rather be without them, but the leaders have decreed otherwise.

2. Ambush

The next day a scout reports to Uvugaru Mang that he spotted a herd of stampeding sarkbestes to spinward. Uvugaru Mang speculates aloud. "Those lazy monsters never run unless they are mad, and only two things drive them mad. Was there smoke on the horizon?"

"No, sir."

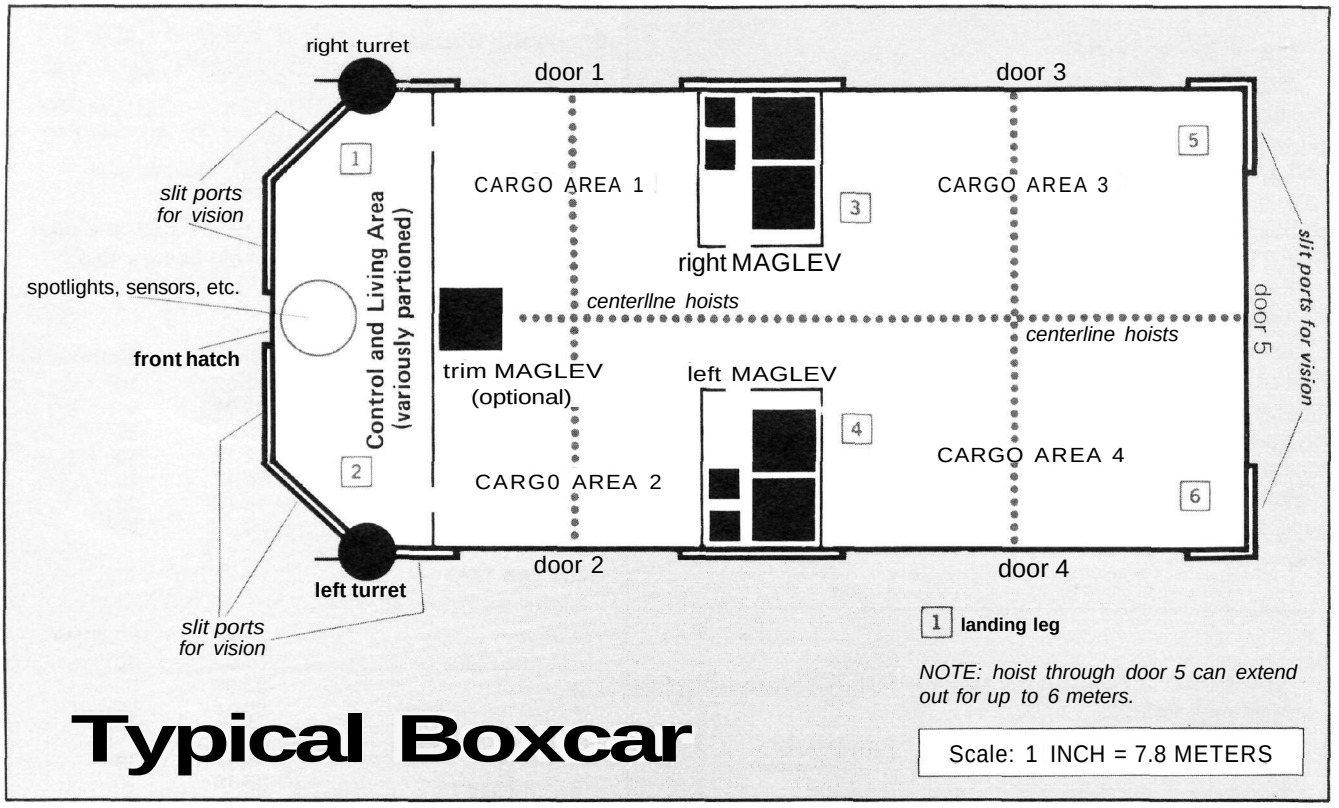
"Then it was probably the Engrinostli caravan. This time they'll learn not to nibble on our route!" Uvugaru Mang radios for a meeting to ensure that everyone understands the situation and that everyone has ammunition. If the explorers ask why the clan is attacking other clans of Ohjogo, Uvugaru Mang replies, "They are only far-kin." and goes back to his work. The clanspeople are confident of success in any impending brawl with the Engrinostli: "We have to teach them another lesson."

During the meeting, the stampeding sarkbestes approach. The boxcars hover at maximum height, five meters, allowing the maddened animals to pass below. The herd numbers millions, maybe billions; they take hours to pass. The dust dims the sky and the vast roar of their hooves shakes the boxcars and makes discussion impossible. At first the Kaladians shout jokes about the passing animal sea, but gradually fall silent as the mass rolls by, and at last most refuse even to look out the ports. It is an inescapable lesson of the smallness of the clan and the colossal size of the Ring, but the Kaladians refuse to accept it.

Where the sarkbestes have passed, the plains are chewed by foot-marks, and the grasses are smashed and flattened. Scattered sarkbeste cadavers can be seen, smashed and burst, unlucky victims of accidental falls during the thunderous rush. Some boxcars indicate that they will swing out and follow the tail of the herd, bagging fresh sarkbestes for the clan larder. Encourage the explorers to get firearm practice by participating in the hunt.

Battle with the Engrinostli

After the herd passes, Uvugaru Mang dispatches three boxcars as scouts to spinward, and three more as pickets in the other direction. The caravan heads spinward also, at a slightly slower rate. Everyone prepares for battle — throwing out debris, tying down loose goods, checking arms, pulling on flak jackets, etc. Children are confined to the most strongly armored parts of the boxcars; goods which might stop bullets are piled around them for extra protection.



Typical Boxcar

Kaladian Player-Boxcars

BOXCAR ONE

General Hit Points: 125

location	1D20	armor/ hit points
landing leg (roll 1D6 for leg)	01	5/5
belly	02-04	2/50
left or right MAGLEV (1D2)	05	5/30
area & door 1	06	5/10
area & door 2	07	5/10
area & door 3	08-09	3/15
area & door 4	10-11	3/15
door 5	12	5/15
solar panels right	13	0/15
solar panels left	14	0/15
left or right turret (1D2)	15	30/15
vertical stabilizer (rudder)	16	2/10
nose spoilers	17	1/5
sensors, spotlights, com gear	18	1/10
control and living quarters	19-20	5/30

BOXCAR TWO

General Hit Points: 150

location	1D20	armor/ hit points
landing leg (roll 1D6 for leg)	01	5/5
belly	02-04	5/60
left or right MAGLEV (1D2)	05	8/30
area & door 1	06	0/10
area & door 2	07	5/10
area & door 3	08-09	5/15
area & door 4	10-11	5/15
door 5	12	5/15
solar panels right	13	0/15
solar panels left	14	0/15
left or right turret (1D2)	15	5/15
vertical stabilizer (rudder)	16	2/15
nose spoilers	17	2/10
sensors, spotlights, com gear	18	5/10
control and living quarters	19-20	10/20

BOXCAR THREE

General Hit Points: 172

location	1D20	armor/ hit points
landing leg (roll 1D6 for leg)	01	3/5
belly	02-04	10/40
left or right MAGLEV (1D2)	05	5/20
area & door 1	06	5/10
area & door 2	07	5/10
area & door 3	08-09	5/5
area & door 4	10-11	5/5
door 5	12	5/15
solar panels right	13	0/15
solar panels left	14	0/15
left or right turret (1D2)	15	20/10
vertical stabilizer (rudder)	16	2/15
nose spoilers	17	2/10
sensors, spotlights, com gear	18	5/10
control and living quarters	19-20	5/20

BOXCAR FOUR

General Hit Points: 185

location	1D20	armor/ hit points
landing leg (roll 1D6 for leg)	01	5/5
belly	02-04	6/50
left or right MAGLEV (1D2)	05	5/30
area & door 1	06	3/10
area & door 2	07	3/10
area & door 3	08-09	5/10
area & door 4	10-11	5/10
door 5	12	6/10
solar panels right	13	0/15
solar panels left	14	0/15
left or right turret (1D2)	15	4/20
vertical stabilizer (rudder)	16	2/15
nose spoilers	17	2/10
sensors, spotlight, com gear	18	5/10
control and living quarters	19-20	5/30

text continued from page 68

Photocopy and divide the provided boxcar stats so that the players each have one. Explain to them that they are temporarily assuming the role of prominent clan members and ace boxcar pilots so that they can participate more fully in the fight. They should be happy to have a chance to dogfight a bit. All will be controlling characters with a 2D6 x10% skill in Atmospheric Craft/Kaladian Boxcar, a 1D8+1 x10% skill in Heavy Weapons (proj.)/Kaladian Turret Gun, and a 2D6 x5% Observe skill.

Everything being equal, these boxcars can accept one-half of their general hit points in damage before they lose all power and mobility. A hit location that loses all of its hit points can no longer function; further hits on that location could start fires which might spread through the boxcar. If explorers are riding in a location hit by enemy guns, they can escape being hit that impulse by successful player luck rolls.

ENGRINOSTLI BOXCAR (for gamemaster use)
Hit Points: 265

location	*1D20*	*armor/ hit points*
landing leg (roll 1 D6 for leg)	01	5/5
belly	02-04	5/80
left or right MAGLEVS (1D2)	05	10/30
area & door 1	06	5/15
area & door 2	07	5/15
area & door 3	08-09	5/20
area & door 4	10-11	5/20
door 5	12	10/20
solar panels right	13	0/15
solar panels left	14	0/15
left or right turret (1D2)	15	30/15
vertical stabilizer (rudder)	16	2/15
nose spoilers	17	2/10
sensors, spotlights, com gear	18	5/10
controls and living quarters	19-20	8/50

ENGRINOSTLI BUZZER

MAS: 48 (1630 kg loaded)
DIMENSIONS: 2.5m wide, 8m long including tail, 4m high to rotor
SPEED: 200 kph maximum; cruising 100-120 kph; can hover as well as rise and descend vertically
MAXIMUM ACCELERATION: 2 kph/im
ENERGY USED: alcohol; max range 400 km
POWER SUPPLY: alcohol-burning internal combustion engine
CEILING: 5000 meters maximum at 1 atmosphere
APPLICABLE SKILL: Atmospheric Pilot
COST: 1200 man-hours
ARMOR: none
HIT POINTS: 45

This light gun platform has short range and no armor, though it is very agile compared to a boxcar. It can take off and land vertically and is small enough that six can be carried by a standard boxcar. Its chief tactic against boxcars is an attack from above, either by machine gun or by rocket.

Engrinostli Buzzers

weapon	*attack%*	*damage*	*range*
Kiton machinegun	60%	1D8+4	100/300/600
gas rocket	60%	sleep	50/100/150

PILOT SKILLS: Atmospheric Craft/Buzzer 60%
Luck Roll 30%
NOTE: if pilot compartment is penetrated, the pilot must succeed in his luck roll to avoid being killed.

BUZZER ONE
General Hit Points: 45

location	*1D20*	*hit points*
twin fixed guns	01-02	10
gas rockets	03-04	5
pilot compartment	05-11	25
fuel tank	12-13	10
engine	14-17	15
horizontal rotor	18-19	10
vertical rotor	20	5

BUZZER TWO
General Hit Points: 45

location	*1D20*	*hit points*
twin fixed guns	01-02	10
gas rockets	03-04	5
pilot compartment	05-11	25
fuel tank	12-13	10
engine	14-17	15
horizontal rotor	18-19	10
vertical rotor	20	5

BUZZER THREE
General Hit Points: 45

location	*1D20*	*hit points*
twin fixed guns	01-02	10
gas rockets	03-04	5
pilot compartment	05-11	25
fuel tank	12-13	10
engine	14-17	15
horizontal rotor	18-19	10
vertical rotor	20	5

BUZZER FOUR
General Hit Points: 45

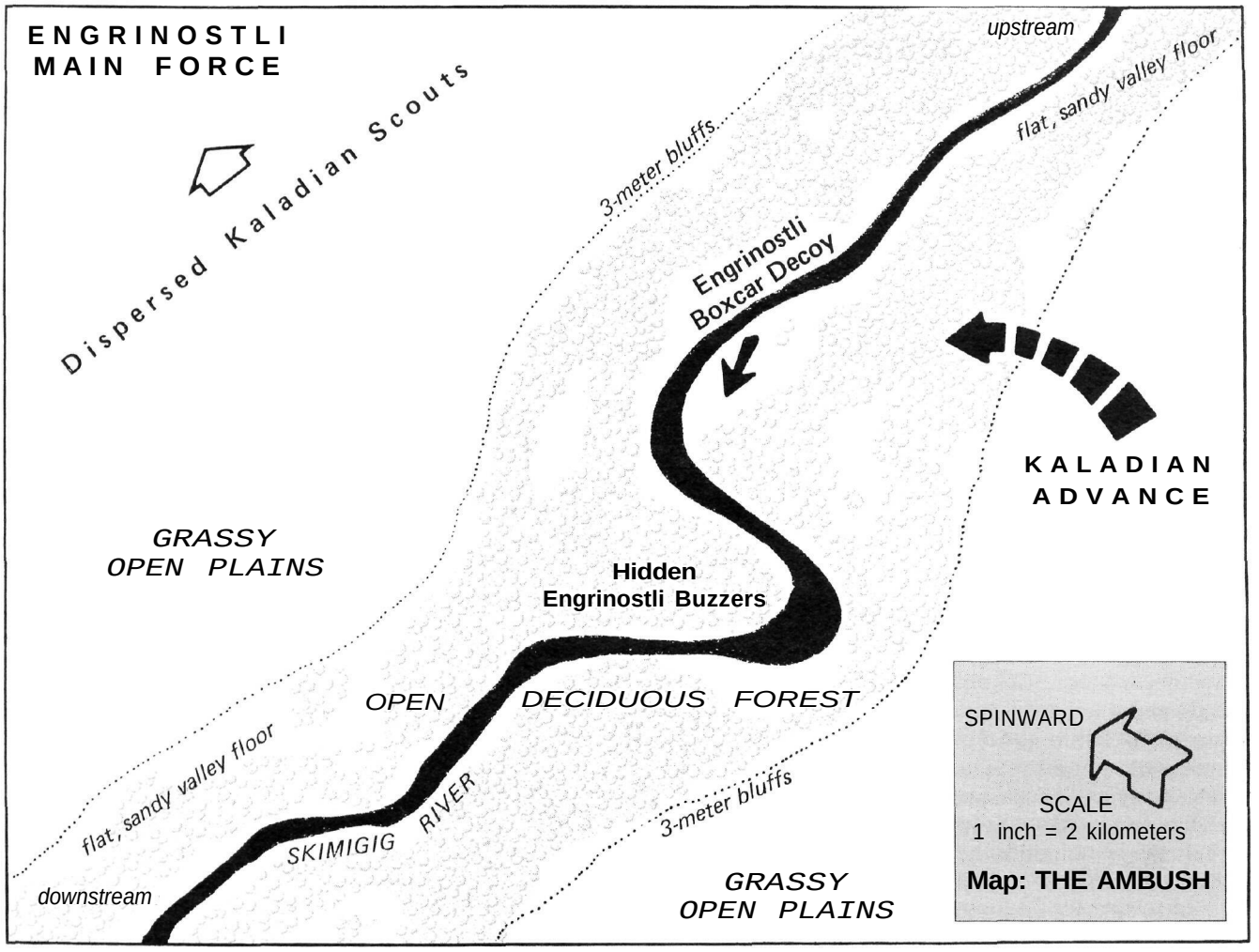
location	*1D20*	*hit points*
twin fixed guns	01-02	10
gas rockets	03-04	5
pilot compartment	05-11	25
fuel tank	12-13	10
engine	14-17	15
horizontal rotor	18-19	10
vertical rotor	20	5

BUZZER FIVE
General Hit Points: 45

location	*1D20*	*hit points*
twin fixed guns	01-02	10
gas rockets	03-04	5
pilot compartment	05-11	25
fuel tank	12-13	10
engine	14-17	15
horizontal rotor	18-19	10
vertical rotor	20	5

BUZZER SIX
General Hit Points: 45

location	*1D20*	*hit points*
twin fixed guns	01-02	10
gas rockets	03-04	5
pilot compartment	05-11	25
fuel tank	12-13	10
engine	14-17	15
horizontal rotor	18-19	10
vertical rotor	20	5



As the Kaladians anxiously search the horizon for their enemies, the radio crackles. Spinward scouts report one Engrinostli boxcar sneaking along a river. The well-armored boxcar appears to have been scarred by fire.

Uvugaru Mang orders an attack, joking that the lone Engrinostli is as sure a kill as a lone sarkbeste. With their superior speed, his boxcars will make firing passes from two directions, dividing any return fire and making unlikely accidental hits from his own guns onto friendly boxcars. Picket boxcars will hold their positions: 11:1 odds should be more than adequate, he calculates.

The ships can shoot at long range for several impulses as they close. Tactics are minimal, but the enemy will try to flee the attackers by dodging through the trees along the river, always lumbering downstream. Lay out or photocopy the battle map to show the players the general situation.

When the players' boxcars close to middle range, let them have a few impulses more in which to merrily blast away. The Engrinostli ship is well-armed, well-armored, and only faking being crippled, but it certainly will lose shortly. Do not let the firing go on so long that the Engrinostli boxcar is destroyed or even badly hurt — that clan has an ambush planned which must be sprung before then. During any impulse in which a player-pilot does not fire and is over the trees, allow the player an Observe roll. If successful, he notices the glint of metal among the trees: the glint comes from the buzzers, waiting in ambush. If the gamemaster wishes, the explorers may also receive Observe rolls, though they probably are watching the arc of tracer bullets and wondering where they can find flak jackets.

The Ambush

The Kaladian sensors are primitive; the Engrinostli trap cunningly laid. No Kiton clan has ever used these small helicopter-like craft for war, though several clans carry them as taxis, messenger-carriers, etc. The buzzers lift from the ground and appear without warning at point-blank range from several boxcars. The Engrinostli plan is to down or damage at least half of the Kaladian caravan then quickly withdraw: if the undamaged Kaladian boxcars pursue them, then they must risk encountering all of the Engrlinostli caravan (12 more boxcars, and possibly more buzzers as well), perhaps fatally splitting the Kaladians.

There are at least two dozen buzzers. Have 1 D2 buzzers attack each player boxcar on the first pass. Have them fire their guns first, then their rockets, and resolve those attacks. Continue to attack until the player-boxcars go down, or until those particular buzzers are knocked out of the air. Then simply state that Uvugaru Mang's ship, on which the explorers are gathered, has meantime been hit by a gas rocket, and that the action must shift to there. The gas bombs hit, easily penetrate the boxcar's lightly-armored walls, and release thin, greenish clouds of vapor. All Kaladians aboard Mang's boxcar pass out; the boxcar automatically settles gently to earth when the deadman switch activates. Oddly, the explorers are still awake.

The explorers have some interesting options at this point. Though the gas is rather nauseating, it apparently

does not harm Known Space humans. The stalwart explorers might run away on foot, man the guns, or steal the whole boxcar and hope to get back to the starship after ejecting the sleeping owners, or try to re-establish radio communications among the Kaladians — whose common radio channel just now is choked by panicky shouts.

But remind the explorers of the clan oath. If the explorers do steal this gaudy, well-known boxcar, they probably should be captured in a few days by other factions of the Kaladian clan and sold as slaves to some perverse scientist seeking new species upon which to experiment. Kaladian survivors who catch up with the explorers will try to kill them out of hand.

While the buzzers continue to exchange fire with still-airborne Kaladians, the decoy Engrinostli boxcar has landed; any explorers peering out from the control section notice that many armed men are running from the large Engrinostli craft toward the several downed Kaladian craft, including the one in which the explorers stand. Beyond, they see that the other downed Kaladians are also surrounded by the clinging green gas, and that a fourth boxcar has crashed among the trees and is burning. The fight between the remaining boxcars and the buzzers has moved beyond sight. Continual gunfire can be heard, though, and a successful Listen roll calls attention to several explosions up and down the river.

Any gunfire from the explorers' ship sends the Engrinostli boarders scurrying in panic, and brings their whole operation to a stand-still — it was not part of the plan that the captures be resisted by heavy weapons fire. There is no cover but sapling trunks in this open forest. Gunfire directed toward the Engrinostli boxcar, the ramps of which are wide open, immediately ignites internal fires. Until they can close their ramps (which will take at least ten impulses), the Engrinostli boxcar takes damage directly to hit points if the explorers aim for the open doors. Any buzzers passing over will also be surprised if fired at, and will not fire or dodge until first hit.

The plans of both sides have fallen through, and both sides have had many killed and wounded, and lost capital goods and vehicles worth many months of trade. The other Engrinostli boxcars show up as the Kaladian scout and picket cars return. The two factions glower at each other for a while in fine hominid style, declare a truce, and try to recover the wounded and arrange the dead for ghoul or vulture disposal. If the explorers have not been in a firefight before, this should be an exemplary experience.

Since the Kaladians in the lead boxcar are still unconscious, Malareet Igin from the scout section takes command. The scouts destroyed two Engrinostli boxcars and one buzzer without taking significant damage, holding back the Engrinostli main force long enough that the buzzers had to break off or be shot down.

The effects of the sleeping gas wear off after three hours. A chastened Uvugaru Mang weeps as he inspects the corpses of his clanspeople (there are 26 dead, including nine children). He takes their blood on his hands and declares that he no longer decides for the Kaladians; they must elect a new leader. Malareet Igin is chosen; she makes the 'singles' boxcar the new lead vehicle. An almost silent dinner is held that evening. Some of the clan salvage metal and guns from two downed buzzers which the Engrinostli did not find. In the morning, a few of them stay with one crippled boxcar, while another boxcar flies the more seriously-wounded clanspeople to a smallish town antispinward where the medical facilities are reputedly good. If the explorers go along on this side trip, they find that the town (named Bugits) has roughly the medical knowledge of a general hospital in 1950 United States, and no important medical supplies.

Aftermath

Malareet Igin calls a meeting. Everyone is worried, angered, or depressed, and Igin has difficulty breaking through the moodiness of the clan. The explorers learn that the caravan was shot up enough that they are going directly to the ruins of Kaladia to get parts, and there is much speculation that the Engrinostli got their gas rockets from the Nightjack proprietors of Kaladia, a point about which many heated arguments occur. While the point is of minor consequence to the clan, the explorers will get a chance to get their own vehicles more quickly.

The journey to Kaladia is across vast plains. Compensating for limping, damaged boxcars, the caravan's journey takes four days. Malareet Igin and Uvugaru Mang spend many hours talking, and Mang seems to be regretting his resignation. Mysterious, surreptitious conversations multiply, and formerly-friendly clanspeople begin to avoid the explorers. On the last day of the trip, they are shifted without explanation from Mang's boxcar to Igin's lead ship. During the trip, Malareet Igin (or Woggo, if he is used) answers explorer questions about Kaladia. Read out loud or photocopy the "Excerpts from the Tales." Treat each paragraph as separate; there is no necessary continuity between the paragraphs.

EXCERPTS FROM THE TALES

"When Ohjogo the Archmaker divided the world among his faithful, our ancestors received this region as their share. For a hundred times a hundred lives we lived here in peace and splendor. Then the Nightjacks attacked with terrible powers, and destroyed the wonderful city. They turned our people into dirt-hackers by means of the *yana* potion. Since that time we have been held in bondage and servitude by those who stole our heritage. They enslave us yet."

* * * * * *

"Ohjogo of the Free, who called himself Eliasor Eliasor Eliasor, returned to our ancestors in the time of my grandmother's grandfather. With his leadership, we Kitons regained a portion of our heritage. The Nightjacks in the cities agreed to supply us with machines and goods, each clan receiving rights to machines from various ruins. By oath, each must receive the same machinery, but it is clear that the Nightjacks have broken the agreement, for they have supplied the Engrinostli with armed buzzers and the strange mist."

* * * * * *

"When Ohjogo departed, the Nightjacks dared not break the agreement. But they erected the Forbidden Towers and threatened destruction to any who entered the ruins without the Peace Signal."

"We have long struggled against the Nightjacks, and our blood has returned ancient rights back to our hands. At the Hour of the Knife we will meet them in battle at the Glistening Forest, and triumph. Though that time is prophesied, no one knows when it will come."

* * * * * *

"The Peace Signal is a loud noise which emanates from the Waiting Place when a certain code is punched into the transmitter. Everyone must wear earplugs because it is so loud. When anyone enters the city without activating the signal, an army kills everyone."

"The Nightjacks are vicious, untrustworthy man-eaters. They lurk at night, shunning daylight because they cannot stand the purity of the sun. They eat only meat and will not cook it. They cannot use the machines which they hoard, but they seek to control us with them."

* * * * * * * * *

"They demand an awful tribute of five healthy adult slaves each time we speak to them. They eat the wretches, removing organs or cutting off limbs one at a time to keep the meat fresh. They have ways of keeping the wounded alive."

3. Nightjacks

The Kaladians casually reveal their usual procedures to the explorers. A negotiating party stops at the Waiting Place and hands out earplugs. Malareet punches in the code to start the siren, whose wailing pierces everyone's ears despite the plugs. The party proceeds down the Slow Road to the Rally Square, and waits until twilight abruptly falls. No lights are turned on, but the sirens stop.

Shortly after dark a gravelly voice echoes across the square. The players may make Search rolls while their explorers listen to an untranslated voice. If successful, the explorers spot a pair of creatures standing on a rooftop nearby, both with hands raised overhead and fingers extended. After a moment they stop speaking, then begin again in a voice translatable by the transdisks.

The creatures on the roof are Nightjacks (called Night Hunters and described in the Hominids section of this book). Use of enhancing gear or another successful Search roll indicates that these individuals wear tight clothing with a short cape. No colors are visible in the darkness.

"I am Porgalka Nambil, woman of the Hunters by Night. The Truce of Two Nights is begun. What gifts have you brought to us, as demanded by Eliasor Eliasor Eliasor? Where are the Five?"

The explorer adopted into the Kaladians and called "far-kin" now hears a voice in his head, as if by telepathy. If more than one explorer was adopted, ail the adopted explorers hear it, but only one (designated by the gamemaster) feels compelled to respond. The others feel like bystanders.

The voice rings, "Do you swear to aid me, with fair words, in a suit with others?" The explorers may well recall that they vowed to do this very thing in the adoption ceremony. The speaker of the voice is unclear.

Malareet Igin then states aloud, "This is our leader, Great Ones; this is the Speaker, High Ones; this is the one who directs us, Mighty Ones." She turns expectantly to the just-contacted explorer, as if expecting a comment.

The compulsion of the voice demands that the designated speaker do his utmost to comply with his oath. However, the explorer has little idea of what to say or of what is expected. But he knows he must speak. As he struggles to say the right thing, or to say nothing at all, his player must succeed with a CONx5 roll the first impulse, then a CONx4 on the next impulse, then CONx3, and so on until the player fails the decreasing roll. When the player fails, his explorer must say something. If the explorer still has no plan, he blurts out a stream of incoherent babble. Force the player to state what his explorer is saying without giving him time to prepare.

Alas, whatever the speaker-explorer says is inappropriate. As he babbles, the Nightjacks on the building move restively, looking at each other and fidgeting with their hands. After the explorer finishes, there is an embarrassed silence. At last the Nightjack speaks again.

"This is not the Truce of Two Nights. This is not the way to do business! No Five greet us, no gifts come our way. Begone quickly, for the doom is upon you now!"

At this all the Kaladians in the negotiating party dash for the boxcars, which have already lifted and crept down the Slow Road. Turret guns begin to blaze. The two Nightjacks on the roof instantly jump for cover as the low building shudders and splinters under the impact of hundreds of bullets. Take care here to understand what the explorers are doing and to start calling out impulses.

Moments after the shooting begins, high-pitched whines of electromagnetic stunners can also be heard, and a few Kaladians drop. Though none can be seen, Nightjack guards are evidently returning fire from prepared positions. The frustrated Kaladians let go with everything they have, filling the square with tracer bullets and ricocheting rounds. Ask the players what their explorers are doing.

There are mostly blank walls at the edges of the Rally Square. Whether they remain in the square or race to the boxcars, have the players make a luck roll for each of their explorers. A special success indicates that the explorer made it to a boxcar and got picked up. A success still means that the individual was struck by a Nightjack stun bolt and dropped unconscious to the pavement. A failure indicates that the explorer was struck by a ricochetting turret gun bullet which does half rolled damage, and a special failure indicates that he was struck by a turret gun bullet doing full damage. The explorer that was "spokesman" is automatically struck by a Nightjack stunner bolt — possibly six or seven! Since the clanspeople within the boxcars can safely ignore stunner fire, the boxcars methodically pick up all the clanspeople and far-kin in the square, then depart. The gamemaster should take care to make this as exciting as possible — attempt to make the players fear for their stricken characters, and worry about whether or not the Kaladians will be able to

PORTION OF KALADIA

This explanation includes information related by the Kaladians, information observed during the approach to the city, and deductions from any scouting done at a distance.

THE WAITING PLACE: a flat, paved area with a single small building which houses a sonic transmitter. Above it a single thin pole rises about 90m, topped by speakers which wail like 20th century air raid sirens.

THE FORBIDDEN TOWERS: six towers, each about 200m tall. They are reflective silver on the outside, impenetrable to sight, sound, or even Known Space sensor equipment.

SLAVE PENS: reconstructed buildings and yards house the miserable captives of the Nightjacks. They are kept here until devoured.

SLOW ROAD: the traditional route to reach the Rally Square.

RALLY SQUARE: the place where the Nightjacks meet with the traders to reiterate their agreement.

BOXCAR WRECKS: within the rubble of this area lie many semi-ruined boxcars. Aided by a successful Observe roll, explorers realize that the remains are those of a large factory.

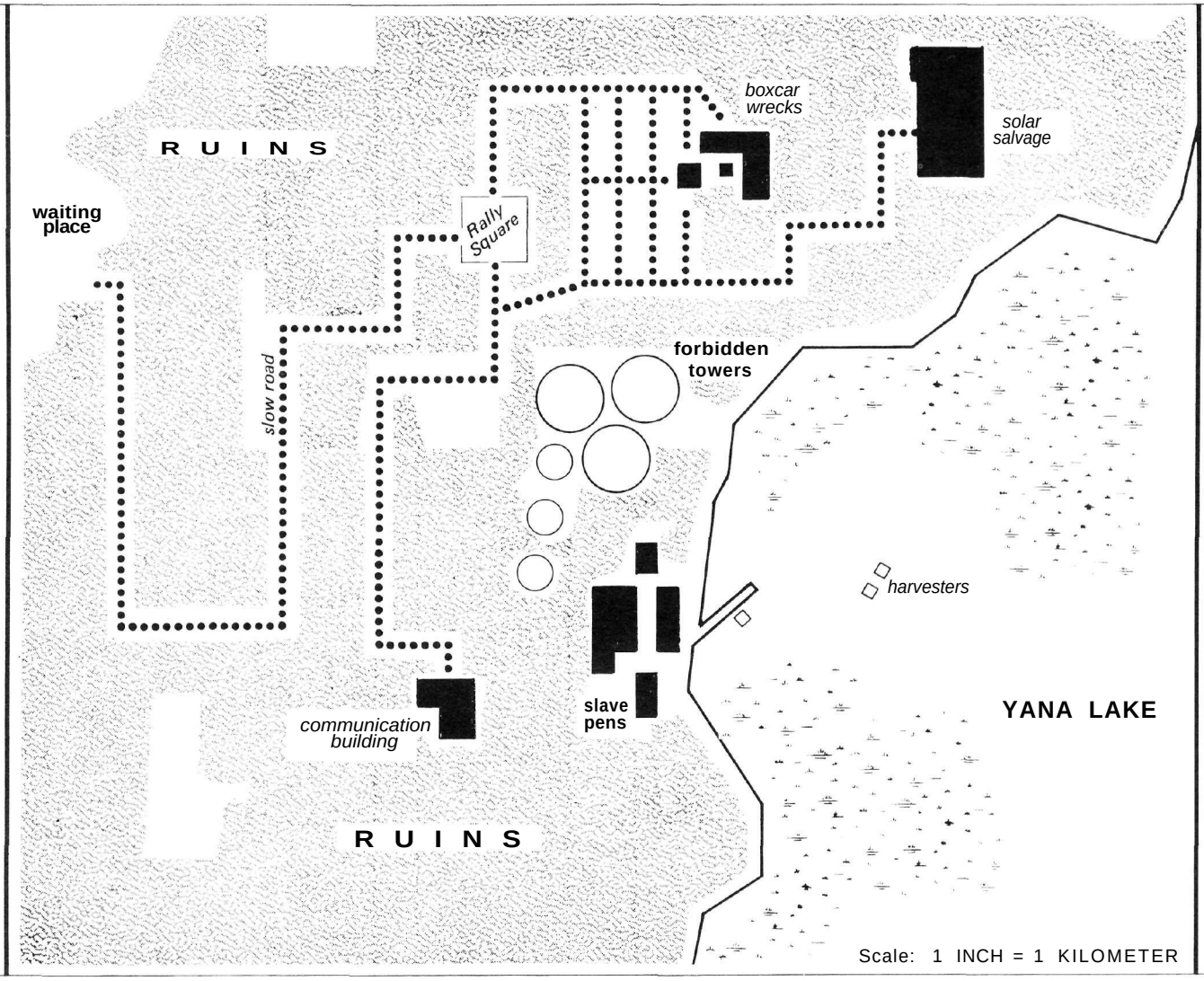
COMMUNICATIONS BUILDING: this ruin can be explored. From it come transdisks and many strange electronic parts.

SOLAR SALVAGE, a single, very large building with an intact roof made of a single piece of black plastic. With a successful Physics or Engineering skill roll (and perhaps a reasoning roll), an explorer may hypothesize that the roof is a single solar panel, potentially yielding a wonderful amount of power. From the interior come many of the machines salvaged by the Kaladians.

YANA LAKE: this islandless body of water is about seven km across and is roughly circular. Its surface is green and scummy.

HARVESTERS: several large machines float on the lake; inspection and a successful Engineering or Botany roll will reveal that they may be harvesting the weeds and muck. Occasionally a small flyboat zips from harvester to shore or back again. One, apparently unloading, is drawn up near the slave pens.

RUINS: most of the city is shattered. A survey of a few hours and a reasoning roll indicates that the damage was done by one gigantic or many smaller sonic blasts.



KALADIAN CLAN RIFLEMEN

All the Kaladian Valley People gunmen have the same weapons statistics; their action rankings and general hit points differ. For the purpose of this scenario, a rifleman stops firing when he or she has taken damage equal to one-quarter or more of his or her general hit points (round fractions up); he or she then attempts to move to the nearest boxcar and escape.

weapon	*skill*	*range s/m/l*	*damage*	*energy*	rate of fire	*magazine*
Projectile Rifle	45%	20/60/180	1D10+2	self-powered	1 round /4 im	8 rounds

RIFLEMEN	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Action Ranking	3	3	3	4	4	4	4	4	4	5	5	5	5	5
General Hit Points	20	24	18	21	20	16	25	26	19	22	20	28	21	33

rescue them. Make sure they notice that, though the designated speaker was struck by the bolts, Malareet Igin escaped scot-free.

Council of War

Ten kilometers beyond the city, Malareet Igin calls a meeting of the clan. Assume that any explorers hit have come awake, groggy and grouchy. All the Kaladians are gleeful and excited. "Now they did it. Now they broke the truce. Now they fall." the Kaladians say. Malareet Igin yells that the treacherous Nightjacks prefer the Engrinostli. No one seems surprised.

Call a halt to the adventure for a moment to learn just how the explorers are feeling. They probably realize that this dangerous episode seems to have been pre-arranged, and that at best, the explorer spokesman was an inglorious dupe left to fend for himself while bullets flew. Give the players a chance to talk. If they decide that their explorers feel cheated and betrayed, and a bit bewildered, they are being true to the situation.

Malareet Igin, Uvugaru Mang, and the other adults brush off the incident, saying "The Nightjacks are treacherous and unreliable. Prepare yourselves for battle." and continue their own preparations. "On to the slave pens!" cries Malareet Igin. As one, the boxcars rise, circle far beyond the city, then sweep across the lake from the right of spinward toward the buildings at the edge of the water.

"You are in my group," Malareet Igin tells the explorers. "Stick close, shoot straight."

The Slave Pens

Woggo or anyone explains to the explorers that the clan is attacking the slave pens to liberate the hominids still alive. "Everyone fears what we will find," implying that corpses and skeletons and ghastly refuse litter the area.

The swooping caravan is not fired upon. As they near the shore, the Kaladians congratulate themselves, saying in effect that the foolish Nightjacks were not expecting a raid from this direction. When near the outer buildings, many boxcars stop and lower their cargo ramps. Fighters pour forth and dash inside several of the slave pen buildings. Others kneel beside the ramps, firing parachute flares into the sky, boasting that "The Nightjacks will be blind under such stars!" In the glare, explorers notice other boxcars watching further offshore, their turret guns pivoting, ready to close and do battle at call. Further off, several boxcars have landed beside a large building "where everything has been stored," according to a guard. A successful Anthropology roll suggests that this phase of Kaladian life is well-practiced and keenly enjoyed.

Malareet Igin and the explorers wait for a while until runners return with reports; the thick walls of the slave buildings have made walkie-talkies useless. Calls from the other boxcar landing unit say that nothing but ammunition and some hand weapons have been found at the storage buildings. Astonished, Igin is silent. Then news comes from inside the slave pens.

"They won't come," pants the first runner. "They are thralls of the *yana*. What shall we do?" Now Igin is completely taken aback. She thinks for a minute, while second and third runners arrive with the same news. "Wait here," she growls at last to the explorers, "Don't move from here." She turns and, with all the runners, dashes through one of the slave building doors.

The gamemaster should ask the players what their explorers plan to do now. Though the boxcar is guarded, they are free to move and can do anything they want. If they hesitate, announce a temporary halt to scenario time and discuss how the explorers feel right now. If the players hesitate, assist them. Are they optimistic? How do they fee] about their clan friends now? What do they think has happened? What do the Kaladians intend to do? Do they have doubts about the course of the action? If they do, try to tempt them into following Malareet Igin and her runners — otherwise they can simply stand there like dummies. Or they can kill a half-dozen clanspeople (some of whom they like), seize a boxcar, and attempt to pass through the outer ring of supporting attack boxcars.

Advise against seizing a boxcar. Any explorer who has flown a boxcar, fired a turret-gun, or otherwise participated in a fire-fight knows that it is dangerous to try to flee past other alert boxcars. Several explorers are likely to die during the attempt or the escape. If the explorers ignore good advice, several alert guards within the boxcars will open fire, possibly damaging the boxcar, but the explorers should be able to escape by flying down an alley.

Without being pedantic, remind the players that it is perfectly possible to be shot or burned to death in Known Space — explorers do not have to travel 200+ light years to Ringworld for that dubious treat. If an explorer must die, attempt to cause it by something special to Ringworld. But if the explorers insist upon a crackling good fight, give it to them. If the explorers lose and any survive to surrender, let the Kaladians pull them apart with their bare hands for such naked, uncivilized, non-mercantile, anti-Kaladian treachery.

If the explorers do nothing, they hear heavy gunfire (punctuated by screams and moans) from the direction which Malareet Igin took. This goes on for most of a minute — drag it out, allowing the players at any time to change what their explorers are doing. If the explorers adamantly do nothing, several Kaladians eventually reel through the doorway through which Igin passed; they are blood-spattered, wild-eyed, and laughing hysterically. "Malareet's right!" one giggles, "Only thing to do!" Go directly to the section headed "Realization", below.

If the explorers follow, they can go undetected and unhindered. The door opens into a long hallway. Voices come from ahead.

Within a large, glass-doored room, Malareet Igin and some armed Kaladians face perhaps a hundred hominids. Most are Valley People, many are Grass Giants, and a few are Hairy Ones. All wear simple shifts. Most stand, facing the Kaladians with raised hands, fingers outstretched. They hum a wordless, rhythmic tune. Some of the hominids wave tree parts. Explorers receiving a reasoning roll see that the fronds are the same type which Malareet Igin waved on first meeting the explorers.

Malareet screams something which the transdisks cannot quite catch. The hominids continue to wave, weave, and hum. The Kaladians open fire, methodically volleying and reloading until every hominid before them has fallen to the floor. If the explorers flee, go to "Realization," below.

If the explorers happen to open fire on the Kaladians, those worthies lurch through an opposite door, holding their wounds, leaving behind the fallen. The explorers should realize that they can easily be caught in the hallway, and run.

Realization

The beliefs and the policies of the Kaladians are at odds, trapping the entire clan. Even if the Kaladians argued for hours or weeks, they might not admit that they have attacked the Nightjacks hoping to get the same weapons with which they imagine the Nightjacks have equipped their clan rivals, the Engrinostli.

The Kaladians have broken the agreement which created and maintained their boxcar caravan; this may mean that the existence of the Kaladians as a caravan clan is doomed.

But the clan pretended that they attacked to free the prisoners of the Nightjacks. Previously, the Kaladians had simply thought that exchanging the explorers (non-kin) as captives for fine machines was a great bargain. Only when the Engrinostli threatened and killed many Kaladians did they decide to break the Nightjack "bonds." If the slave hominids refuse to leave with the Kaladians, it can only be because they are hopelessly drugged, and it is better to destroy them. But what now? The attack has failed to find weapons, and murdered the hominids which the Kaladians ostensibly hoped to free. Now the Nightjacks will surely refuse further trade, and soon hide the materials and devices which the Kaladians need.

The question which the explorers must answer to their own satisfaction is whether or not the Kaladians want any outside far-kin witnesses to this cataclysmic failure of policy? Do the Kaladians blame the far-kin for any part of the disaster — after all, things only started to go sour after the explorers were picked up. Do the clanspeople look narrowly at the explorers? Do they keep them away from the boxcars and toward conveniently-blank walls? Just how vicious did the Nightjacks prove to be? Do Woggo's stories of assassins, treachery, and clan wars come to mind? How secure are the explorers' lives when all around them the clan is wild-eyed, sullen, and pretending the irretrievable loss is a great victory? Any explorer receiving a successful Psychology roll may begin to speculate along these lines, as will any explorer whose player realizes the implications of what has happened.

Flight

If they are smart, the explorers should flee on foot, either down an alley or through the hallways of the slave pens. If they do not take the hint, within the night the Kaladians will try to disarm the explorers and stand them up against a wall "where you far-kin can be watched more easily." If the explorers still do not try to escape, within an hour or two more, the Kaladians will suddenly decide to kill them and open fire. This is not a carefully-organized execution - the Kaladians will just start to shoot. The explorers should feel as though they are in enormous danger, but some, perhaps most, should be able to escape.

As said before, the explorers should be smart and run. Perhaps Woggo can join them or warn them. Any pursuit by the Kaladians is both close and cautious; running fast, the explorers easily make their way to deserted nooks in the ruins which only a full-scale search could uncover. To the Kaladians, out of sight is out of mind; they'll be glad to tell favorable stories about the aliens who saved the day, then left when the great Kaladian triumph was assured. The circumstances of departure never will be mentioned, or perhaps even consciously understood.

Once secure, allow the explorers to take stock and to discuss their options. Remind them that they are armed, and that it may be possible to deal directly with the Nightjacks. Let them consider the alternatives before the Nightjack patrol approaches; if they decide to seek out the Nightjacks, let them initiate contact. If not, let them sleep: the one left on guard can inform them that the glare of flares (still floating in the sky) reveals several figures approaching, and that they arc not Kaladians. Give the explorers time to prepare themselves, so that no one acts rashly.

A figure steps into the open and raises both hands. A voice grinds through the transdisk on its chest. "The Four Dialects of Peace descend upon me. I am Zarang Nambil, man of the Hunters by Night. Peace I give you. Peace I ask."

If the explorers respond in kind, several more Nightjacks reveal themselves. Most carry heavy weapons of an unfamiliar type, but refrain from pointing them at the explorers. Initial negotiations are first hesitant, then more confident. At last the emissary states that Kaladians are coming, and that everyone should retire to safety. The explorers are guaranteed safety and may keep their weapons. If the explorers do not agree to come, then sure enough a patrol of Kaladians comes running down the street, and if the explorers do not immediately run after the retreating Nightjacks, they will be left to engage in a firefight with twice their number of armed, blood-mad Kaladian warriors.

If the explorers agree to come with the Nightjacks, the party walks a short distance, enters a blasted house, then descends a basement stairwell clogged with trash. The stairwell leads to a door which opens when a Nightjack places his palm against the center. A wide clean hallway continues beyond, dimly lit by red lights.

Safety

After a half-kilometer, the tunnel ends in another security door which also must be palmed open. The explorers find themselves in a sparsely-furnished but comfortable room. The Nightjacks relax noticeably, lock their weapons into holsters or lean them against the wall, and look towards Zarang Nambil, their leader.

"Please relax," says Zarang Nambil, "Is anyone wounded or needy of assistance? My sister arrives soon; food may precede her visit. I see from your teeth you are omnivores. Does your meat need be dead? Is there some food you prefer which we might have?"

The room is 7 x 12 meters, with 4m-high ceilings. The players may attempt Observe rolls; if successful, the explorers notice that all the doors are also quite high. Four doors open into the room.

Zarang Nambil does his best to make the explorers comfortable and at ease. Wounds are tended with a substance resembling plastiskin. Seriously-wounded explorers are carried to the room next door, where surgeons cleanse the wounds and stop blood loss (they cannot administer antibiotics to an unknown hominid species).

The food proves to be varieties of raw vegetables, steamed fruits, and ground meat patties with different spices. Some servants bring in small cages which contain little pink-furred rodents. The Nightjacks dabble at the fruit and vegetables, and unselfconsciously extract rodents. The neck is deftly snapped, its head bitten off,

and then the rest of it is sucked and crunched until the whole animal is neatly eaten, with not a drop of blood spilled.

Be sure to ask the explorers' reaction to this way of taking food. It is clear that the Nightjacks do it all the time. If even one explorer seems to be distressed, Zarang looks about to seek the reason, rushes to comfort the explorer, and then snaps orders to the others, who quickly clear the animals from sight.

Porgalka Nambil arrives and is introduced. She is polite and neat, precise and penetrating, candid and open. She asks who the explorers are, what they think of the Kaladians, and what their intentions are. She answers the explorers' questions as well, but make sure the conversation is mostly hers. If the explorers become hostile or belligerent, she withdraws with her brother and leaves the explorers locked into the inescapable room (only a Nightjack palm will open any of the doors). They return and repeat the procedures until the explorers become calm and agreeable.

After she determines that the explorers are not up to mischief, she invites them into the tower, and conducts them to the main living area.

THE NIGHT HUNTERS

Read the general Night Hunter (here called Nightjacks) description among the hominid section of this book; there is an illustration of this species there as well.

The Nightjacks of Kaladia are pacifistic. Their only weapons arc stunners. They preach and follow non-violent behavior based upon the instructions of their great teacher Eliasor Eliasor Eliasor, which they feel leads everyone to a better way of life.

They revere Eliasor Eliasor Eliasor as a prophet who apparently had powerful psionic abilities now no longer understood. Eliasor Eliasor Eliasor taught individuals to activate latent natural psionic abilities, but his method is known only for Nightjacks. Thus, many of the Kaladian Nightjacks have psionic powers. For instance, Porgalka Nambil is empathic and can sense the emotions of most hominids, though she admits that the explorers, for instance, are harder to read. She also volunteers that several leaders of the Kaladian Convoy are independently powerful psionics; she does not know the origin or particulars of those powers, but the explorer-spokesman at the Rally Square may well deduce that his babbling was forced by a Kaladian psychic.

Forty celestial cycles ago, Eliasor Eliasor Eliasor established this colony as one of a network of similar colonies. But shortly after he left to continue his work elsewhere under the Arch, other folk seized or made demands upon Eliasor's missions. The Nightjack followers at Kaladia decided upon a scheme to slowly change and retrain the hard-pressing Kitons. The slaves which the Nightjacks were paid each visit were introduced into their work force, taught the ways of Eliasor Eliasor Eliasor, and placed on a maintenance program of *yana* drug. Eventually a large-enough community could be built that everyone could be secure.

Porgalka Nambil conducts the explorers on a tour. Underground tunnels connect the slave pens with the Six Towers. Other tunnels in the ruins also are used.

The explorers are invited to speak at length with any slave who are actually treated more like soldiers in a gentle, weaponless army. The former captives arc happy to be where they are, are resolutely devoted to the way of Eliasor Eliasor Eliasor, and express sincere pleasure at their way of life. Their food is better and more plentiful than in the old life, their existences more peaceful and stable, their leaders more intelligent and capable, and their purpose in life clear for the first time.

If an explorer comments on their semi-glazed expressions or feels (even without stating aloud) doubt concerning their sincerity, then Porgalki Nambil speaks, "I sense your doubt. You recognize symptoms of drug indoctrination. Believe me, these friends who were brought to us are sincere. I could not treat them without sincerity." The explorers must decide whether or not they think this Nightjack policy appropriate. Any successful Psychology or Anthropology roll indicates that the Nightjacks do seem to believe that they work for the best.

The six towers are transparent viewed from within. From the top the explorers can see Kaladian boxcars prowling about the ruins.

Living quarters fill the tops of the main buildings. Most of the central floors arc devoted to animal-raising pens for some two dozen species of rodents, each favored for some specific trait or flavor. Their food is mainly pellets which are processed from plants harvested in the lake. The processor is on the bottom floor.

While their explorers inspect the animal cages, the players may attempt a Biology or Zoology skill roll. If successful, the explorers notice that many cages are empty and that many of the living rodents have lost patches of pink fur and are listless. If they comment, Zarang Nambil expresses admiration at their powers of observation, and asks if they know what disease afflicts their rodent hutches. It is slowly destroying all their breeding stock.

The Nightjacks also express great regret and sorrow over the massacre of the slaves. If asked about retaliation, they state that they'll do nothing but maintain the ancient rules. "The deeds of the Doer attract justice."

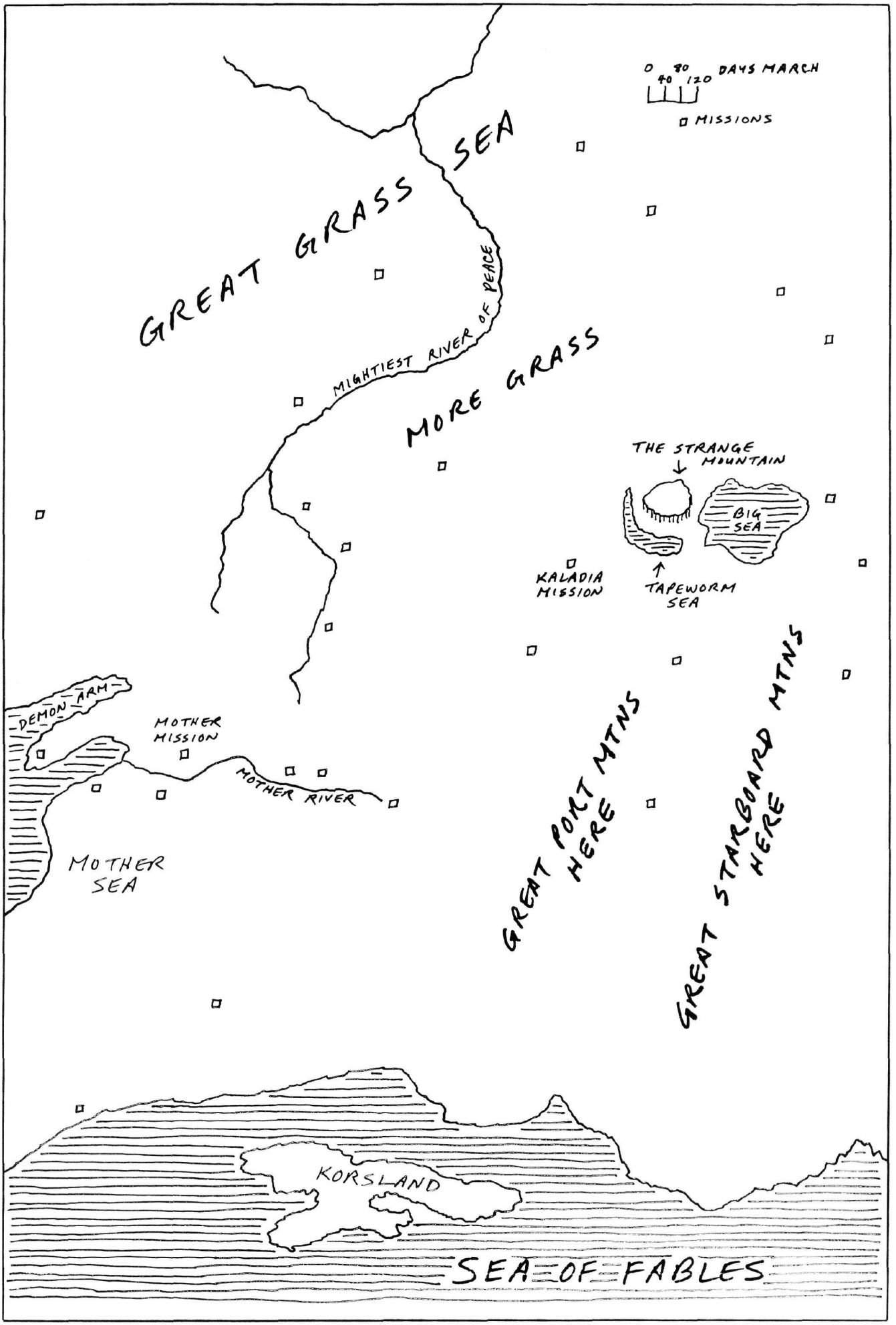
The explorers can also survey several underground storage rooms where much boxcar-part salvage, weapons, and signal materials lay on table after table. The Nightjacks notice that the explorers show great interest in this material. "I regret that we cannot give you the parts you seek," they say, "But Eliasor Eliasor Eliasor insisted that everything be bought with the proper price. Had you known the ritual of Truce of Two Nights you would have access to the ruins."

The explorers notice that the ruins seem to hold nothing resembling the Engrinostli gas rockets which the Kaladians wanted so badly. If asked, Porgalka Nambil says she knows nothing of buzzers nor gas rockets. She will, however, get as much information as she can, and thank the explorers for the news.

The tour takes the whole day. When eating time nears, the Nightjacks discreetly slip off to devour their animals if the explorers previously had expressed disgust, shock, or other negative emotions.

Eliasor Eliasor Eliasor

Porgalka Nambil takes the explorers to a library if they ask for more information about the great prophet, Eliasor Eliasor Eliasor. "This is all I can teach of the Prophet," she says, "The rest is up to you."


0 40 80 120 DAYS MARCH
MISSIONS
GREAT GRASS SEA
MIGHTIEST RIVER OF PEACE
MORE GRASS
THE STRANGE MOUNTAIN
BIG SEA
KALADIA MISSION
TAPEWORM SEA
DEMON ARM
MOTHER MISSION
MOTHER RIVER
MOTHER SEA
GREAT PORT MTNS HERE
GREAT STARBOARD MTNS HERE
KORSLAND
SEA OF FABLES

The viewing room is a large transparent dome open to the sky. The floor is composed of living plants which feel to bare feet like silky warm fur. Pleasant odors linger on the air, hauntingly familiar and tempting. In the center, a meter in diameter and raised a meter from the floor, is a shining cylinder. The Nightjack passes her hand over the top of the cylinder, muttering unintelligible code words, then steps back.

A holographic image forms above the cylinder, rotating slowly. A cross-legged man sits calmly on air, peering out. His bright red skin has many darker freckles. Patches of hair sprout irregularly from his body and face. A mechanical device, like a speaker, rests on his chest, and a thing like a gun barrel sticks from his forehead. His skin is scarred; belts of small blue circles ring his waist, chest, neck, and forehead. Call for Search rolls; those benefiting from successes see several irregular protrusions under the skin of his arms, a faint network of blue veins across his chest and back, and notice that the scars on his back regularly undulate.

"I am Eliasor Eliasor Eliasor, son of folk and sum of folk. Teacher and learner, I wander ten thousand years."

As he continues, his voice dwindles and a telepathic projection replaces it. Throughout his talk, the prophet's demeanor is dispassionate, calm, and radiant.

"I was sent by those who made the Circle of Life — to walk it, to take of it, to learn from it, to grow within it, and to heal it of the inner pain which all who live must know.

"That pain comes from this. Though love solves all problems and soothes all conditions, love cannot be sought. All who seek love must desire it; it is so arranged beneath the Arch that never, therefore, can seekers attain love — only their desires. And who can master their own desires? Those who try must be the slaves of desire. But some forget love and the desire for love, and act for fitness of deed. They then know love; to those holy ones, love is a faint light shining from them: they are glad love gladdens others, for life is difficult, yet they feel much which is greater than love.

"Love is like sparks thrown off by the furnace of the soul. The child in us seeks love in those moments when it tires of seeking the base of the Arch. Adults obsessed with love become cruel." Eliasor Eliasor Eliasor then tells how life is made up of the four dialects — doubtful definition, actionless action, mobile essence, and centerless being — and how coherence occurs only on the cusp of contradiction. After a time, Eliasor stirs, stops rotating, and peers at each explorer. "And so the way of life must be the way the heart commands, for in no other manner may the soul best cohere and shine, and without that radiance all that is best in us seems mere accident, which makes our fellows hate us.

"Well, I have told no secrets. Is there more you would have of me?"

Explorers may now ask questions, and the optical circuits of the computer reply, if they hold the answer. Eliasor Eliasor Eliasor has traveled millions of kilometers, encountered innumerable hominids and animals, and recalls much of everything. The holographic record within the cylinder contains everything the prophet remembered when he made the recording.

Conveniently for your campaign, Eliasor Eliasor Eliasor remembers every desirable clue. For instance, he certainly remembers taking the longevity drug, and might remember some nearby landmark as well, but probably doesn't recall exactly when or where. Other tantalizing replies to likely questions include "I have met others like you humans. They said they came from Earth, which lies within a great sea." or "I learned who made this place, and why, in an ocean land where ships sail over the edge and fall to destruction, and sail between the 87 isles. You must discover the reasons for yourself."

Gamemasters may wish to use the teachings of Eliasor Eliasor Eliasor, as interpreted by the Nightjacks of Kaladia or other cultures, as a resource in many adventures.

Save-the-Rodents Research Project

If the explorers can cure the rodents (called "pinkies" in translation) they can use the cure to pay for salvage rights among the ruins. The idea is acceptable to the Nightjacks, and they place their facilities at the explorers' disposal to aid in the research. Unless the explorers are completely incompetent or lack the necessary skills, they should be able to solve this problem. Give them the time they need.

GOAL: cure the affliction haunting the pinkies.
ACTIVE SKILLS: Biology or Zoology, Search
STEPS: 3

Step 1: the explorers attempt to isolate and establish control groups. They may think to ask if any rodent hutches have been unaffected, or a successful reasoning roll may remind them to ask this. They can find that one rodent farm in the spheres has not been touched by the plague. If they isolate the hutches here, they will have a control group with which to test and re-test hypotheses. Establishing procedures which allow the rodents to be fed, yet which create as sterile a barrier as possible, take 150 man-hours. Urge the players to be creative in the establishment of the sterile barrier: UV, sound waves, full-body wash, antiseptic solutions, etc. Remind the explorers that the Night Hunter have many Valley People slaves, some of whom are expert animal husbandrists.

Step 2: once a reasonably-sterile barrier has been created, the control group is safe. Successful Biology and Search rolls (one of each is needed) allow comparison of the rodents, their cages, their food, and anything which contacts them. A second successful Search roll detects a small flea-like parasite living in the fur of afflicted rodents; it is not present among the control-group rodents. This painstaking examination takes 250 man-hours and a minimum lapsed time of 12 days. If blood-test equipment is available (the Nightjacks lack this), antihistaminc levels in the afflicted rodents seem to be unusually strong.

Step 3: with a successful Biology or two successful reasoning rolls, the explorers learn that the small insect is easily killed by contact or proximity to grain alcohol, that its eggs do not hatch when coated with a standard Valley People fungicide; applications of ultrasonic waves also keep it under control, as does systematic hutch hygiene, and merely washing each rodent every few days. There prove to be many routine measures available to the Nightjacks. This takes 50 man-hours to determine.

It may be hypothesized that the bite of the parasitic insect in some way had begun to upset the typical rodent immune system, decreasing the ability to fight off low-

level diseases. Perhaps the not-very-clean Kitons unwittingly left the new insect on the fur of a Nightjack, who in turn brought it to the rodents, which the insects thought tasty. During the course of the operation, the explorers will also discover that the Nightjacks know little or nothing about biology or zoology, except for medical techniques and harvesting. They also lack the scientific method of investigation, working solely by trial-and-error. Hence the ease with which the infested rodents stymied their efforts.

The Nightjacks are very pleased by the explorers' success. They allow the explorers complete access to the ruins and give them an underground shelter as a workshop which will not be looted by anyone coming to perform the Truce of Two Nights. Several hominid slaves also are at the explorers' disposal for shifting heavy items.

To emphasize their gratitude, the Nightjacks provide a pair of laser heavy weapons (doing 3D10+20 damage per shot) which they had hidden from the Kaladians; they are sure that the wise explorers will not use these without great need. The gamemaster should determine the actual characteristics of these weapons as a compensating factor for the boxcar which the explorers actually build; the lasers definitely will outrange the Kiton turret guns.

Build-a-Boxcar Research Project

Constructing their own boxcar is tedious but not difficult if the explorers have the right skills. The explorers must determine their boxcar's design characteristics. Hint about possible variants: mounting extra armor to stop control section hits, reducing the size of the boxcar, doubling MAGLEV banks for more flying height or speed, scavenging electronic parts for adequate sensor systems, etc. It will have to be sturdy enough for a lengthy journey; the nearest spare parts will be thousands of kilometers distant.

GOAL: build a boxcar.

ACTIVE SKILLS: Atmospheric Craft, Engineering, Physics, Repair, Strategy

STEPS: 5

Step 1: the explorers must systematically survey the remaining technical resources of Kaladia. Everything they need is here, but finding the best and using it at the right time can be tricky. With a successful Strategy roll, this planning takes 60 man-hours. Without the roll, the process takes 150 man-hours. This survey also demands successful Engineering and Repair rolls; if one or both fail, then major portions of the design do not work when in place and tested. Repairing the items after installation takes 50 hours more if one roll is failed, and 150 hours if both rolls are failed.

Step 2: bringing the pieces together — the MAGLEVs, the batteries, the solar panels, the hull, the optical circuitry, the hull, etc., takes the explorers 1000 man-hours, but they can use as many as a dozen slaves to ease this chore. They must remember to ask for this help.

Step 3: installing all the gear, wiring, and testing it takes a minimum of 500 man-hours. Examine the hit location table for the Kaladian boxcars to remind yourself of some of the things which could go wrong. If one of the rolls in step 1 was missed, an industrial accident occurs, and a random hominid worker dies during the work. Though the Nightjacks will still be grateful to the explorers, after the accident no more slaves are provided for the explorers' use. Successful Atmospheric Craft, Engineering, and Physics rolls are required in this third step, as well as two Repair rolls. Each missed roll costs 50 man-hours before it can be tried again.

Step 4: at this point the craft is static-tested as a complete unit. This requires both a successful Atmospheric Craft and Repair roll, taking 100 man-hours, and an additional 50 hours each time a roll is missed.

Step 5: the boxcar is flight-tested, requiring a successful Atmospheric Craft roll. Each time the roll is missed, it costs 100 hours in trial-and-error trimming and balancing. If the roll succeeds at first, no extra time is taken. When the boxcar is finally ready, the explorers should adequately provision it.

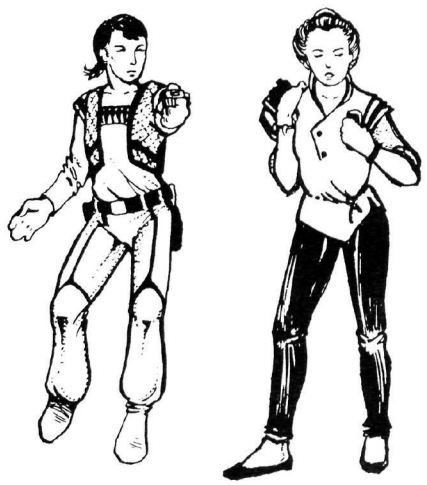
Departure

The explorers can leave when they wish. They are equipped with everything available. The Nightjacks supply a sketch map of the Eliasor mission-colonies which they believe to exist, but caution that the world is wide and their knowledge cycles old. This map is on page 78. Photocopy it and give it to the players; the larger-scale map on page 64 contains the true information. The Nightjacks also supply a florid letter of introduction — the explorers haven't a chance to interpret it.

The Nightjacks wave goodbye, calling out words of gratitude and encouragement as the boxcar lifts silently from the ground. Porgalka and Zarang Nambil call, "May life fit you well."

The boxcar ought to work well. The food is pretty good. The explorers should be in a fine mood. Choose whether or not the Kaladians or Engrinostli lurk about waiting for targets. If a caravan does appear, the explorers must decide what to do. They may be able to outrun Kaladians or Engrinostli; with their laser weapons they certainly out-gun them. Are the explorers still fearful, or will they let matters be? What is fitting? Did they learn from Eliasor, or from the Kaladians?

Allow this adventure to close with the explorers happily MAGLEVing in the direction of their starship.



ARCHMASTERS

Shadowswords and Seekers

Covenants without the sword are but words.
— Camden

Archmasters are robust hominids whose remote forebears the City Builders once bred selectively to form a hereditary warrior caste. Properly, City Builders (Engineers) and Archmasters (Half-Engineers or Half-Builders) are genetically-related subspecies, their bloodlines co-evolved from a common progenitor They are still able to interbreed. In appearance, though, they are distinctly different. Flatlanders find Archmasters physically imposing, and often strikingly human in appearance. The term Archmaster grew to encompass the professional order originally founded to defend and to advance City Builder interests.

Dispatched to distant lands by the ancient City Builder emperors, Archmasters spread widely, though thinly, over vast areas of Ringworld to pave the way for City Builder civilization. Though never numerous relative to City Builders, their physical perfection and superb training, and the backing of the godlike Ringworld "engineers," made the Archmasters a formidable presence where ever encountered. Their bearing, formal discipline, and code of honor marked them as bold, resolute professionals impossible to mistake for barbarian adventurers. Their way of life required military skills, an ability to select or create stable political structures among the lesser hominids, and a detailed knowledge of many practical crafts, local languages and customs.

Archmaster legions were empowered to bestow the title of their particular professional order, occasionally, upon carefully-chosen members of other species within their administration or dominion, especially when this proved politically expedient. Such distinction normally followed many falans' apprenticeship and training — and a proper initiation incorporating tests of honor and courage. With the aid of City Builder cross-species fertility drugs, Archmasters sometimes even interbred with local hominids. Consequently, Archmasters of various species and appearances are found in some regions.

Most species nonetheless still speak of the original, archetypal Archmasters: they were tall and heavily-muscled, weighing 1 00-1 50 kg, with broad shoulders and lean hips. Their skin was generally tanned deep bronze to nearly black. Naturally beardless but not bald, their hair was often worn to shoulder-length, the hairline shaping a noble brow. Their faces exhibited strong, angular features, with a resolute mouth and jaw. Though sometimes taciturn, they spoke with commanding clarity. They dressed simply, perhaps clad only in tunic, loincloth, or kirtle. They often carried no arms other than swords of dark, polished iron, steel, or City Builder *Shadow Metal* alloy, relying on their personal force of character and combat training. Female Archmasters were not uncommon — some of the most famous Archmaster epics sing of Athena-like women, whose grace, intelligence, and ferocity was unmatchable.

For ages, archmaster legions were an important facet in the ever-expanding City builder empire. Stationed in remote, often-barbaric regions dominated by primitive hominids, they provided a crucial buffer and important link between the magnificent urban oases and the outland frontiers. Species unimpressed by City Builder ambassadors and their advanced technology often were quite impressed by the brawny and forthright Archmasters.

Archmasters served as elite guards, soldiers, and naval commanders; as generals of primitive hominid armies; as local magistrates, constables, rangers, or gendarmes; as overseers and foremen of massive engineering projects; and as hunters and leaders of great expeditions. These dedicated half-engineers often set their lives to exotic tasks entrusted them by their distant City Builder lords, whose fabulous floating towers they might never again visit. In some areas the children of Archmasters became hereditary rulers of the lands claimed by their fathers (or mothers) for the empire.

Very rarely, Archmasters went dark, forgetting their honor and denying their origins, carving out personal empires. Some became ruthless conquerors, erecting giant statues, obelisks, and other monuments to their own prowess. City Builder historians speak of several famous civil wars fought against such opponents.

The Fall of Cities stranded most Archmasters far from the chaos of the shattered City Builder empire, in borderland provinces and outpost garrisons, or in lawless wilderness, isolated and unimaginably remote from their peers and lords. Over the passing falans, many foreswore their duties and became wanderers, adventurers and tale-bearers— knights errant, adhering to archaic traditions handed down and shaped by the centuries, colored by myths of strange origins and destinies.

Others, as determined to assist in the rebirth of their civilization as they had been in defending and promoting it, began epic quests in search of its legendary source — the ancient City Builder centers existing somewhere "at the base of the Arch." These Archmasters are sometimes called seekers, and lone individuals sometimes take the name Seeker. Traveling slowly afoot, by animal, or by water craft, Archseekers frequently have turned their strength, will, training, acquired skills, and slight knowledge of 'ancient magic' to the benefit of the hominid cultures through which they passed. Local custom, in turn, has often influenced these solitary searchers: some buy their mates, see slavery as right and natural, follow unusual diets, practice bizarre religions, and so on. Some have survived many centuries (a few, perhaps, since the Fall of Cities!) using massive doses of the Ringworld longevity drug — searching ruins for hidden caches of it, trading it, and occasionally killing 'evil magicians' for those unfortunates' hoards of the substance.

In some present-day locations, bands of surviving Archmasters (or of those claiming the title and tradition) serve isolated City Builder enclaves, local hominid governments, kings, and even mad despots. These latter-day champions are generally called Shadow-Swords, after a legendary legion of the ancient order. Distinct alliances of modern Archmasters, though are nearly always local in nature, have their own unique names — Shadow-Swords of Zrillar, Darkblades, Rimswords, Golden Legion of Flame, Swords of Sunfire, Defenders of the Empress of the Floating Tower, etc. Archmasters of these legions normally are content with the established order in their realm, and with their place in it.

Archetypal Archmaster Traits

Their great abilities notwithstanding, Archmasters are discernably less intelligent than City Builders. (it is unwise to dwell upon this among them, as their teachings hold them to be second only to City Builders in a few trivial respects, insignificant in light of their superiority in other areas.) Archmasters are also less socially-sophisticated, less shrewd at bargaining, and less adept at subtle political intrigue. Honest and forthright in the main, they often seem reserved, formally courteous, an stubbornly noble and courageous. Most live austerely, disdaining luxuries. While well-of communication — sharing to a degree the City Builder's natural skills in hominid languages and customs, culturally determined modes of thinking, and biological limitations in speech and perception. Their commanding presence usually proved an asset in opening negotiations, mediating disputes, and otherwise creating territorial order — but where it did not their duty was clear. Archmasters swore solemn and forceful oaths of allegiance; and the traditions of their service demanded lifelong, disciplined training in techniques of primitive combat, single and otherwise. Archmasters seldom were issued, or needed, advanced energy weapons. They were skillful, dangerous warriors: when no other choice was possible, their long swords of dark-gleaming metal dripped with blood.

For archetypal Archmasters increase these City Builder characteristics by 1D6 each; STR, MAS, CON, POW, DEX; decrease INT and EDU by 1D6. For most other hominid Archmasters increase all characteristics by 1D6. Such hominids are chosen for overall exceptional abilities.

2502

11 new hominids ▪ Ringworld vehicles hyperspace ▪ UNSS Calatorie de Soare (GP3) Thrintun, Tnuctipun, Pierin, and 3 other alien species scenarios: The Kaladians; The Sand Eaters

A Ringworld Supplement

LEAVING FOR RINGWORLD — A last view of the solar system from the edge of the Sun's gravity well. "The sky of deep space looked not much different from the lunar night sky. In the solar system the planets add little to a naked-eye view. One remarkably bright star glared in the galactic south; and that star was Sol." *Front-cover stars are a background pattern only.*

Different Worlds Presents

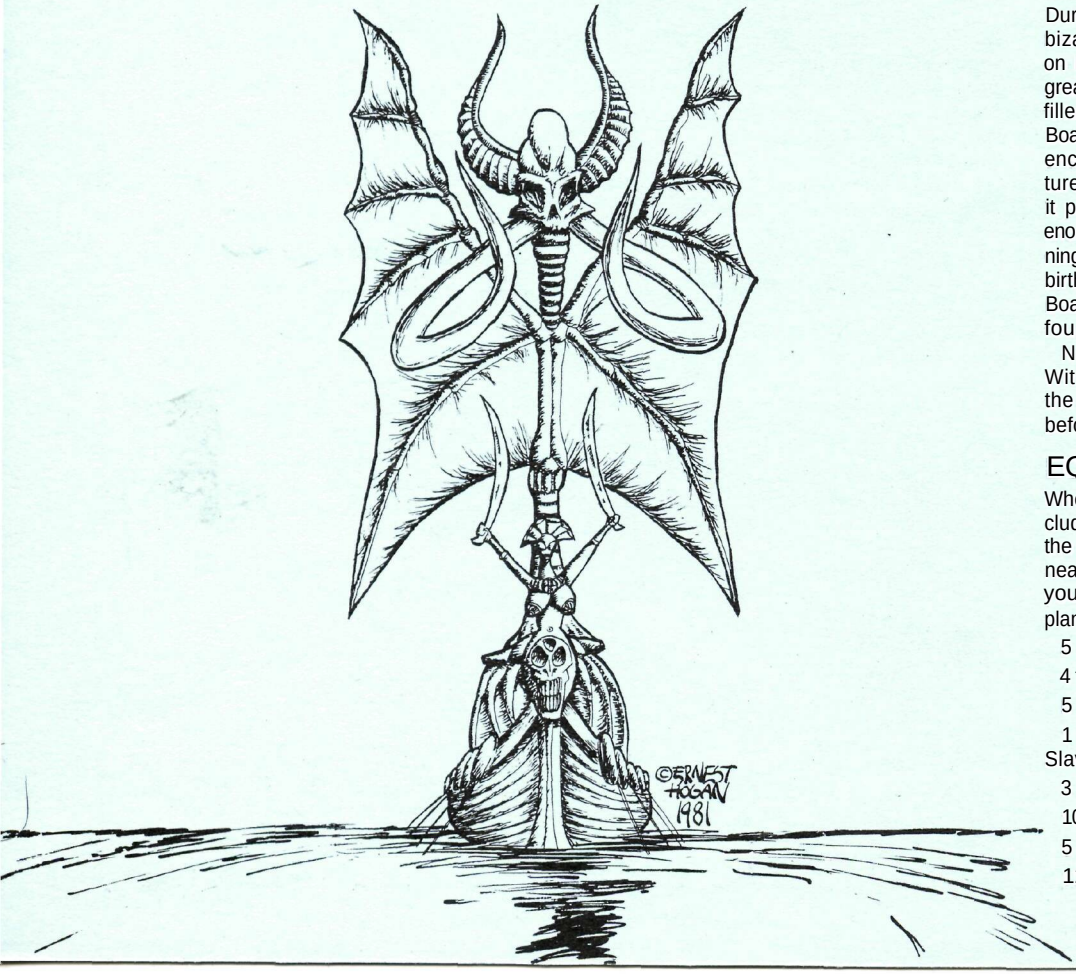
Special Ringworld Module

Louis Wu & His Motley Crew

By Ed Gore

Illustrated by Ernest Hogan & Lisa A. Free

This scenario is set on Ringworld's Great Ocean, between the Map of Mars and a map of an unknown planet anti-spinward of Mars. It is concerned with the adventures of Louis Wu, Chmeee, Harkabeeparolyn, and Kawaresksenjajok after the righting of Ringworld, as detailed in *The Ringworld Engineers.* Those who have read the book are familiar with what has gone before, and with most of the present situation. Those who have not read the book should talk to those who have.



PLAYERS' INFORMATION

Many years have passed since the end of *The Ringworld Engineers* book, the beginning of this scenario. Since the death of Teela Brown and the repair of Ringworld, you have done a number of things.

Most important of these was the repair and refueling of a Kzinti colony ship which was discovered on the Map of Mars. With this ship you set sail for the map of an unknown planet far to the anti-spinward. During this voyage you have seen myriad bizarre sights, including entire villages built on huge boats, riding the currents of the great ocean. It was at one of these that you filled out the crew, taking on many skilled Boat People to help run the ship. You also encountered one of the mammoth sea creatures rumored to live in this ocean. Luckily, it passed far to port, without coming close enough to become a threat. Near the beginning of the voyage Karkabeeparolyn gave birth to a girl, which, under the care of a Boat People nurse, has grown into a healthy four-year-old child.

Now your voyage is almost at an end. Within a few *falans* the ship should arrive on the unknown shore. With all that has gone before, who knows what might lie ahead. . .

EQUIPMENT

When the game begins, the ship's stores include the following items. It is possible that the Hindmost, still tucked safely away beneath Mons Olympus, may be able to supply you with more equipment, if it serves his plans.

5 40-point stunners (10 shots each)

4 flashlight lasers

5 25-point hand beamers (10 shots each)

1 Puppeteer digging tool (double-barreled Slaver disintegrator)

3 suits of Puppeteer-made impact armor

1000 square feet of super-conductor cloth

5 comdiscs

12 lift belts

PLAYER-CHARACTERS

The following are optional player-characters. Players should transcribe them **to *Ringworld*** character sheets before play.

CHMEEE

STR	31	Damage Modifier: 3D6
MAS	25	Health Roll: 42
CON	14	Reasoning Roll: 39
INT	13	Luck Roll: 39
POW	13	Dodge Roll: 66
DEX	22	Hit Points: 39
APP	13	
EDU	18	

Action Rank Rating: 2
Movement Rating: 5/impulse
Credit Rating: B

Location	D20	*Points*
Right Leg	01-03	12
Left Leg	04-06	12
Abdomen	07-10	12
Chest	11-15	14
Right Arm	16-17	10
Left Arm	18-19	10
Head	20	12

Skills: Atmospheric Craft 35% (Flycycle 48%); Bargain 72%; Climb 43%; Debate 68%; Fast Talk 43%; Flashlight Laser 69%; Handgun, Energy 27% (hand beamer 62%, stunner 69%); Heavy Weapon, Energy 27% (Slaver disintegrator 41%); Hide 39%; History 31% (human space 68%); Hyperdrive 28%; Interworld 90%; Listen 83%; Mathematics 31% (operational analysis 83%); Observe 81%; Orate 83%; Own Language 96%; Personal Flyer 35% (Lift Belt 42%); Psychology 72%; Reaction Drive 35%; Scent 50%; Search 67%; Sneak 46%; Strategy 54%; Theology 31% (Kzinti religion 62%); Track 59%; Unarmed Combat 60%; Weapons System 35% (laser cannon 47%)

LOUIS WU

STR	13	Damage Modifier: 1D3
MAS	12	Health Roll: 42
CON	14	Reasoning Roll: 48
INT	16	Luck Roll: 45
POW	15	Dodge Roll: 42
DEX	14	Hit Points: 26
APP	15	
EDU	27	

Action Rank Rating: 4
Movement Rating: 3/impulse
Credit Rating: A

Location	*D20*	*Points*
Right Leg	01-03	8
Left Leg	04-06	8
Abdomen	07-10	8
Chest	11-15	10
Right Arm	16-17	7
Left Arm	18-19	7
Head	20	8

Skills: Anthropology 43% (cultural 55%); Astronomy 40%; Atmospheric Craft 30% (flycycle 80%); Bargain 75%; Botany 40%; Debate 100%; Engineering 71%; Fast Talk 110%; Fine Arts 30%; Flashlight Laser 50%; Handgun Energy 29% (laser beamer 64%, stunner 70%); Heavy Weapon, Energy 29% (laser rifle 89%); Hide 42%; History 43% (human space 98%); Holography 58%; Hyperdrive I 70%; Mathematics 43% (applied 88%); Orate 90%; Own Language 90%; Personal Flyer 30% (lift belt) 60%); Physics 43% (nuclear 84%); Psychology 60%; Reaction Drive 30% (colony ship 50%, scout ship 90%); Search 75%; Sneak 40%; Swim 45%; Track 55%; Unarmed Combat 80%.

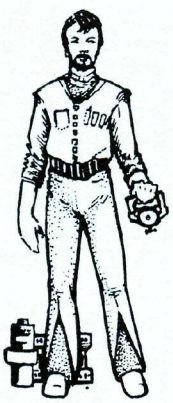
KAWARESKSENJAJOK

STR	10	Damage Modifier: —
MAS	9	Health Roll: 36
CON	12	Reasoning Roll: 45
INT	15	Luck Roll: 33
POW	11	Dodge Roll: 42
DEX	14	Hit Points: 21
APP	14	
EDU	9	

Action Rank Rating: 4
Movement Rating: 3/impulse
Credit Rating: n/a

Location	*D20*	*Points*
Right Leg	01-03	7
Left Leg	04-06	7
Abdomen	07-10	7
Chest	11-15	8
Right Arm	16-17	6
Left Arm	18-19	6
Head	**20**	7

Skills: Climb 29%; Listen 32%; History 21%; Mathematics 24% (calculus 53%); Physics 24% (Ringworld physics 37%); Own Language 75%; Personal Flyer 29% (lift belt 39%); Search 31%; Sneak 41%



HARKABEEPAROLYN

STR	8	Damage Modifier: —
MAS	9	Health Roll: 33
CON	11	Reasoning Roll: 42
INT	16	Luck Roll: 33
POW	11	Dodge Roll: 39
DEX	13	Hit Points: 20
APP	15	
EDU	12	

Action Rank Rating: 4
Movement Rating: 3/impulse
Credit Rating: n/a

Location	*D20*	*Points*
Right Leg	01-03	6
Left Leg	04-06	6
Abdomen	07-10	6
Chest	11-15	7
Right Arm	16-17	5
Left Arm	18-19	5
Head	20	6

Skills: Climb 33%; Listen 25%; History 12%; Mathematics 28% (calculus 67%); Physics 28% (Ringworld physics 47%); Own Language 80%; Personal Flyer 29%; Search 41%; Sneak 24%

1 Human/Kzinti food processor

1 80-point laser cannon

2 vacuum suits

1 stepping disk (connects to the crew quarters of *Needle)*

1 ship's doc (this will not work on the natives)

2 pair vance goggles

100 boats capable of holding 100 persons each

1 spool containing 1 mile of Sinclair monofilament

20 lumes

100 years food for 500 people

7 years fuel

misc. items, such as analytical equipment, etc.

GAMEMASTER'S INFORMATION

The purpose of this scenario is to allow an introduction to the *Ringworld* game system using characters familiar to those players who have read the books ***Ringworld*** *and* ***The Ringworld Engineers.*** Those who have not read at least one of the books will have a more difficult time playing, but should be able to survive with help from players familiar with the books. If you have more than four players, then allow the extra players to play Boat People, Ringworld natives who make up most of the crew.

When the scenario begins, the explorers' ship, the *Tee/a Brown,* is less than a month from a 'map' of an unknown planet. After arriving, the explorers will be confronted with a strange, dead world. Investigation further inland will reveal ruined cities, and thousands of recently slaughtered corpses. Proceeding inland, the explorers will come upon small settlements. Here refugees and survivors will be able to shed light upon much of what has occurred, if the explorers can gain their trust.

The final part of the scenario deals with the explorers helping the natives throw off the domination of the shore-dwelling City Builders.

Part One:
ARRIVAL

Before beginning the scenario proper, allow the players to read the Players' Information and the Equipment section. Then, since they are still nearly a month away from the map, allow them some time to get into their roles. Play out a couple of shipboard encounters between the crew members and allow them to communicate with the Hindmost back on Mars. Then proceed to the adventure proper.

When the explorers come within sight of the map, the first thing they will notice is a huge wall of *scrith,* nearly a mile high, which appears to surround the island. If they attempt to sail around the map, they will travel for nearly a month before they see anything other than the *scrith* wall. After traveling for a month, one of the Boat People on watch will cry out. He will race to the bridge and report that there is some sort of opening in the *scrith* up ahead. After an hour of travel, the ship will pull up before a huge tunnel, leading through the *scrith* into darkness.

THE TUNNEL

The tunnel is about a quarter of a mile in diameter, and is half filled with water. The Kzinti ship can enter the tunnel, though there is little clearance. The walls of the tunnel are made of *scrith.* Once inside, the explorers may illuminate the tunnel by placing a dispersing lens over the laser cannon, creating a sort of super flashlight. If the players fail to think of this, have them try Reasoning rolls, or if they are in communication with the Hindmost, have him suggest it. After the ship has traveled ten miles, the beam will fall across what might at one time have been a huge air lock of sorts, though now it lies in ruin, apparently blasted by some great explosion. If anyone makes a successful Observe roll, they will notice that the explosion was recent; no more than a month ago. Continuing, they will travel on another mile or so, and the ship will run aground.

After inspecting the damage it will be seen that the ship has run into a 'reef of foamed *scrith,* about fifty feet below the surface. The mass and inertia of the ship has caused it to ram almost fifty feet into the *scrith* before stopping. The Boat People will say they cannot dislodge the ship. The foamed *scrith* has excellent traction, and the ship is wedged very tightly. The Boat People estimate that it would take months, maybe years to unstick the ship.

Part Two:
CASTAWAYS

The five-hundred-odd Boat People who comprise the crew will immediately begin to work at freeing the ship. The explorers may find themselves feeling rather useless at this point, since none of them knows very much about ships. This is intended. If the explorers do not decide to explore ahead on their own, have the Hindmost suggest that it would be the best way to spend their time while waiting. After they have chosen their mode of transportation, and chosen any others to accompany them (player-character Boat People?), proceed to part three.

Part Three:
THE NEW WORLD

The explorers continue down the tunnel nearly fifty miles before they see light ahead. The tunnel bends sharply, then suddenly sunlight appears ahead. Less than an hour later they leave the tunnel. Behind them they see the tunnel, like a tube extending to the horizon, above which they can make out the top of the *scrith* wall. Ahead the explorers see land. The land is covered by a lush orange and purple jungle, and looks, if not hospitable, at least not forbidding. Chmeee may notice a resemblance to the jungles of Kzin. After a day's sailing the explorers will reach the shore. (Or if the explorers chose to use lift belts, nine hours. In the future always assume that the lift belts take % the time sailing does, and are five times as fast as walking.) They may set up camp on the shore, or just inside the jungle. It makes no difference, there will be no trouble tonight.

When the explorers wake, Chmeee will notice a sound coming from the shore. Anyone rushing there will hear a splash, and see a ripple in the water, as though a large fish had just jumped from the water, and fallen back. Nothing else out of the ordinary will occur.

The explorers may now begin their exploration in earnest. Refer to the Map of Mruf and allow the explorers to wander. If they wander for more than a day without coming upon anything of interest, roll an encounter on the encounter chart, or better yet, invent some small event of your own to create a bit of excitement. Make sure, however, that you don't stray too far from the main storyline, or reveal anything important too soon. Make sure that the explorers find a ruined village relatively quickly. If they explore for more than two days without finding one, make one appear right along their path to speed the scenario along (unless they enjoy walking in circles, in which case by all means allow them to continue).

When the explorers find a village, go to section four.

Part Four:
RUIN

As the explorers approach the village, it will become obvious that no one lives there, though someone did until quite recently. Roll 1 D6, the result being the number of days since the attack on the village. If the result was a one, tell the explorers that as they approach they can see wisps of smoke coming from some of the huts, and Chmeee's sensitive nose can smell blood, which is almost human, and something else, something slightly distasteful. Occasionally a cry will split the air, though it does not sound quite human, or for that matter quite like anything the explorers are familiar with.

When the explorers enter the village, they will see death everywhere. The bodies of City Builders, and a few other, less familiar species, lie all about. More prominent however are the bodies of what must be the natives. The natives are humanoid, and measure about five feet in length and are very heavy. They are amphibious and covered with smooth, slippery skin. Most of the dead natives died of gunshot wounds, while the dead hominids are impaled with bolts, probably from the crossbow-like weapons lying near some of the natives. Some of the natives still gasp out their last breaths, though any attempt to communicate with them will result in a string of incomprehensible noises. If either Harkabeeparolyn, or Kawaresksenjajok tries to come near one, it will seemingly panic, twisting and turning, then dying, probably from internal injuries.

If the die roll indicates that the slaughter took place over a day ago, there will be no smoke, and no scent of blood in the air. All wounded have died, and an eerie silence rules the village. All the explorers can find are corpses and burned-out shells of huts. Nothing of apparent value remains. If the explorers wish to conduct a house-by-house search, allow them to, but they will discover nothing.

After discovering the ruined village, the explorers may cast about for trails leading away from the village. In this case, have them attempt their Observation roll. If they make one roll, they will find a trail of hominid tracks leading to the shore, where they will find evidence of a camp. Two successful rolls will lead the explorers not only to the above trail, but also allow them to find a trail of tracks, obviously made by natives, which leads toward the city marked on the map. This, obviously, is the next stop.

The trip to the city must be made on foot (or by lift belt), and will take two days (five hours).

Part Five:
ENCOUNTER

When the explorers near the city, have them attempt to make their Listen roll. If they succeed, tell them that they sense movement in the brush near the path. If they fail, allow them to blunder into the ambush set by the Mruftu.

THE AMBUSH

The Mruftu are lying in wait on either side of the path. There are twenty of them, half armed with knives and crossbows, the other with knives. Their stats can be found below.

TACTICS

Once the Mruftu have spotted the party, they will react in one of two ways, depending on the party's mode of transportation. If the explorers are using lift belts, the Mruftu with crossbows will fire arrows. The Mruftu will try to take prisoners if possible, since they want to find out more about those who destroyed their villages.

If the explorers are on foot, they will be greeted by the ten knife-armed Mruftu, who will leap from the brush, shouting (in Mrufti) that the explorers are to drop their weapons and come along. They will also make appropriate gestures, so that anyone making an INTx2% roll can get the drift of what they're saying. If the explorers do not cooperate, they will be fired upon by the crossbowmen, who will concentrate on Chmeee, as he is the most obvious threat in the group (and probably the one who didn't want to cooperate in the first place. . .). This will lead to a situation similar to the first case, with the Mruftu trying to subdue and capture the explorers.

If things look very bad for the Mruftu, they will pull back into the brush, and attempt to escape. They will gather reinforcements and try to capture the explorers once more before they reach the city. This time there will be nearly fifty of them in the party, armed more or less as before. If this party is defeated, then simply proceed to part seven.

THE MRUFTU AMBUSHERS

Only a sampling of the attacking force will be presented here. Reuse these stats as necessary, until the explorers are captured, or all twenty Mruftu are incapacitated. The Mruftu come in five types. The number of each type in the ambush is noted in parentheses after the type number.

Mruftu 1 (3)

STR	12	HP 19
CON	8	
MAS	11	Armor: 1 pt skin
INT	**10**	
POW	9	
DEX	9	
EDU	1	

Weapon	*Att/Par*	*Damage*
Claw	25%/00%	1D6
Knife	30%/25%	1D3+2

Mruftu 2 (11)

STR	14	HP 25
CON	11	
MAS	14	Armor: 1 pt skin
INT	11	
POW	11	
DEX	11	
EDU	2	

Weapon	*Att/Par*	*Damage*
Claw	40%/00%	1D6+1D3
Knife	40%/40%	2D3+2

Mruftu 3 (3)

STR	15	HP 26
CON	12	
MAS	14	Armor: 1 pt skin
INT	11	
POW	12	
DEX	12	
EDU	2	

Weapon	*Att/Par*	*Damage*
Claw	40%/00%	1D6+1D3
Knife	30%/25%	2D3+2
Crossbow	40%/10%	1D8+2

Mruftu 4 (2)

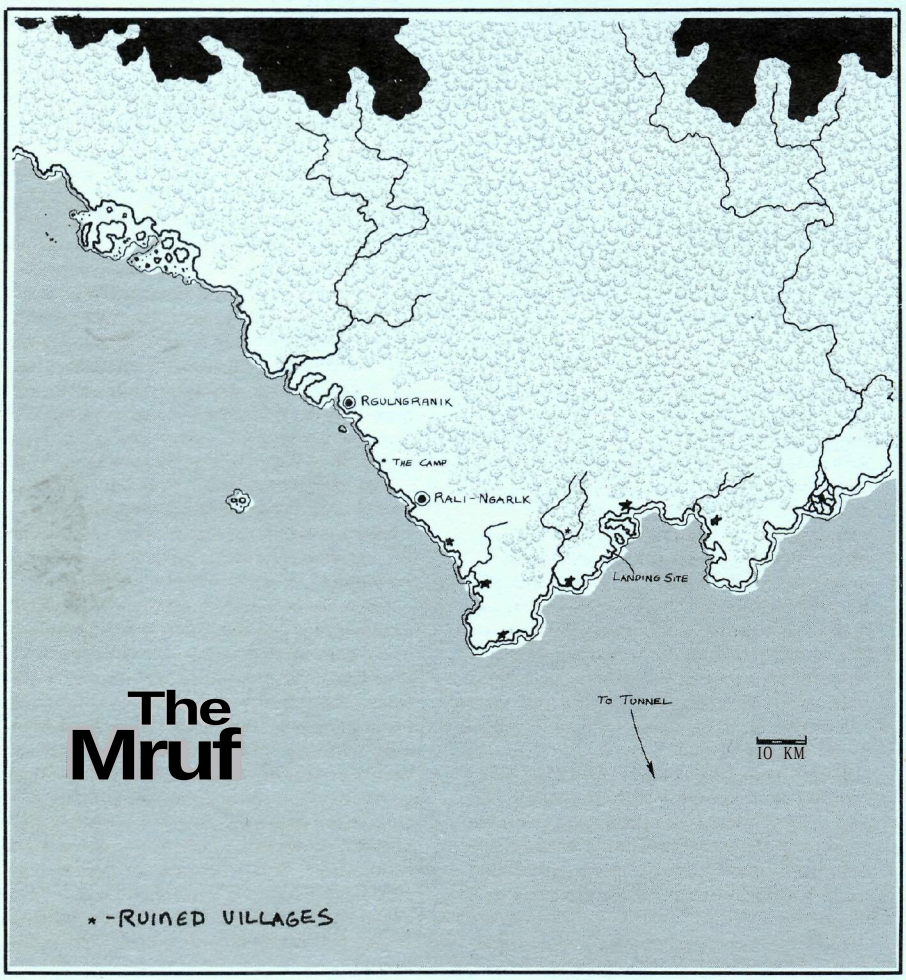
STR	16	HP 28
CON	13	
MAS	15	Armor: 1 pt skin
INT	11	
POW	12	
DEX	13	
EDU	2	

Weapon	*Att/Par*	*Damage*
Claw	40%/00%	1D6+1D3
Knife	30%/25%	2D3+2
Crossbow	50%/10%	1D8+2

Mruftu Leader

STR	18	HP 31
CON	15	
MAS	16	Armor: 1 pt skin + 2 pt
INT	13	leather = 3 pts
POW	14	
DEX	14	
EDU	3	

Weapon	*Att/Par*	*Damage*
Claw	45%/00%	2D6
Knife	40%/35%	1D3+2+1D6
Crossbow	55%/15%	1D8+2



Part Six:
THE CITY OF RALI-NGARLK

The following only applies if the explorers were not captured. If they surrendered, or were subdued by the Mruftu, skip this section, and go straight to part seven.

As the explorers approach the city, the path will widen into what could almost be called a road. It will continue this way for almost five miles before the explorers reach, rather abruptly, the city proper. The city is more a collection of large huts, long houses, and some wooden structures than a proper city, but it is the largest settlement they have found so far.

The city is not walled, though there is a lone wooden arch across the road at one point, presumably where it enters the city. There seems to be no one on the streets, though the city shows signs of habitation, such as the scent of cooking vegetables wafting towards the party. After the party has moved thirty meters within the city, there will be a flash of movement from a nearby building, and the explorers will find themselves under attack by a party of Mruftu. There are ten of them, all armed with crossbows. However, the bolts are all coated with a POT 18 poison which will cause the explorers to become unconscious unless they can resist a POT vs. CON attack on the resistance table. Note that if an explorer is hit by more than one spear, the drug will have a POT equal to 18 times the number of bolts which have hit the explorer. Note that this drug affects Chmeee differently than it does the hominids. If Chmeee is hit by one of the

bolts, then have him roll the drug's POT vs. his CON as normal, but if he fails, he will become unconscious and take damage equal to POT divided by 4. It can safely be assumed that the explorers will succumb to the drug. If they don't, hit them again, it is important that they be captured. After you have subdued all of the explorers, continue to part seven. Try not to let the explorers know that they are fated to lose the fight, allow them to enjoy it while they can.

THE ATTACKERS

Again only a sampling of the attacking force will be presented here. Reuse these stats as necessary, until the explorers are captured, or ten Mruftu are incapacitated. The Mruftu come in three types. The number of each type in the ambush is noted in parentheses after the type number.

Mruftu 1 (6)

STR	15	HP 26
CON	12	
MAS	14	Armor: 1 pt skin
INT	11	
POW	12	
DEX	12	
EDU	2	

Weapon	*Att/Par*	*Damage*
Claw	40%/00%	1D6+1D3
Knife	30%/25%	2D3+2
Crossbow	40%/10%	1D8+2*

Mruftu 2 (2)

STR	**16**	**HP 28**
CON	13	
MAS	15	Armor: 1 pt skin
INT	11	
POW	**12**	
DEX	**13**	
EDU	2	

Weapon	*Att/Par*	*Damage*
Claw	40%/00%	1D6+1D3
Knife	30%/25%	2D3+2
Crossbow	50%/10%	1D8+2*

Mruftu 3 (2)

STR	**17**	**HP 28**
CON	14	
MAS	14	Armor: 1 pt skin + 1 pt
INT	12	leather = 2 pts
POW	12	
DEX	13	
EDU	2	

Weapon	*Att/Par*	*Damage*
Claw	45%/00%	2D6
Knife	40%/35%	1D3+2+1D6
Crossbow	55%/15%	1D8+2*

*See text for information on the drugged crossbows.

Part Seven: QUESTIONS

If the explorers were taken outside the city, tell them that they are led through the woods, their hands bound behind them. At last they reach what appears to be a city. As they are led down the street, a swift motion catches their eye from a nearby building- all of them feel the sting of darts and blackness closes in. . .

When the explorers wake they will find themselves in a darkened room, the walls of which seem to be made of packed earth. They have been stripped of their possessions, including their translators. Their rope bonds have been exchanged for roughly worked metal. Through the room's one door, made of wood, they can hear voices, though they cannot understand the language. The voice continue for some time before they hear a tinny voice, which sounds like it is speaking Interworld! Anyone who can make a Listen roll will hear the following:

"What was that!?"

"I don't know. It seemed to come from one of the invader's devices!"

"Listen, it can speak, though in the invaders' tongue!"

The explorers should soon realize that one of the translators was on, and has been picking up the language and has now begun translating. If anyone thinks to yell to the translator, it will translate whatever is said into Mrufti.

The Mruftu, who had been debating over the best way to question people whose language they did not even know will soon understand that they can now communicate with the party. It is now up to the party to convince the skeptical Mruftu that they are not members of the invading City Builder force. This will require the gamemaster to do a great deal of improvisation in the parts of the Mruftu inquisitors. The following points must be discussed and satisfactorily explained before anything else can happen:

1. Why are there two City Builders in the party?
2. Why does everyone except Chmeee look all dry and icky like the invaders?
3. What is Chmeee?
4. If the explorers brought along much technology they will be questioned about it.
5. What are the talking discs?

If the explorers cooperate with the Mruftu, by the end of the day they should be well on their way toward gaining the Mruftu's trust. The Mruftu value honesty greatly and will not distrust the explorers if they seem honest and tell no obvious lies. Mentioning that they come from the stars will not help the explorers' cause, though it will not harm it much, the Mruftu dismissing the statement with an enigmatic "Stranger things have happened" sort of attitude. Once the explorers and the Mruftu understand one another better, the Mruftu will explain what happened.

Part Eight: A TALE

The explorers will be unbound, and led out of their cell, to the surface, where a fire is started. Here they will meet the city elders who will tell them what has happened. . .

THE ELDERS' STORY

After the fire has begun to burn brightly, the four elders will make a complex gesture in the direction of the arch. They will then bow to the explorers and seat themselves on the ground around the fire. One of them, apparently the oldest of the four, will begin to speak.

"It was no more than three *rgulrnak* that the ships of the invaders first appeared upon the water."

At this point there will likely be a pause as the explorers attempt to find out what a *rgulrnak* is. They will soon discover that it is one day and one night.

THE MRUFTU

The Mruftu are an amphibious race which developed on the fourth planet of a type-G star near the original location of the Puppeteer homeworld. While they no longer exist in Known Space, having been destroyed by an early Extremist Puppeteer government, they can still be found in small numbers on the Map of Mruftu on Ringworld.

There are no more than 300,000 Mruftu remaining on the Ring primarily because of a plague caused by a mutation of the superconductor plague bacteria. It may well be that the Puppeteers will destroy them again, though this time accidentally.

If the Hindmost discovers their existence, he will be surprised at first, then realize that their appearance was almost inevitable.

While the Mruftu of Known Space were a violent, semi-technological race, the Mruftu found on Ringworld are a far more peaceful bunch, though when provoked they will retaliate with surprising ferocity. They also tend to switch moods very rapidly, often suddenly becoming cold and calculating, particularly if faced with a difficult situation.

The Ringworld Mruftu had contact with the City Builders during that race's period of power. They would trade with their shell and gold jewelry for such comforts as humidifiers or steel and iron goods which they have a difficult time making because of their metabolism.

The Mruftu are currently little more than primitive hunter-gatherers living off the land, clustering together in their primitive settlements. They have potential to be much more, but due to their natural limitations, and possibly some artificial limits placed on them by the Pak, they have not developed.

Mruftu

		Average
STR	**4D6**	**14**
CON	**3D6**	**10-11**
MAS	4D6	14
INT	3D6	10-11
POW	3D6	10-11
DEX	3D6	10-11
EDU	1D3	2

Armor: 1 pt skin, possibly 1 or 2 pt leather armor in addition

Move: 1 m per impulse walking, 1.5 m swimming

Weapon	*Att/Par*	*Damage*
Claw	25%/00%	1D6
Amphibious crossbow	10%/05%	1D8+2
Knife	20%/15%	1D4+2

Description: Physically the Mruftu are predominantly a grayish-green with a white underbelly. While most of their body is covered with smooth, slippery skin, they have a scaled ridge along their back. They are somewhat anthropoid, and while on land they will shift between walking upright on two legs, and a sort of running hop using all four limbs. They are amphibious, as is obvious from the gently moving gill slits beginning at their neck, and proceeding to the lower chest region. Their hands are also webbed for greater swimming speed and tipped with needle-like claws for catching fish while in motion. Their language has a croaking, baying sound which makes it impossible for humans to speak, though a Puppeteer could learn it easily.

"Legends speak of a time far in the past when the dry ones would descend from the sky, bearing gifts for Mruftu. Of course these came from the water, not the sky, but all the better is it not?

"Naturally, we gathered many boats and went forth to greet them, bearing with us many gifts of shell, stone, and metal. We were greatly awed by the size of their ships, which were many times larger than our small boats. When our boats closed to within twenty meters we were startled by a loud clap, as if thunder, which rolled out from one of the dry one's ships. Nearby a boat capsized, the crew's screams filling the air as it sank. I saw much blood about the wreckage, and did not understand what had been done. I did know, however, that these dry ones possessed powerful magic, though not of the sort you have shown us. Yours is a much quieter magic, which agrees more with Mruftu. At this point I called for the boats to pull back to the shore. Though the oarsmen pulled with great strength, the invaders' ships glided without effort after us. By the time we reached the shore, 13 of our original 17 boats were gone, destroyed by the invaders' loud magic. We fled back to the village where I am Elder, hoping to use our knowledge of the area to our advantage. It was hopeless, however. The dry ones came in great numbers, landing two of their five ships. They carried magic with them, blasting holes in homes and Mruftu alike.

"Grusturfin and Yrlagrin," he continues as he gestures at two of the other Elders, "tell me the dry ones landed at their villages within hours of destroying mine. There are many other villages about, and a few cities, though none are so large as Rali-Ngarlk. I do not know what hashappenedto these, though there are runners out warning the villages, and trying to find the dry ones. Once they are found, we will must what we can and go to face them. We can do nothing else."

It is hoped that the players will realise that the Mruftu can allow the explorers to help. If they don't, the runners return an hour later with news of more destroyed villages, and will say that the invaders appear to be sailing to Rgulngranik, a city up the coast about fifty miles. The Mruftu will gather all of the healthy men and women of the city and march off to Rgulngranik. The Elders will ask the explorers to stay in the city until their return. They will not ask for help, though if it is offered, they would accept. After extracting the party's promise to stay, they will leave. If the party offers to help, then the Elders will wish to speak to them in private. Go on to part nine and continue the game. The following paragraph is only to be used if the explorers decide not to help.

Three days later, survivors will trickle in from the battle. All will have the same story, they were slaughtered, and the invaders have begun to continue up the coastline. The Elders are dead, all of them. Since it is very unlikely that the explorers will not aid the Mruftu, especially if Louis Wu's player is doing his job, it is up to the gamemaster to determine what will happen from this point forward. It is likely that the explorers will attempt to ambush the invaders. In this case use part nine, but part eleven will never come into play since the elders are now dead, and Rgulngranik has been laid waste by the invaders.

Part Nine:

CONQUISTADORS

The Elders will lead the explorers to a hut, in which they will tell the explorers that they are thankful for their offer of help, since the Mruftu realize that they are doomed against the magic of the invaders. They will then ask the explorers what they intend to do. If the explorers contact the Hindmost he will tell them that he thinks stealth is the best way of handling the situation. If the Mruftu are described to him, he will wail piercingly and request to speak to Louis alone. The Hindmost will then proceed to question Louis about the Mruftu. He will seem confused by their genial nature. At last he will say something about Pak intervention, and perhaps that explains why they are docile. The Puppeteers are familiar with the Mruftu from an early part of their commercial empire's expansion. They were a warlike race on the verge of developing spacefaring technology. The Hindmost will never say it in so many words but Louis will discern that the Mruftu were eliminated as a possible threat, their home system being less than a dozen light years from the original location of the Puppeteer homeworld.

After the party has formulated a plan, the Elders will offer them as many Mruftu as they need to implement it, up to one hundred. Choose these from among the Mrufti presented so far. They may then leave, accompanied by the runners, who know the location of the invader camp. It is now up to the explorers to destroy the invaders before any more harm comes to the Mruftu.

THE INVADER CAMP

The camp is located on a stretch of sandy beach about twenty miles south of Rgulngranik. There are two guards posted at all times at the points marked G on the Camp map. The exact species of the guards must be determined by the gamemaster. They may be chosen at random from among the soldiers. The rest of the camp is detailed in the key below.

CAMP MAP KEY

1. Tents: These cloth tents each provide shelter for two men, drawn randomly from the available soldiers. They will be sleeping, getting ready for tomorrow's attack.

2. Ship One: Aboard this ship can be found Hrisapelcorlin, commander of the expedition. In addition, there are 20 soldiers aboard who will be sleeping in preparation for the attack on the city.

3. Ship Two: This contains 25 soldiers, all sleeping soundly.

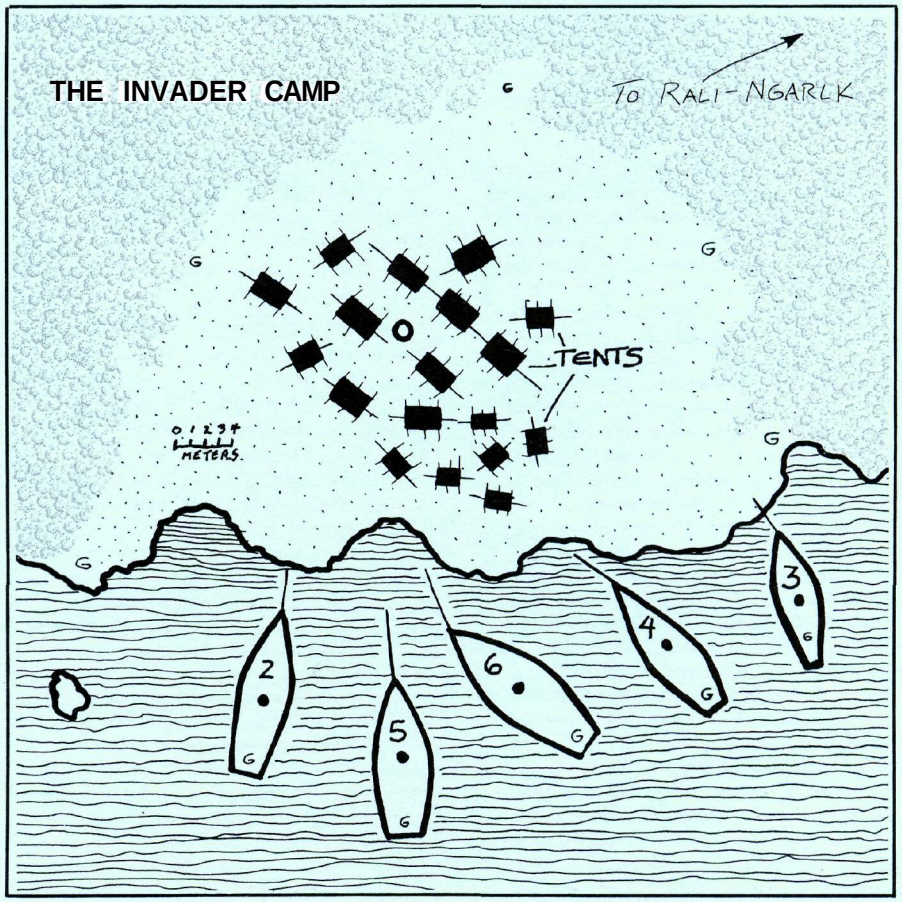
4. Ship Three: In addition to the ten soldiers sleeping on board, this ship's hold contains the expedition's fresh water supply.

5. Ship Four: There are no troops aboard this ship, but the hold is filled with the expedition's food supply, which includes a great deal of preserved fruit, to fend off scurvy.

6. Ship Five: This ship contains 12 soldiers. The hold contains the expedition's supply of extra weapons, gun powder, and other munitions.

THE ATTACK

The explorers will not notice the camp until they are within 150 meters of it. At this point they should all attempt Observation rolls. If they succeed they will see the camp and may attempt to Hide, Move Quietly, or whatever they wish. If they fail, roll the nearest guard's Listen. If he succeeds, the explorers will walk into a camp full of prepared soldiers who will be waiting for them.



Use Situation Two when the explorers attack the camp. In any case, the explorers may move forward ten meters and try to spot the camp again. Continue until the explorers spot the camp or close to within fifty meters, at which point it will be in plain sight.

Situation One

If the explorers can come within thirty meters without being detected, they should be allowed to look at the map of the camp, and decide exactly what they want to do. From here on it is primarily the gamemaster's duty to decide what effect their actions will have, keeping the following things in mind:

1. These are soldiers. If they are attacked by surprise they will be awake and able to function within twenty impulses. They will then be able to ready their weapons and attempt to hold off the explorers.

2. Ship Five is a bomb. If it is hit by a hand beamer, it has a 10% chance of going off. If hit by a flashlight laser the chance increases to 40%. When it goes off, those aboard the ship will take 20D6 points of damage. The explosion will disperse at a rate of 1D6 per 2 meters. This means that someone 10 meters from the ship will take only 10D6 points of damage. Note that this explosion would almost certainly cause any ship within ten meters to being sinking.

3. While the men are professional soldiers, they are not stupid. If they lose over 50% of their troops and are still losing, Commander Hrisapelcorlin will come off Ship One and offer to surrender. He will also do this if the ship containing the food supplies goes down.

4. Each of the ships can take 50 points before taking on water. Once a ship has begun taking on water it will sink in 1000-total damage impulses.

If the explorers win the fight, either through killing all of the invaders or getting them to surrender, proceed to section ten.

Situation Two

Ignore the Camp Map Key, all of the soldiers will be awake and ready. Those listed as being in tents will stay there, using them as cover. Those on the ships will attempt to ready the cannons. The munitions ship will will weigh anchor and try to leave. This will take nearly 100 impulses and should not make a difference except that it will not fire its cannons in the meantime.

Victory can still be achieved using the same methods as in Situation One, only this time it will be much harder.

STATS

As before, no attempt will be made to detail all of the opponents found in the camp. Use the numbers from the key to determine the total number of men in the camp. Try to use common sense when using the soldiers as there will be far more average and bad ones than there will be good or great ones.

Soldier 1 (Night Hunter)

STR	10	HP 23
CON	11	
MAS	12	Armor: 1 pt skin + 2 pt
INT	13	leather = 3 pts
POW	11	
DEX	13	
EDU	2	

Weapon	*Att/Par*	*Damage*
Rifle	35%/00%	1D6+8

Soldier 2 (Grass Giant, few)

STR	18	HP 39
CON	13	
MAS	26	Armor: 2 pt skin + 2 pt
INT	12	leather = 4 pts
POW	11	
DEX	10	
EDU	1	

Weapon	*Att/Par*	*Damage*
Rifle	40%/00%	1D6+8
Club	50%/40%	3D6+1

Soldier 3 (Hanging Person)

STR	7	HP 16
CON	9	
MAS	7	Armor: None
INT	13	
POW	12	
DEX	17	
EDU	2	

Weapon	*Att/Par*	*Damage*
Pistol	75%/00%	1D3+4

Soldier 4 (City Builder)

STR	12	HP 22
CON	12	
MAS	10	Armor: 4 pt chainmail
INT	16	
POW	11	
DEX	14	
EDU	5	

Weapon	*Att/Par*	*Damage*
Rifle	50%/00%	1D6+8
Knife	30%/25%	1D3t1

Hrisapelcorlin (City Builder Noble)

STR	14	HP 24
CON	13	
MAS	11	Armor: 4 pt chainmail
INT	14	
POW	10	
DEX	14	
EDU	6	
APP	17	

Weapon	*Att/Par*	*Damage*
Pistol	45%/00%	1D3+4
Rifle	60%/00%	1D6+8
Knife	30%/25%	1D3+1

Part Ten: AFTERMATH

The explorers may round up the soldiers who are still alive. There will be little fight left in them. If Commander Hrisapelcorlin is alive, he will already be with the explorers, having just negotiated a surrender. The commander will not speak about where he is from, and if the explorers check out the ships, they will find all of the maps have been burned. The commander is willing to talk to the explorers, and if asked about why he is here, and why the attacks on the natives, he will tell them that he is here in the service of his queen and that he has come searching for Ilrithacaraydo, a city where roads are made of gold and wizards walk the streets. If asked about this, he will explain that it is a well-known legend which survived from the fall of the cities, when the City Builders traded with Ilrithacaraydo. He saw these monsters coming at his ship and felt that he had to defend it. If asked about the unprovoked attacks on the villages, he will become silent. Later questioning may reveal that he saw the natives were carrying items of shell and gold which would be valuable on the mainland. If the Mruftu are asked about Ilrithacaraydo they will say that they know of no such place, and seem eager to return to Rali-Ngarlk with the prisoners. If the commander is questioned at length, have the questioner roll both his Orate and his Luck. If both rolls succeed, the commander will let slip that his expedition come from one of the kingdoms found in the ruined cities on the map's ocean shore. These rolls may be tried anytime the commander is questioned for more than half an hour.

Searching through the ships, and through the possessions of the crew, the party will find numerous objects made of beaten gold or carved from shells. The craftsmanship is superb, and it is obvious that they could indeed have been valuable on the mainland.

Part Eleven: VICTORY?

When the party returns to Rali-Ngarlk they will be greeted by the populace. If the explorers were expecting celebration they will find none here. The Elders will take the prisoners, including the commander, and place them all under arrest. By day's end they will be sentenced to death. By midnight they will all be dead.

The Elders will thank the party for their aid, saying that they are glad that many Mruftu lives were saved. They will also ask if the explorers discovered where the invaders were from. If the explorers tell them (assuming they know), the Mrufti will get ready for war. They will tell the explorers that they are welcome to come, since they are now almost Mruftu in the Elders' eyes. If they decline, they will be given a great deal of native jewelry and other valuables. Since there is no standard monetary system on the Ring, we shall just say that it is enough that it could be used to purchase a twelve-room home, where such things exist.

If the explorers do not know, or do not reveal the invaders' home, the Mruftu will invite them to stay as honored guests. The Mruftu will begin to warn the other cities about what has happened and the Mruftu will tensely await the next invasion. If the explorers choose to leave, they will be rewarded as above and are free to return at any time.

Whether the party goes with the Mruftu or decides to leave, and whether or not they aided the Mruftu in the first place, when they return to the ***Teela Brown***, they will find that the Boat People have freed it. The Boat People deny that they had much to do with it, however. One of them was exploring below the water and found a hatchway. Upon opening it he was carried into a small room by the rush of water. The door closed and he feared he would drown. However, the water drained out, allowing him to look about. Finding another door in the room, he opened it, entering a large room with many controls, not unlike the bridge of the ***Teela Brown***. He dared touch a few, but when a blue light began flashing he grew frightened and left. Returning to the surface, he found that the 'reef had submerged, simply sank into the water, and the ship's buoyancy had freed it. The explorers may receive this information sooner if they have left a comdisc aboard ship.

What happens after this point is up to the gamemaster. There is the rest of the map of Mruftu to explore, the City Builder ruins along the ocean's shore, the Pak control station the Boat People found, and, who knows, perhaps there is an Ilrithacaraydo, waiting for someone to find it. . .

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Larry Niven's Ringworld

COMPONENTS:

Explorer Book: introduction, human explorer creation; pursuits and skills; game system; essays on Earth, the Belt, Canyon, Down, Gummidgy, Home, Jinx, Margave, Plateau, Silvereyes, We Made It, Wunderland; Kzin explorer creation and in-depth essay; Puppeteer explorer creation and in-depth essay. **Human Space Technology:** autodocs, computers, drugs, energy systems, autopilots, memory plastics, medicinal and recreational drugs, boosterspice, stasis fields, gravity generators, handguns, heavy weapons, vehicles, vac suits, water tools, much more. **Creatures Book:** complete statistics and lengthy descriptions for aliens (including Grogs, Outsiders, Kdatlyno, Dolphins, and Bandersnatchi), hominids (including City Builders, Healers, Ghouls, Grass Giants, Muck Ogres, Hairy Ones, Machine People, Valley People, and Vampires), and unusual Ringworld flora and fauna. **Ringworld Book:** essays on Ringworld history, the Pak, rishathra, the structure of Ringworld, the shadow-squares, scrith, mysteries of Ringworld, energy and power, Fist-of-God, eyestorms and punctures, the rim transport system, attitude jets, control and repair centers, and more; Ringworld hominid technological devices and weapons; a complete introductory journey to and adventure on the surface of Ringworld; gamemastering tips; plus much more. Other components include dice (2D6, 1D8, 2D20), explorer sheets, game reference sheets, visions of Ringworld (four essays), the Ringworld printout.

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Chaosium Inc., P.O. Box 6302,
Albany, CA 94708-0302

Printed in the U.S.A.