GURPS® Fourth Edition

TransHuman Space™

Cities on the Edge™

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STEVE JACKSON GAMES

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There is no human reason to be here, except for the sheer ecstasy of being crowded together.
– Jean Baudrillard, ***America***

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Introduction

Cities on the Edge is about the Fifth Wave city and city life in 2100, in the world of ***Transhuman Space.***

In the last century, some cities have died, but many more have been born, and yet the future of the city remains uncertain. Like their inhabitants, cities are evolving into something new – but no one yet knows what!

Is the future a wilderness dotted by giant arcologies . . . or a sprawl of meme-tailored metavillages? Will sapient cities be the next step in evolution? Or will messy, inefficient, and creative cities adapt to house whatever clades emerge in the transhuman future? Adventurers in ***Transhuman Space*** have the chance to explore these developing communities, and to watch the process, perhaps even intervening – as the ground on which they walk evolves beneath their feet.

About *Transhuman Space*

The ***Transhuman Space*** series presents a unique hard-science and high-biotech universe for roleplaying. Set in the Solar System in the year 2100, it is a setting rich in adventure, mystery, and ideological conflict. The core book is ***Transhuman Space,*** which presents an overview of the setting with game mechanics for ***GURPS*** *Third Edition;* other books in the line expand on specific aspects of the setting. ***Changing Times*** is the GM's guide and *Fourth Edition* update for the line.

About *GURPS*

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Errata. Everyone makes mistakes, including us – but we do our best to fix our errors. Up-to-date errata pages for all ***GURPS*** releases, including this book, are available on our website – see above.

Rules and statistics in this book are specifically for the ***GURPS Basic Set,*** *Fourth Edition.* Page references that begin with B refer to that book, not this one.

Cities are . . . distinguished by the catastrophic forms they presuppose and which are a vital part of their essential charm. New York is King Kong, or the blackout, or vertical bombardment: Towering Inferno. Los Angeles is the horizontal fault, California breaking off and sliding into the Pacific: Earthquake.

– Jean Baudrillard, ***Fatal Strategies***

About the Authors

Anders Sandberg is an academic jack-of-all-trades from Sweden with a background in computer science, neuroscience, and medical engineering. He has also been debating transhumanism since the early 1990s, and he is currently researching the ethics and social impact of human enhancement at the Future of Humanity Institute at Oxford University. He has also been interested in cities and infrastructure ever since he dreamed he was Amsterdam.

Waldemar Ingdahl is a Swedish science journalist and writer, and has published several books in his native language. He has a keen interest in sociology, politics, and the societal transformation brought on by technological innovation. He currently lives in Stockholm.

Chapter One
The City of the Future

The people! A bustle of Chinese businessmen in iridescent parkas, with a halo of servants and a bodyguard cyberswarm. A woman with a brain projected above her head like a flickering turban. Parahuman kids rushing along, surefooted in the slush, dodging virtual snowballs with transhuman reflexes. People with holes in their heads. A suburban woman in burqa shopping with a cybershell decorated with feathers.

The sights! Snow delimiting the complex airflows around the buildings above. A hotel clad in a mesh of glowing dots. Two sapients, surrounded by flashing rails, dropping bomb-shaped, legged devices into a hole in the ground. Colorful birds flying toward a fast food restaurant, ignoring the weather.

The sounds! Dozens of languages just within earshot. Infrasound sighs as the arcology above sheds wind vortices. Insect-exact needle legs clicking as a delivery spider nervously navigates through the crowd with something hidden in its container. Papua-Vietnamese club sounds. A plastic sticker lecturing to an empty street corner.

The smells! Croissants, freshly baked. Freshly printed Alibanana burgers. Moldy bioplastic binder. The latest Joliette perfume, part engineered pheromones, part subliminal virtual display. Warm fur and wet dog. A whiff of the arcology's interior scent of the week.

Somewhere in this experience is the person I need. I do not know who or what. I do not know what they want or will do. But I know that if I can find that person, our shared skills will rock the world.

The City Is Dead; Long Live the City!

In 2100, many feel that cities are obsolete, little more than beautiful museums (or warnings!) for future generations. Life is *better* in a designer village, arcology, or orbital habitat.

Yet humanity still lives in cities. Once, this was a matter of economic opportunity: wealth was in the cities. However, in Fourth and Fifth Wave economies, economic opportunity is not location-specific . . . and suburbs, metavillages, and "new cities" offer pleasant, smaller-scale living without the crowds, crime, and chaos. Yet humanity still lives in cities. Why?

Cities enable unexpected meetings. The inhabitants of a suburb are typically of the same species, similar social status, and a shared memeplex. Even in an arcology, it is easy to meet only similar people. In a city, the opposite is true – inhabitants meet people with different lifestyles every day. It is difficult to maintain the illusion that everyone is like oneself.

This is scary. It is exhilarating. It generates creative conflicts.

Cities are also cheap places to live. When the office moved onto the Web, rents plummeted. Many cities now have space problems: There is too *much* of it. The cities are decaying, and attracting more and stranger subcultures.

Small subcultures (even online subcultures, if physical closeness is useful) thrive in the cities – they are tolerant, cheap places to live! A subculture may move to New York City to build an AI-run utopia on the top floors of the Empire State Building . . . or to Venice to paint the interior of an old corporate complex with the annotated genome of their guru.

Finally, some – the guardians of old cultural values and institutions – stay in the cities to protect them from neglect, crazy subcultures, and decivilizers who want to "restore" them to wilderness.

> *When you get there, there isn't any there there.*
>
> *– Gertrude Stein*

The Liquid City

The cell phone ate the wristwatch, alarm clock, camera, PDA, heart monitor, and bacterial alert sensor . . . before itself vanishing into the wearable. Buildings too have converged.

Once, a single office would have a particular function. Computers generalized the office; mobile computers helped eliminate the need for many offices; augmented reality moved the remaining offices out of the building entirely.

Fourth and Fifth Wave cities have few large buildings devoted to a single purpose. Offices, schools, administration centers, art galleries, banks, and conference centers are interchangeable. Still, homes, restaurants, nightclubs, historical buildings, and cultural centers remain. Some stores have taken the space left behind, becoming spacious halls – but the catalog can be reconfigured with a button. It is cheap and easy to remodel to fit a meme (though the nostalgia-authenticity memeplex still requires the "real thing").

Most of the empty space is usable. A company launch could rent a former school, covering the interior with tapestries of corporate heraldry, and the next day the class of '38 might have a reunion, temporarily restoring the school to its old look. "Instant remodel" entrepreneurs make good money.

Telepresence reduces the number of cars and parking lots. Some lots and garages have become housing, but most have become parks, lawns, and gardens.

A Partial Urban Glossary

alang: (Hindi) A long building, in particular a long biotech arcology.
arcologist: Someone who believes that arcologies are not just convenient but the *right* lifestyle for everyone.
augies: Slang for virtual interface glasses.
bark: The outer surface of an arcology, with the most desirable homes.
Brahmasthan: The geometrical and energy center of a building in Vedic architecture. A common design in biotech buildings is to have a "Brahmasthan skylight" in the middle.
CAVE People ("Citizens Against Virtually Everything"): See *Nimbys*.
commensalist: Someone who is living with an extensive home ecosystem and who is unafraid of having other organisms sharing his personal space.
doogie: A mental enhancement addict.
glaxs: Slang for virtual interface glasses.
infrastructure crime: Fifth Wave nations are dependent on extremely complex systems; crimes affecting national infrastructure are taken very seriously. A major power outage or Web interruption can have devastating economic and social consequences.
intbandi: (Hindi, "brickwork") A house made of biotech bricks.
lightpaper: Cheap solar collectors taped to roofs or just unfolded to power devices. Discarded lightpaper is a common sight in Third Wave slums.
Nimbys ("Not In My Back Yard"): Citizen activists who protest against a proposed project or change because it might affect them negatively. Throughout the 21st century, Nimbys have grown more powerful. This has accelerated the growth of suburban and metavillage sprawl, since the easiest way of getting an unpopular facility built is to build it further away from the city. In recent years, thanks to decivilization, unpopular facilities might instead be moving into the unwanted and less protest-prone city centers.
ocs: Slang for virtual interface glasses.
specs: Slang for virtual interface glasses.
technocore: The utility part of an arcology, especially the central shafts transporting heavy goods and local recycling plants.
urbophobes: 1. People who are afraid of cities. 2. People who dislike cities and want to remove them.
whees: Slang for VII.
orgotecture: Automatically designed buildings using a minimal amount of material.
urb: A "server city"; a secure virtual environment for infomorphs.
woollie: A brain stimulation addict.

Clusters

Clusters are industry gatherings particular to a location, such as Bollywood (movies), Silicon Valley (IT), Antwerp (diamonds), Paris (*haute couture*), or Rotterdam (container transport). When enough people and corporations of a particular industry gather in an important location, for whatever reason, they gain a competitive advantage.

Telepresence has reduced the advantages of clusters, but not enough to eliminate them: People in a cluster meet each other outside work, create new connections, and share ideas and information. The Bangalore gardening societies share important rumors, and people have created business plans while waiting for commuter trains. The human enhancement spa clusters of Finland emerged from tax breaks, a desperate spa industry, and a newly mainstream transhumanist movement who wanted a relaxing place to upgrade.

Clusters are living phenomena – economic memeticists have only recently begun to understand them at all, and most attempts at deliberately creating one fail, although many cities have become clusters in attempting to reinvent themselves. The steel city Magnitogorsk in Russia reinvented itself as the conference-spa capital of the southern Urals. Fresno first became a call center cluster for Chinese-American businesses and then a cluster for running translation AI systems. Male, the capital of the Maldives, is a common destination for biotech island developers.

Of course, when the world moves on, an entire city can be left in the dust: Observe the Rust Belt of the U.S. steel industry, the remnants of Hollywood, and more recently, the slowly dying Guiyang biochemistry cluster.

Old Cities

Some cities and city-states remain cohesive because there is no space. Singapore cannot build more suburbs, and the Netherlands Randstadt already covers the entire lowlands. These cities are marked by soaring arcologies and high-rises, save for a traditional city core protected by urban preservationists and the wealthy (needle-scrapers next to Berlin's Brandenburg Gate or Istanbul's Hagia Sophia are simply not acceptable).

Most arcologies are at the edge of the city, replacing suburbs or industrial areas. Some urban preservationists go further by putting limits on advertisements, store styles, and even clothing and body styles. The conflicts between antiquarians, tourist boards, and inhabitants in historic cities are often entertaining, and often result in a place that looks great for tourists but is dead in their absence.

Planned Communities and New Towns

New cities also developed during the 21st century. Young, often shabbily built sprawls or untested social engineering projects, they are a diverse mixture. Most developed in the former third world as population and wealth rose.

Arcologies are extreme examples of urban planners attempting to construct utopia. Closely allied with the Preservationist movement, the arcology vision is to reduce the total environmental footprint of humanity. This requires not just building the arcology properly, but also social engineering to get inhabitants to work together in the right way. Failures can become disasters, such as the 2088 riots in the Marmaris arcology – Turkish authorities had to relocate 3,000 people from the unusable structure.

> *Euralille looks and feels as if a lunar research station has crash-landed onto a small, respectable French market town. This is meant as a compliment.*
>
> ***– The New York Times***

Suburbia

Early in the 21st century, the "New Urbanist" movement grew in power. Modern cities were seen as being built at too large a scale and as failing to provide shelter, personal space, and adequate resources within walking distance. The response was the creation of new suburbs, "posturbs," mini-towns, and villages covering former countryside.

Connected by light rail and telecommunications, built at a human scale, and able to provide most of what a city could, they were quite successful. As the Decivilization movement began restoring cities to nature, the New Urbanist movement was supplanting nature with an endless, tasteful suburban sprawl – in many areas of America and Europe, one can travel from one former megacity to another without leaving the posturban landscape.

Less imposing than the arcologies, but very widespread, are metavillages, the most advanced form of New Urbanism: planned communities of one to two thousand people that provide community, shared interests, and local life. The earliest attempts, such as Disney's Celebration in Florida and England's Poundbury, were crude (small-town charm was typically enforced through detailed regulations!), but modern developers create good memetic environments and attract the right people. Metavillages have grown increasingly common and popular, especially among minorities, small religious groups, and those seeking stability. Some observers worry that they are helping to splinter humanity, functioning as village-sized, homogeneous ghettos, trapped in groupthink.

Bordercities

Fifth Wavers seldom think about borders. Freedom-of-movement treaties and wealth make travel anywhere easy, and *inside* the blocs, border checks are absent or discreetly automated. Countries often standardize border controls and intercommunicate, so travel to a variety of places uses the same preparation. Clearly defined lines have largely replaced pre-modern neutral zones (called marchlands), but some regions have brought the idea back as they integrate. For instance, even if Strasbourg may formally be in France and Kehl formally in Germany, few would notice distinctions in culture, politics, administration, or economy – or even notice that they had crossed the border.

Borders *do* manifest themselves between neighboring blocs, though. Despite the increase of WTO-enabled free trade, border towns still have more intranational contacts than cross-border contacts – even though some borders are *inside* city boundaries. While travel between suburbs or arcologies is seldom restricted, the memetic borders are felt (and often even programmed into the city's digital environment). These demarcations are usually cultural rather than administrative, especially for particular enclaves (see *Kungsholmen,* p. 58).

The Ottawa-Gatineau Border Crossing

Quebec's borders are heavily monitored, and ground crossings involve a lot of scans and searches, largely due to Quebecois high spirits dating back to secession, Canadian and American pressure over Montreal, and Quebec's entry into the E.U. Quebec's relations with Canada remain friendly, but Quebecois border controls make for lively debates . . . and arguably, the growth of the Maple Syndicate (***Transhuman Space,*** p. 107).

This is felt most at the Ottawa River, where Canada's capital, Ottawa, lies on the Ontario shore and Gatineau on the Quebec side. This was once a single metropolitan area, but political division has slowed contact down. A joint light rail train system is the easiest way to cross legally (the Maple Syndicate prefers the frozen river in winter), but it still involves significant trouble.

E.U. visitors find the situation ridiculous and the European Parliament has reprimanded Quebec, but symbolism and Millennial Generation politicians' emotions prevent any easing of controls.

Gatineau has suffered the most, becoming a rowdy town dominated by the Syndicate.

The Narva-Ivangorod Border Crossing

The European Union has a very long border with Russia, from Finnmark in the Arctic to Brest in Belarus. Snakehead organizations (***Transhuman Space,*** p. 107) have been a nuisance since the E.U. banned bioroids in 2091, and the illegal trade in people remains brisk.

Estonia's independence in 1991 divided the Russian-speaking city of Narva into Estonian Narva and Russian Ivangorod. Due to the unruly situation in Russia, a border treaty took a long time coming . . . and some details remain to be sorted out.

Nearby St. Petersburg, a biotech sanctuary, generates a lot of smuggling. The Estonian border guards (assisted by GRA agents) employ some of the best E.U. surveillance technologies, with chem- and bio-sniffers, drones, and microbot hunter swarms, but the snakeheads grow ever more cunning in their pursuit of the lucrative trade. While the Russian government officially supports the tight border and helps fund the GRA, local authorities are less helpful. Rumors say that this is one of the standard entry points for TSA exiles into Europe.

Friends and Enemies of Cities

Some people see cities as sources of strikes, riots, and rebellions. Others see them as sources of pollution, resource consumption, and ugliness. They have psychological dangers, too: anonymity, social chaos, and dangerous ideas. They are also vulnerable to war, disease, fire, and crime.

One solution is to build an ideal city. Sir Ebenezer Howard founded the garden city movement in 1898 to plan cities as self-contained communities separated by greenbelts. (In practice, the result was sprawling suburbs connected by highways to crowded city centers.) This eventually led to the modern post-urban culture and metavillages. Similarly, the modernists of the early 1900s, who wanted to replace the whole sprawl with a few megabuildings surrounded by parks, led to the arcology movement.

In 2100, global movements seek both to rid the Earth of cities and to preserve the cities of Earth.

E-Weapons

Microwave disruptors (***GURPS Ultra-Tech***, p. 121) are "non-lethal" weapons that disrupt electronics and communications. These ***Ultra-Tech*** weapons can be assumed to exist in the ***Transhuman Space*** setting, although they may not be widespread; military cybershells and equipment will generally be sealed and shielded, making these things less than useful on the battlefield, and their only "civilian" uses would be for crime and sabotage. Getting hold of such a device may be an adventure in itself unless one happens to have contacts in the right kind of organization, a skilled technician-armorer for a friend, or some possibly illegal minifac templates. Nonetheless, they are practical weapons for striking against enemy infrastructure and communications, and China and the TSA used "E-weapons" in the Pacific War, causing high economic costs but few fatalities. Unfortunately, terrorists *can* also acquire them, and they tend to damage advanced nations more than poor nations.

Hardening is easy for important equipment, but the *real* damage is the effect on the myriad ubiquitous, small civilian systems: doors, cybershells, clothing, virtual interfaces, v-tags, implants, cameras, lamps . . . Problems can easily cascade out of control. In a city, the effect on nearby traffic, businesses, tourists, and infrastructure can easily climb into stratospheric costs. Even optical systems typically have enough vital electronic parts to cause problems.

Decivilization

The meme that cities are unhealthy for both humans and nature has existed almost as long as cities themselves, but the Decivilization movement came into its own in the '50s, amidst fears of biotech violence, posthuman terrorists, and emergent threats (such as self-replicating machines). A city is an easy target for such things, and the countryside seemed a prudent alternative.

Messody Simtob, an influential environmentalist, developed the first decivilization plan in 2053 to deal with the economic and environmental blight of southern Louisiana. Although never implemented, it inspired many local movements; the most common type, "Parking Into Parks," involved buying the worst land in the city and donating it as a park.

In the '80s, the Decivilization movement grew with the implosion of many major cities. An entire generation grew up unattached to cities, and tax-paying voters in arcologies and suburbs saw little reason to keep unnecessary buildings in cities they never visited. Meanwhile, preservationists, arcologists, and demolition and ecorestoration companies all found reasons to lobby together.

Today, Decivilization is a broad, faceless movement. Local, charismatic individuals lead particular groups, but there are no global leaders – a successful "Decivilizer" leader more often moves into Preservationist politics than tries to unite the fractious members of his own movement.

Many Decivilizers only want to restore the land to parkland, suburbs, and wilderness. Decivilizers that are more orthodox also denounce arcologies and *any* high-density dwelling. Meanwhile, the Gaia Restoration Project (***Toxic Memes***, p. 35) promotes the decivilization of the entire planetary surface.

Decivilization works best in areas where city memes are weak, particularly in America and Australia. By contrast, Old World city memes tend to be strong. Tearing down parts of Old London because they are not useful is simply preposterous!

Passive Decivilizers see the process as inevitable: people *will* end up in arcologies, space, or digital space in the long run. *Active* Decivilizers see the process as a struggle: there are forces trying to keep the inefficient, dirty, and dangerous cities around, and they have to be circumvented or defeated.

Archaeologists

Unexpected allies for the Decivilizers are professional archaeologists. When the traces of modern civilization are removed, new archaeological finds are often discovered. Entire Stone Age villages have been found underneath parking lots; evidence for a previously unknown native tribe was found when reducing Oxnard, California. Modern methods of sampling, NFUN ("Near-Field Ultrasound Nodes"), and ISH ("In Situ HyMRI") produce 3D reconstructions of what lies underneath the ground without having to dig it up.

It is said that the unusually large number of Decivilization advocates in Greece is due to a memetic plot by archaeologists to gain access to sites. Some archaeologists, however, warn that without the protective cover of cities, many important sites will be subject to erosion.

Negalopolis

Few Decivilizers are violent, but the Negalopolis cult has no qualms about massive vandalism. They use plants and nanobugs to break down building materials; odorants to make buildings unlivable; low-frequency vibrations to damage structures; super-absorbent gel in drainage pipes; memetic campaigns against neighborhoods; and similar methods to "speed up" the abandonment of cities.

Negalopolis was inspired by the rants of Mahagonny Benares-No-More, an influential critic of more "mainstream" decivilization. Mahagonny argued that passive decivilization will fail: cities are alive and defending themselves. However, a concerted program of sabotage against the city on all levels – physical, memetic, economic, and political – could turn the "megapolitan tide" and cure the planet's "city plague."

The most successful Negalopolis attack was the Milpitas Devastation of 2096. Using cybershells, activists managed to place capsules of super-absorbent plasticrete throughout the water, sewage, and drainage pipes of a large portion of the city. The initial expansion of the plasticrete destroyed the foundations of many buildings, and the first rainstorm rendered the entire area easier to tear down than rebuild.

Upload Preservationism

Upload Preservationism is a radical memeplex of decivilization, preservationist, and cybergnostic thinking. Upload Preservationists want mankind to go entirely digital. The first step would be to move into arcologies, and then into *digital* arcologies, leaving behind a pristine world where tiny underground "urbs" run an infomorph humanity.

In 2098, the World Urb Federation inaugurated the first official urb, Bathys, in a mineshaft near Athens. Bathys turns small profits as a net provider, AI/ghost hotel, and virtuality node. No great influx of environment-conscious minds has occurred, but the WUF believes time is on their side.

The Urban Protection Movement

The flip side to the Decivilization movement, the Urban Protection Movement wants to save the cities.

Squatter Networks

Consisting of various creatives, subcultures, fringers, and radicals who feel that cities are *their* space, the squatter networks try to ensure that spots of attractive chaos, cheap housing, and reduced oversight remain in Fifth Wave nations. The ideological leadership (nearly always members of the creative class) points out the need for fringes and zones of autonomy for a society's memetic health.

Sometimes the squatter networks do a good job, as in Rotterdam's Vrijstaad (***Fifth Wave***, p. 103). Often, however, a lack of diplomacy, sectarianism, and infighting result in a fiasco like the Indianapolis de-development project.

Squatter networks often have strong ties with drifters (***Under Pressure,*** p. 17) and other mobile groups.

Urban Protection Foundations

The UPFs are the upscale face of the Urban Protection Movement. Ubiquitous in Europe, they are cultural preservationists, with distant ties to the remnants of the Majority Cultures Movement (***Fifth Wave,*** p. 12). They are mostly comprised of older, conservative individuals wishing to retain the beauty and character of their cities. UPFs usually work by lobbying governments and corporations to mothball (see below) old and beautiful buildings, and many European UPFs are themselves among the largest property owners.

Although Decivilization is a powerful political force, and most politicians resent "concrete huggers," the UPFs have their *own* politicians. Even in cyberdemocracies, the lottery ensures that there are a few elected UPF members, and the UPFs provide those few with a lot of support.

A small subset of the UPFs are "robot city" enthusiasts – who want not just to mothball buildings, but to *populate* them with cybershells or bioroids for the appearance of life. The Greater Chicago UPF and Andersonville Mechatronics, Inc. are currently experimenting with this in the Chicago Chinatown area. Most UPFs (and other urbanists), however, view this as little more than constructing an expensive theme park – one that won't cover its own costs in the end.

Mothballed Buildings

Few European cities would even *consider* tearing down an old building without a replacement – changing the character of a city just because nobody wants to rent a building is not an option. "Mothballing" a building makes it look "in use" despite abandonment. A combination of preservative coatings, restorative repairs, minimal lighting (and similar *visible* utilities), and discrete maintenance cybershells provide a reasonably cheap illusion of use.

The concentration of human beings in towns is contrary to nature, and this abnormal existence is bound to issue in suffering, deterioration and gradual destruction to the mass of population.

– Sir Henry Campbell-Bannerman

Although most mothballed buildings feature security, and some go so far as to fill them with aerogel foam, they usually make great hiding places. Sophisticated squatters with catalyst spray can even create tunnels in aerogel-filled buildings.

Urban Pests

Cities are ecosystems, with humans as a keystone species. Species move in from the countryside and find new niches, making use of the warmth, safety, rich nutrient sources, and vertical environment. However, immigrant species often cause trouble and become pests.

Rogue Weblife

In fact, in 2100, the most costly pest, in terms of money spent on protection and repair after attacks, is uncontrolled and renegade *Weblife*. Its constant evolution and closeness to vital systems makes Weblife management a huge business, which is often partly integrated with conventional pest control.

Cockroaches

Cockroaches are extremely good at utilizing any form of food as long as there is warmth, humidity, and darkness to forage in. Tiny hunter cybershells have made modern buildings harder for roaches to survive in, but they do still persist. Genemod roaches also exist, ranging from colorful pets invented by misguided biohackers to bioweapons designed to deposit bacterial flora.

Termites

Termites are social insects that eat cellulose, and have become a serious problem for biomaterial buildings. As with ants, however, many now prefer to control termites with pheromone signals rather than kill them. Used right, they can keep lawns trimmed and remove detritus.

Rodents

Rats and mice have survived miniature hunter cybershells and designer pathogens, but not without a fight. Biotech Euphrates has done the most to control them; they released the first SMC (Sterilizing Murine Cytomegalovirus) in 2026, which allowed third world countries to control their mouse populations.

Despite rumors of escaped lab animals and Doolittle rats, most city rats are not enhanced – the crafty little pests just seem that way.

Doolittle Raccoons

Although it's not a serious problem at the moment, a number of raccoons with the Doolittle virus enhancement (***Broken Dreams,*** p. 140) have begun using tools in an almost human manner, and have been raiding east coast suburbs and metavillages, robbing delivery cybershells, and hiding in abandoned and mothballed buildings.

Aspergillus Glaucus A450

"AGA450" is a mutant or modified fungus, source unknown, that eats plastics. Once started in a warm and humid environment, it can corrode devices, plastic electronics, smart clothing, and buildings with worrisome speed . . . and once started, it can survive into cooler and drier weather as well (though it grows more slowly).

Although it is primarily a problem of the tropics, instances have been caught starting in piles of refuse and plastic sewer pipes elsewhere. It is most damaging to electronics, for which it has a slight preference.

Bitumenovore

"Bitumenovore" is a genemod microbe community that thrives on asphalt. Beijing Zhongjing Bioremediation created it decades ago, based on chemosynthetic organisms found around underwater asphalt volcanoes in the Gulf of Mexico and Rangoon tar pit bacteria. It was originally intended for bio-remediation work, and was designed to survive in harsh conditions and turn asphalt into dust. Unfortunately, the fail-safe gene that made it dependent on spray-on BZBC nutrients was easily hacked.

In 2041, the Florida Department of Transportation detected signs that road asphalt was breaking down unusually fast, and eventually traced it to a bitumenovore variant able to survive on its own. Vehicle tires had cross-infected almost the entire American highway system, raising maintenance costs substantially.

Bitumenovore variants are now found worldwide. Tailored bacteriophages and bactericides can remove them, but this is expensive, and *keeping* a road clean is a near-impossible task. Most countries simply accept the extra maintenance.

Wrecker Dandelion

A dandelion variant that burrows into concrete with its acidic taproot was released at some point by Negalopolis (p. 9). Within a few generations, it can render concrete leaky and brittle, and since concrete is mostly used in older, less-smart structures, the dandelions can often wreck undisturbed for many, many generations.

Wolves and Bears

Decivilization has brought an increased number of large predators near to urban areas. Although seldom dangerous unless provoked, they can do damage to pets and property, and tend to scare people. Most countries use tracer devices to track and identify them. Older tracers are often implanted radio tags; modern tracers are often robot flea cyberswarms.

Vines and Climbers

The broad class of invasive plant species includes kudzu, mile-a-minute weed, engineered ivy, and (in lakes and ponds) water hyacinth; all form dense infestations that strangle other vegetation. Several were introduced for useful properties such as erosion control or decoration but went out of control. In many city environments, they take over unused lots and cover everything.

Chapter Two
Architecture

Someone programmed the blueprint layer of the building to sprout cheerful advice like "Safety is everybody's responsibility" whenever we logged on. To ensure that we read it, the messages appeared in new places all the time – pasted across a wall, circling over the building or in front of the elevator buttons, jumping away when we reached for them . . . Finally, somebody got fed up and set up an advice eater agent.

Building Styles

One can tell a lot about a city from the style of its buildings. During boom years, new buildings go up, matching the times. Berlin is marked by nationalist buildings from the 19th century, postmodern buildings from after the fall of the Berlin Wall, and a ring of environmentally conscious arcology hillocks (Stadthügeln) from the 2050s. Shanghai is marked by the Bund's pre-World War II buildings and the business skyscrapers of the first boom of 1990-2010, both in turn dwarfed by the titanic arcologies of the second boom of 2060-2090.

The main architectural innovation of the 21st century has been the arcology (see pp. 14-15). Combining all of a city's functions into a single building, arcologies are showpieces of advanced construction, manufacturing, life support, and computing. Different visions of the arcology's purpose can result in immense variation in design: Does it solve city-specific problems, separate man from nature, provide a safe haven, or just symbolize pride?

Although not exactly an innovation, the spread of light rail, AGT (Automated Guideway Transit), and underground cargo transports has been almost as important. Collectively, these ease commuting and move transport away from the streets. Most city infrastructure is shifting underground. Streets are increasingly places for pedestrians and bicycles. Meanwhile, rooftop landing pads still shape buildings into a characteristic flat-topped shape.

Low-density living and metavillages lead to enormous variation and innovation in smaller houses. Freed from most material constraints, housing styles are often limited only by building codes and irritated neighbors.

Buildings often aim for eco-friendliness and smarts, but that isn't enough . . . they must *look* eco-friendly and smart. Mid-21st-century buildings are often covered in natural materials, and '80s buildings in living material. Early smart houses might announce their abilities with cute antennas or metal ornaments; modern smart houses access the local augmented reality layer in subtle ways to announce their wealth – just *feel* the bandwidth.

Building details common in nearly all '70s architecture were arcades and covered verandas. The main factor was the ozone crisis, but arcades are also useful for protection against rain, wind, and sunlight, and for fitting in with reemerging street culture.

Orgotecture and Modular Houses

One interesting building advance has been *orgotecture;* a marriage of custom manufacturing and automatic topology design. Automatic topology design uses software to maximize strength and minimize material costs, under user-defined constraints such as window placement and the ability to bear specific loads.

The software starts with a rough design meeting the constraints, and then removes unnecessary material and shores up weak points in a series of small modifications, eventually producing a construction using as little material as possible. The result often resembles a mixture of organic branching shapes, truss work, and elaborate lattices – tree-like pillars are a clear orgotecture giveaway. There are few straight lines or corners except as a design constraint, and since the design is fitted directly to the circumstances, no two orgotectural buildings will look the same.

Custom manufacturing provided the ability to order arbitrarily shaped pieces, and so made orgotecture affordable: The architect or customer lets their software design the house. Then the builders order the pieces from a robot factory, await delivery, and put the marked pieces together like a 3D puzzle, leaving only surface finish and utilities to consider. Orgotecture can include accept any constraint – long afternoon sunlight, plenty of bathrooms, indentations to preserve nearby trees – and meet it in ingenious and smooth ways. Arcology superstructures are often orgotectural, even when the interior is modular or traditional.

Certain biological and nanotechnological building materials allow slow, automatic adaptation with use. While they cannot reorganize the entire house, they can add extra support for heavy loads and deal with unexpected environmental conditions. However, orgotecture houses are also organic in that every part fits exactly with every other part; this makes it hard to redesign them radically once they are built, since every wall is load bearing and the exact angle of the stairs also keeps the structure stable. The opposite approach is to make houses *reconfigurable.*

Modular houses are composed of interchangeable pieces, movable walls, smart materials, and sensors that allow them to change decor and function on command. The furniture is often also modular, and can shift shape, texture, and color to fit in. With a few commands and mover cybershells, a living room can become a workshop, library, bedroom, or bathroom, or a large room can split into smaller guestrooms.

Most modular houses cannot move parts themselves, but advanced designs allow even that. A popular feature in the Oikia Buildings "Dynatem" line of advanced modular homes is that the home AI can completely reorganize the home. Some people have their homes change monthly, others allow random surprises when they are away or download the "design of the month" from design journals. Some nomadic consultants bring "home designs" with them, and have their current house reshape itself to their preferences.

Even non-modular buildings often have flexible elements. High-rise and arcology apartments often have large windows that can fold out into small balconies, while leaving a smooth, aerodynamic, and easily cleaned facade the rest of the time. Changeable wall textures are another common feature.

Orgotecture appeals more to settled people who want stability, usually older, better-off people in the leisure class. Modular houses appeal to professionals and people experimenting with new lifestyles.

Tentacle-Tech

Piezoelectric cables that can snake through tubes and narrow sewers are a reasonably common tool, but some buildings use very narrow versions in large quantities as *architecture*. Done right, tentacle-tech can simulate mobile walls, "friendly" curtains, or even customizable furniture. Controlling tentacle-tech is roughly as complex as controlling a cyberswarm, and houses that use it extensively often have a dedicated LAI assigned to the task.

The New Hutong

Hutongs are the characteristic "Beijing courtyard" neighborhood style; the word can refer to both the lanes between courtyards and the neighborhoods built of such lanes. Each rectangular courtyard (called a *siheyuan*) is surrounded by four inward-facing houses, with a single gate and privacy screen leading to the outside street, traditionally located on the eastern end of the southern wall. The lanes outside the courtyard form a grid. During China's modernization, high-rise apartments replaced many hutongs (some going back to the 13th century). However, in the 2050s, ideas from the western New Urbanism movement exerted influence, and many older, middle-class Chinese looked for increased security and reduced megacity sprawl.

The *Rénxìng* design movement argued that manageable communities, defensible space, and individually configurable homes were cost-efficient. The "new hutong" returned to the enclosed, inward-facing courtyard, adding modern facilities, movable walls, and increased safety. Some include movable roofing for climate protection, allowing gardens in difficult climates. The small lanes are ideal for pedestrians, and are typically decorated with navigational frescoes, self-repainting surfaces (in less well-off areas), or advertisements (in public housing projects). For goods delivery, many neighborhoods have tunnels or centralized depots.

The classic hutong was home to two or three generations of an extended family, but this has become rare. The new hutongs focus on a community – some shared interest, a parahuman design, or a major project. Many special interest hutongs network intensely with each other, adding connecting virtual windows to form hutong cyber-communities. Others are practically isolate communities in the midst of a city.

Many Chinese inland cities (and cities throughout Rust China) use a hexagonal hutong design, with zigzagging lanes. These neighborhoods confuse outsiders, but maximize space use, block cold mountain and steppe winds, allow rapid construction, and keep cyclists from going too fast. Locally, they are known as *mílù*, "be lost."

Today, the new hutong has spread beyond China. Western variants are found in the American Midwest and northern Italy. In South America, many are built with biotech bricks and covered with enamel, wood, or greenery.

Underwater Rooms

Underwater rooms were recently in fashion for beachfront villas, and many still have them. These basement or sub-basement rooms have a window wall looking out into the water. Self-cleaning windows, smart sealants, and anti-condensation devices ensure low maintenance costs, without interfering with the relaxing and authentic underwater panorama . . . in theory.

In practice, most beach-front waters lack tropical clarity, and since few environmental protection agencies allow villas in the middle of coral reefs, most such rooms face the outskirts of city harbors instead.

They still have some advantages. For one thing, they are harder to eavesdrop on than most windowed rooms – laser microphones are more visible, and radio signals are somewhat dampened. Shootouts inside such rooms are not advisable.

The architect represents neither a Dionysian nor an Apollonian state: here it is the great act of will, the will that moves mountains, the rapture of the great will which aspires to art.

– Friedrich Nietzsche, ***Twilight of the Idols***

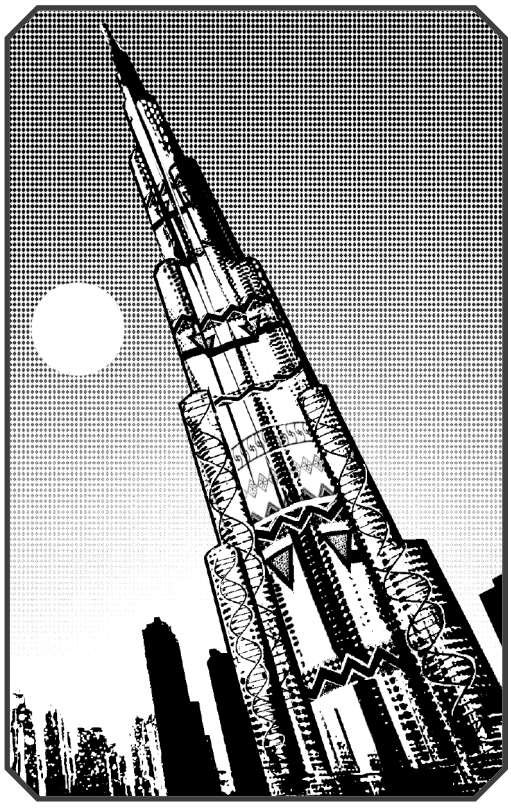
MEGASTRUCTURES

Megastructures are the *big* buildings – the grandest or most grandiloquent products of the architectural imagination.

SKYSCRAPERS

If there is a symbol for grandiose striving, it is the skyscraper, and in the 22nd century, it has paradoxically become both obsolete and more magnificent than ever.

The dissolution of cities has reduced the need for high office buildings (and slashed land values). On the other hand, ambition, optimism, and hubris, combined with tremendous advances in automated building, yield a powerful desire for skyscrapers regardless of need. In addition, many *landmark* skyscrapers, useless for modern purposes, are maintained for the skyline and city history – for example, mid-town Manhattan has frequent clashes over whether to expand Central Park over historic buildings or not.



The '30s also saw a skyscraper building boom, as formerly poor nations made their mark in South America, India, and South Africa. The boom ended with the Johannesburg Singularity in 2039, which breached the one-mile limit (the Madinat al-Hareer complex in Kuwait hit economic difficulties and was never finished). Built on land poisoned by mine tailings, and covered in a helix of ceramic plates reminiscent of DNA and traditional African art, this needle-like building became a national symbol of the emerging South African Coalition.

It was also called the Last Skyscraper, as the trend away from traditional offices was clear. Today, only half of the available space in the Singularity has ever been permanently leased. The rest is used for exhibition galleries, indoor gardens, or temporary projects.

During the '40s and '50s, most mega-engineering was in space, such as the constructions at L4 and L5 and the Mars beanstalk. Merely terrestrial skyscrapers seemed rather pointless (although arcologies benefited immensely from space life support and recycling research).

Today, the ambitious are returning to Earth. China regained the record for highest building with the Beijing Crane in 2090, lost it to Australia's Nullagine Solar Chimney Hotel in 2097, and reclaimed it with the Shanghai Xingzhe Arcology in 2098, reaching 1.86 miles high if the uppermost spire is counted.

Skyscraper Limits

The *basic* problem for tall buildings is simple: Each floor carries the weight of all higher floors. Bricks and mortar can reach about 10 stories without impracticably thick inner walls; iron and steel beams made the first skyscrapers feasible; diamond and nanotube beams (with more than 600 times the strength/weight ratio of steel) allow incredibly slender constructions.

At this point, a column of feasible length would pierce soil or even bedrock. Classic steel skyscrapers solve this with spread footing, where the column stands on an iron plate, which rests in turn on a pyramid of horizontal steel beams, which rests in turn on a concrete pad on the earth. The mile-plus skyscrapers of today extend this with building roots: The substructure extends splayed beams deep into the ground, anchoring the building against lateral shocks, reducing ground movement, and providing sensors to detect unwanted changes.

Another issue is the risk of buckling. Stiff materials help to a point – encasing the building in a stiff shell is more cost-effective, and most modern skyscrapers use an exoskeleton for load bearing.

Wind resistance is a complex issue. Most skyscrapers bend a little in the wind, swaying a few feet without any ill effects on the building – but occupants may hate it. Stiff and tight buildings are sometimes possible, but more often not. Most solutions favor making the sway less noticeable – mobile counterweights (pioneered by the still-standing Citicorp Center in New York City) are old-fashioned, but still effective. A *truly* modern skyscraper has a fractally branching internal skeleton and adaptive members: beams that *change length* depending their load. The building LAI constantly adapts to the changing forces to keep it stable; many keep track of the weather online and even through Doppler measurements to prepare for gusts of wind and rain.

Elevators are also problematic for very tall buildings. Although modern materials allow for lengthy elevator shafts, a single elevator cannot be everywhere it is needed when the floors number in the several hundreds. Banks of elevators can solve this issue, but each new elevator shaft reduces the space available on every floor it serves. One solution uses express elevators that go to certain floors, plus "local" elevators within groups of floors. Another is to put the elevators on the outside . . . but that makes the elevator cars vulnerable to the weather, and may upset fearful or vertigo-sensitive passengers.

Safety for skyscrapers is always difficult. In larger arcologies, it is impossible to evacuate in less than a couple of hours; the only choice when faced with a fast-moving event is to withstand it. Fire hazards are largely beaten, but chemical and biological agents remain a threat (though duct sensors and filters help). Power reserves are *vital!*

In addition, a skyscraper's exoskeleton is vulnerable to any event capable of *denting* it – the weight of higher floors can cause the entire building to buckle and collapse. Most modern skyscrapers have numerous defenses against climbers, fliers, and similar methods of carrying bombs – so far no spires have been felled, but few doubt that there are malevolent minds considering how to achieve it.

Example Architectural Companies

Here are some of the more popular building designers of this age.

Harris Tubic Architects

Although now receding into the history books, Harris Tubic was the most famous architect of the 21st century. He invented many widely copied techniques – shell-tubing, cantilevered shadows, dynamical sail climates – and designed a multitude of great arcologies such as Clarenceford 2, Miami Central, and Zhouxing Airport.

His designs are all very solid hardtech arcologies with no hint of biotechnology. A firm preservationist, he is currently too elderly to undertake any new projects, though his firm still does brisk business.

Kenneth Grimshaw & Partners

Kenneth Grimshaw is today's celebrity architect. Entirely uninterested in huge projects, he designs family houses in biotech materials and his trademark artificial jasper.

Molecular Architecture Inc.

A nanotechnology-focused firm whose main line of business is the development of nanotech and biotech building materials such as biobricks, cultured bone, Paduak Fullerene (see *Biomaterials,* pp. 17-18), and EvoPane (see *Biomaterials,* p. 18). The firm usually provides custom materials for other architecture firms.

Oikia Buildings

A modular architecture firm who provide everything from individual walls to entire apartments, as well as furniture and lifestyle tips. Oikia runs several lifestyle consultancies, advising on the good (modular) life.

Kormangala Biosolutions

Biotech Euphrates' main competitor in the biotech building business, Kormangala Biosolutions is a Bangalore-based firm that grows everything from giant biotech arcologies to small affordable snail-shell-based "bioshelters."

Lofstrom Pillars

One radical idea is to construct pillars out of fast-moving iron pellets (a "Lofstrom pillar"). A heavy mass driver at the bottom accelerates a massive stream of pellets upward through a vacuum-filled tube to another mass driver at the top that turns the stream downward into a parallel tube, where they are again turned around and thrown upward. Along the way, electromagnetic fields are used to anchor the building to this pillar of flying metal. The entire construction rests on electromagnetic fields rather than matter.

The few constructions built on Lofstrom pillars all exist on the Moon where vacuum, energy, and low gravity are plentiful. The first was the McCann-Kellgren telecommunications tower (containing only radio equipment) in Luna City. By changing the velocity of pellets it could be raised several miles or moved down to a receiver platform.

The second was the Concentric Restaurant, constructed during the Lunar Engineering Expo in 2099. The restaurant hovered 300 feet above the Expo on a Lofstrom pillar. Most visitors found the experience unsettling, despite multiple safeguards, including both small brake thrusters and a magnetic brake.

Many have speculated about when the first Earth Lofstrom pillar will be built.

Domes

The domed city is a classic science fiction concept, not unlike the flying car. However, while the flying car is a reality in 2100 (although hardly commonplace), city-sized domes remain impractical. A transparent dome can maintain a pleasant climate, but it also keeps in pollution and smoke, and must be cleaned. In addition, while modern materials allow a self-supporting dome many miles across, a half-finished dome is not self-supporting. (A tightly synchronized ballet of cybershells and skyscraper-sized NAI cranes might manage it, but that would be somewhat expensive.)

Smaller domes acting as greenhouses have become popular among Isolate communities in the far north and Patagonia. They both warm and provide a visible symbol of isolation.

Arcologies

An arcology is an entire city in a single megabuilding. Seen as solutions to overpopulation and environmental degradation, the first ones were built as hospital-homes for the elderly or as efficient factory cities in emerging countries. They were strongly influenced by space colonization – most orbital habitats are arcologies by nature. The arcology meme is strongly tied to frugality, efficiency, and mega-community.

Arcologies slash a city's land area and operating costs, but usually require a single organization to pay for everything. Arcology consortia tend to be a mixture of government and business, with enough internal politics and competition with neighboring arcologies to keep everybody interested. Arcology administrations employ a surprising number of bureaucrats, fixers, memeticists, and shady troubleshooters.

Reduced office space use helped make arcologies feasible, but also added more requirements for open areas, informal meeting places, and empty space for short-term rent. Arcology interiors usually give the impression of being spacious leisure malls, but good space is at a premium (while rent in the windowless core is often precipitously low). Arcology dweller careers tend to move outward rather than upward.

Arcology Generations

To date, there have been three major generations of arcologies. The first were hard-tech buildings, starting with mall cities and experimental "safe living complexes," and later giant pillars and pyramids. Many now show signs of wear and tear, including occasional malfunctions in their core infrastructures. Restoration will be hugely expensive – they were not designed for piecemeal reconstruction.

The second generation was the biotech arcology. Grown rather than built, these versions were strongly favored for their style, ease of maintenance, and perceived eco-friendliness. Still, many early biotech arcologies have been torn down and mulched by now, and their limitations in material strength have always been difficult.

The third generation arcologies are hybrids, mixing the strengths and components of each freely. Biotech walls grow on buckytube cables held up by metal and bone frames, symbiont bioshells secrete organic or inorganic building materials, and water, power, and nutrients are moved around by combined pipes and organic vessels. Hybrid arcologies are typically self-organizing and emergent: if there is a need for something local, biomass and AI build it. There is an ongoing race to be the first "real" commercial hybrid arcology. Prototypes have been flowering in Bangalore for a decade, but building the community remains hard.

Arcology Culture

Arcology culture is different from "outdoor" culture. Natives live close to vast numbers of people in a completely artificial environment. The *idea* of living in an uncontrolled, open system seems strange. Many prefer telepresence and the Web to real travel.

Arcologies can also *create* new cultures. The Nuiwhare Heretaunga arcology outside Hastings, New Zealand, was constructed in 2058 as a Maori cultural community. Traditional elements such as the *marae* (communal ceremonial center) were very successfully combined with a modern environment . . . and it was soon imitated. These arcologies produced a new lifestyle that have developed over the years into the "arcology *iwis,*" a group of new Maori tribes, often at odds with more orthodox Majority Cultures Maori in metavillages and with urban, mixed-society Maori.

Types of Arcology

Mall cities are the perhaps-final product of 20th-century mall development – a mall of stores in the bottom floors of high-rises that extend through a glass roof, with infrastructure below ground level. Many smaller and earlier arcologies are built this way. It requires no new building techniques, suited the earliest adopters well, and was familiar enough to convince skeptics to move in. In some places, mall cities grew organically as streets were roofed over, buildings were extended above, and part of a city grew into a kind of arcology. (Arcologists dislike such messes and refuse to call them arcologies.) Newly built mall cities might consist of several levels of malls held aloft by buildings acting as pillars.

Stadthügeln resemble steep-terraced hills, with "villas" and gardens on the outside surface and a vertical light shaft surrounded by stores in the center. They are found mostly in central Europe, having been built during the '40s to replace failing concrete suburbs in the old Eastern Bloc cities.

Pillar cities are simply skyscraper arcologies – a vertical construction with different floors for apartments, parks, shops, and meeting places. Many groups of pillar cities are linked by horizontal "open air" parks (nearly always domed over or otherwise protected against strong winds and cold). Another popular variant is the *Ocean Pillar,* with subsurface foundations, marinas, reef gardens, and submarine bays. Very tall arcologies are less efficient, so most pillar cities are not quite skyscrapers by 2100 standards.

Pyramid arcologies are common today, providing a large surface area and reduced elevator problems. The land footprint can be rather large, and they are usually built atop former suburbs with low land prices. One odd, very expensive variant is a double: an upright pyramid set atop an upside-down pyramid, with the entire structure held aloft by giant pillars.

A *Wall arcology* consists of a long row of broad high-rises (typically around 70 floors) containing apartments, meeting places, and open areas, connected to a lower row of robofactories and other industries. Between the high-rises are transportation buildings, malls, and meeting environments.

Organic or *reef arcologies* are shorter than the artificial ones, forming long meandering walls (*alangs*), reefs, or labyrinths, covered in light-collecting leaves. People live in surface apartments – the interior contains the infrastructure. In the courtyards between are parks and public spaces. While not so land-efficient, they have significantly lower maintenance costs than other types.

> *The cities of the world are concentric, isomorphic, synchronic. Only one exists and you are always in the same one. It's the effect of their permanent revolution, their intense circulation, their instantaneous magnetism.*
>
> *– Jean Baudrillard,* ***Fatal Strategies***

Urbiculture

Urbiculture is the production of food within a city, or within a large, otherwise non-agricultural building. City farming has been going on since cities began, with rooftop or backyard gardens where chickens and pigs were fed refuse; there was a slight break in the 20th century, but the arcology city again produces much of its own food. Tank-grown food production occurs in the core depths, while hydroponic farming allows thin vertical farms with transparent plastic trays moving on conveyors just inside the arcology shell. Some arcologies also have fish farms connected to the recycling system (which also provides nutrients for the hydroponic baths). Few arcologies are 100% self-sufficient, but many produce nearly all their food on the inside and only take in basic nutrient chemicals. Urbiculture is also popular in private homes, as a house AI can act as gardener.

Example Arcology: Guan Gong

Early Chinese arcologies were built for pragmatic reasons: water shortages, lost farmland, growing urban populations, and the increasing cost of transporting food to the cities. The Pearl River Delta Habitat Project, early in the 21st century, sought to fix these problems with a series of increasingly larger arcologies. The first was a 300-person testbed centered on a food-packaging factory and an urban agriculture system of algae ponds, hydroponic gardens, and fish farms. Each new arcology grew in size, complexity, and production, until the showcase Green Dragon Arcology on Hainan Island was finished in the 2020s with over 3,000 inhabitants. Today, with the tradition established, motivations can be more complex.

Guan Gong is one of the lesser arcologies in the Shanghai area. The basic structure consists of three 120-story skyscrapers, interconnected at multiple levels, with 20 stories underground. The height is 2,000 feet, not counting antennas and reflector panels. Each interconnected level contains seven million square feet of floor area, with the non-connected levels containing two million. The total population is 20,000 people, mostly telepresence professionals. Every 500 feet, a "sky terminal" acts as a local city center, transportation hub, and plaza.

The whole arcology is a steel-frame "rack" design: additional pieces can be slotted in as needed, transported in by superlifter air vehicles or cargo elevators. The building is divided into eight-story, 30×60-foot, rectangular units: five floors of housing, office, school, or hospital clinic and two floors of storage, plus an open plaza, garden, or local minifactory. Much of the volume of the arcology remains empty, to allow in sunlight.

Double-decker elevators serve two floors at a time, and act more like local buses than traditional elevators, even including internal cargo space between passenger spaces. Between inhabited floors are infrastructure floors containing cargo handling and storage, local recycling, cybershell storage, and backup systems.

The main robofactory lies beneath the complex, sending up manufactured objects through dedicated cargo elevators. Trash is sent to the lower levels to be disassembled, cleaned, and recycled. The heavy elevators also allow parts of the buildings to be disassembled and moved to other places as needed

The glass surface of the arcology is separated from the interior buildings by a garden and walkway space. These indoor gardens have their own microclimate, controlled by sprinklers and adjustable-transparency glass. Uninhabited sections are used for hydroponics gardening.

Although it now uses a fusion reactor beneath the building, local energy production was originally handled with solar cells, wind power, and even hydropower from wastewater falling down shafts (as a part of the "Shanghai Ecological Thrift Program"). Each floor has emergency energy storage that can be used in case of blackouts or damage.

In case of disaster, each block can be evacuated separately. The elevators are largely fireproof, and airlift from sky terminals is possible in a truly serious situation – or at least the simulations look plausible. Partitions can fold down to prevent fire spread, local water resources can be swiftly redirected to sprinklers, and firefighter cybershells are available to manage any crisis.

Geofronts and Subscrapers

Geofronts are very large (often spherical or semi-spherical) underground spaces used for living. Although excavation technology has improved markedly, and a nearly self-sufficient fusion-powered underground biosphere is certainly possible, falling land prices and reduced needs for dense settlements have not made them economically attractive. Some survivalist groups are interested, but usually lack funding, and instead turn to abandoned mines and bunker complexes.

Another form of underground living is the *subscraper.* A vertical shaft is dug with apartments ringing the central space along circular walkways and terraces. Light comes from above, directed into apartments using light shafts and sunlight-gathering mirrors above the subscraper. Subscrapers tend to be quiet, temperate, and compact.

The best-known subscraper community is Xianyang, in China, where a cluster of subscrapers was constructed to replace the old city. The architect Siwei Zhu claimed to have been inspired by the cave houses of northern Shaanxi, and included features such as semicircular doors, windows with sash bars set like fan ribs, and rock floors to make them similar. Initially skeptical, the inhabitants now enjoy the underground small-city feeling, and the authorities find the design reassuringly simple to monitor.

Floating Cities

Floating islands provide the ultimate in privacy. Most are little more than a garden and house, intended to float in a lagoon somewhere. The biggest are often anchored over a guyot (a flat-topped seamount) or reef. Although an island-like, floating structure is simple, creating a self-sustaining, organic island takes a great deal of biotech skill.

The Maldives is the center for biotech island construction, with Indian biotechnology firms deeply involved. Several atolls are used to house the islands before they can journey to the open sea. Critics warn that the islands are depleting the oceans and coral reefs of carbonates, and an increasingly vocal international movement opposes the "coral imperialists."

The islands are seeded with seacrete, followed by artificial coral on large buoyancy tanks (called "oysters"). These are often grown individually and then moved together. In the Maldives, small family companies often handle the first-stage growth. The grown oysters are then transported into the deeper atolls and auctioned off. These atoll auctions are floating fairs attracting drifters, tourists, con men, and traders.

The oysters are bound together into larger rafts that act as an island core, to which are added technological systems, layers of specialized coral, and plants. During this time they are growing in the protective atoll and monitored by telepresence cybershells (a series of "island-jackings" in the '90s resulted in much beefier security); after a few years, the island is ready for sale.

Some are simulated coral islands with sand beaches inside protective bays; others are floating forests or smooth-skinned giant plants. The housing is usually built into the island itself. Underwater garages, rooms with coral garden views, and elevators for deep-sea visits are all possible features.

The most-common way of moving a floating island uses ocean currents. Fullerene cables lower underwater sails to various depths, catching the right currents and steering the island. (Most islands also have traditional engines to overcome difficult currents, but "sailing" is more efficient.) Since most islands orbit an ocean current gyre, this generally works well.

Floating islands are robust despite their relatively fragile materials. Fullerene cables link buoyancy sections, and while a collision or explosion may break off parts, complete collapse is unlikely; afterward, new coral can be grown to fill out any cracks, and tanks can be restored. Still, it is possible to break a biotech island with sufficient stupidity, and every year someone with more money than sense tries to meet a serious storm or head into the southern sea where they encounter major waves and icebergs. The remaining floating sections often end up as valued parts of drifter habitats.

Drifters sometimes link their craft into temporary cities for trade, celebration, or mutual protection; land-dwellers tell stories of immense drifter rafts filled with all the sex, deceit, and other drama of a good meme. Drifter groups are usually loners and dislike working too closely together, but as the seas become more and more inhabited, and after some of the dangers unleashed by the Pacific War, larger flotillas and rafts have become more common.

Biotech

People were dancing and laughing in the upper rooms, but I was down in the cellar with the gardener, fascinated. He was showing me the literal roots of the house, the slowly pumping hearts and the colonies of mites that protected it. Everything was dark, wooden, and aromatic, so unlike the glass tower where I lived. At that point, I realized what I wanted to do when I grew up. I wanted to grow houses.

The simplest form of biobuilding uses biotechnology to make the building material, such as bioadobe or industrial bamboo (sprayed with plastic to proof it against water, wind, and pests). The next step is to use biotechnology to build the house and possibly even have living organisms integrated in the structure. Biobricks are a common example.

"Real" biotech buildings are organisms in themselves. From a practical standpoint, they have many disadvantages, but they are popular for aesthetic and ideological reasons. To transhumanists, they represent the interplay between technology and nature at its best, and while most preservationists dislike the warping of the natural, there exist borderline ecosophic groups who want the intimate contact with life that a living building represents.

Biomaterials

Biotechnology produces a wide array of building materials.

Bioadobe (***Fifth Wave,*** p. 23) is a common building material in poorer areas. Besides looking cheap, it has another drawback: in earthquakes, it easily shatters, burying inhabitants under rubble. It is hoped that as prices for tank-grown wood decrease, more poor communities will build wooden buildings instead.

Cultured enamel and ivory bathroom tiles are very popular; they are warm to stand on and hard, and can be purchased with colorful pigment patterns. *Roofing chitin* looks like plastic, is often brightly colored, and is both biodegradable and very cheap.

Tank-grown snail shells and mother-of-pearl are popular for interior decoration, often with natural shell patterns. The calcium carbonate/protein matrix is not resistant enough to be suitable for outdoor use without heavy coatings. Several bioarchitecture companies in Bangalore are experimenting with organic buildings that secrete an outside shell continuously just like a snail, avoiding ugly wear and tear by reabsorbing the shell at the back. Their competitors would love gene samples.

Instead of petrochemical asphalt for paving and roofing, biotech glues can be used. They are noncarcinogenic and come in many exciting colors and fragrances. In addition, they are safe from bitumenovores (see p. 10), although every year some new fungus, snail, or insect discovers that it likes a particular bioglue brand that then has to be replaced.

> *It's the sexy sectors – tech, biotech – that are behind the explosive growth . . .*
> *– Art Hogan*

Since trade in many tropical hardwoods was heavily regulated in mid-century, much of the production of mahogany, teak, tigerwood, iroko, moabi, bibolo, bubinga, sapele, etc., shifted to biotech vats. As tank-grown wood became cheap and environmentally friendly, hardwood floors and furniture came back with a vengeance. Complex inlays were the rule in mid-century homes, although these days they feel a bit dated. Tank-grown wood can produce exotic shapes and textures not found in nature such as green pine, purple mahogany, or walnut with braided fibers. These days, few carpenters care much for "wild" wood, since the quality is variable and one cannot order it to spec over the Web.

Even many high-tech materials are produced by biotechnological processes bordering on nanotechnology. For example, Paduak Fullerene, from Molecular Architecture Inc., is an organic composite of nanotubes linked by a wood-like matrix.

It is about as strong as steel but otherwise very similar to wood (it is entirely possible to hammer nails into it), and is a popular choice for beams in "rustic" architecture. Another material from the firm is EvoPane, self-cleaning and self-repairing roof tiles housing a designer bacteria that breaks down leaves and dirt.

Biobricks

The step up from bioadobe is *biobricks*. Unlike bioadobe, biobrick buildings are seen as quite presentable even in advanced nations, although perhaps slightly old-fashioned.

The builder constructs the basic structure and orders blocks of matrix. Matrix is scaffolding for growing cell cultures covered with a protective plastic film. The matrix blocks are put together and then pumped with a nutrient solution mixed with "architectural algae." These organisms begin to reproduce on the matrix scaffolding, turning it into a coral-like structure. A sequence of chemical signals are sent using the nutrients to trigger different developmental stages. They first build a strong inner skeleton and vessels to transport nutrients, then they refine the material so that it becomes denser in more loaded areas, developing a surface enamel or bark. Finally, they turn it into a largely inert bone-like material.

The drawback with this method is that the original blocks are not particularly strong, especially when filled with water. Hence, they can only form structures a few stories high on their own. However, since most buildings will have a stronger internal skeleton of metal or composites this is not a major problem.

Living Buildings

Growing a biotech building from a seed takes time, if it is to grow like a normal organism. An ordinary biotech building can grow up to one yard per day with external nutrient supplies. Usually, it is first surrounded by protective shell, either a grove of engineered bamboo or a bioplastic greenhouse. Many buildings are started using a large number of seeds that grow together into a single organism. The supervisor sends hormone signals to guide growth and keep the building healthy.

Most biotech buildings cannot subsist on photosynthesis, so they use electrosynthesis: electric power fuels internal organs that fix carbon dioxide. Such electric biotech buildings can survive power outages for a long while, but do not thrive. Many designs have safeguards that make them hibernate in case of nutrient or energy shortages. Also, biotech buildings cannot grow too tall on their own for the same reason as trees; as they grow higher, it becomes harder to bring water up from the roots to the top. Most therefore tend to be just a few stories high. Some bio-architects have opted for hybrid solutions to this problem; they install electric pumps that move sap through pipes to the top of a high building, enabling it to grow arbitrarily tall. Purists find this distasteful, and point out that such a building is very vulnerable to power outages.

Biotech buildings also require nutrients to function. While many have leaves and roots, this is seldom enough. Most designs have a nutrient tank that is periodically refilled and a recycling system that minimizes wastage. This is the literal heart and kidney of the building, and should it fail, the building may die.

Living buildings work best in warm climates. One ingenious approach to extending their range has been to add fine hairs on their skin to trap warm air and protect against dehydration and cold. This produces a silvery sheen many see as beautiful. A few central Asian projects have tried to extend this to a thicker "fur" (or rather, cotton); the results have been mixed. One design tested in northern Pakistan by Beccary Genomics suffered runaway fur growth that led to fluffy sheets ripping away in the wind, clogging streets and giving the buildings a patchy appearance.

Sick Biobuildings

Disease or pests can infect biotech buildings, and so they must be managed with care – otherwise they die.

One problem is *Klein Rr disease*. Originally a plant cytorhabdovirus attacking sugar-apple, this was discovered to attack living buildings created by Chandigarh Ecotecture in 2096. Chandigarh had used enough genes from sugar-apple and soursop trees for their fruit-bearing buildings to enable the virus to infect them. Infected buildings started leaking nutrient sap, distorting near the ground, and producing bad smells. Worse, the virus was transmitted by insects; damaged parts of the buildings exuded a sap that attracted aphids that in turn could infect other buildings with the same design. While the original virus was mostly a problem for Chandigarh Ecotecture, it was soon discovered to have mutated to affect some other biotech building designs; while less destructive there, it still caused vein damage and ugly discoloration. The company is well on its way to bankruptcy thanks to heavy litigation and the cost of treating the sick buildings.

A common quality control problem involves plant pararetroviruses. These splice themselves into a genome and spread when the host cells reproduce. If they contaminate an initial batch of architectural algae, they will spread throughout a building, at first doing no real damage – but when the later stages of construction are activated, the virus will react to them as signs that the host cell is doomed; like rats leaving a sinking ship, it starts to reproduce fiercely and spread into the surroundings. This is a typical behavior among many viruses, but especially troublesome when it happens at the same time throughout a huge biological scaffolding. At best, the internal structure of the walls becomes damaged or distorted; the viruses can also cause other parts of the genetic program to activate randomly, making the building grow openings, roof chitin tiles, or extra reinforcement in the wrong place. At worst, entire building sections can liquefy into stinking ooze.

Obviously, proper building procedures involve ensuring that seed cells and nutrients are kept pure and free from outside contamination. However, lapses in judgment, sabotage, and shoddy work procedures make such building rot accidents happen from time to time. The worst offenders are pirates who steal cells and nutrient solution, by stabbing the matrix with samplers or by sampling the waste drain, then use their acquisitions to seed their own buildings. The most embarrassing incident occurred 2099 in Ujung Pandang, Indonesia. The TSA Acquisitions Directorate had pirated an Indian design from a building site in Gangapur, and they were using it to grow the new suburb of Dadapan as a demonstration of TSA biotech abilities. The project manager had even allowed a Webcast of the entire site. Over the span of a week, 12 high-rise buildings first turned a sickly yellow and then began to melt. In the chaos, management forgot the publicly accessible Webcast, and after the news got out, the whole world watched the disaster replayed repeatedly. "Dadapan Meltdown" has even entered common usage to denote a particularly embarrassing self-defeat. The TSA of course claims that the whole event was a Chinese bio-weapons attack.

Chapter Three

Infrastructure

The alley was filled with refuse, which was a bad sign. Usually the cleaning swarms would pick up any small dirt and call in mobot reinforcements to deal with larger junk. But for some reason, they did not go here, and the spot was a disgusting mess. Just the place to hide if you were a small cybershell housing some nasty Weblife.

Something moved behind me and I whirled around. A box covered with cereal advertisements bent and made a movement as if trying to stand up. Instead it tipped over and started a small avalanche of refuse. That seemed to trigger a reaction from other garbage. Torn pieces of wrapping paper began to scintillate. A ribbon neatly tied itself into a rosette again and again. A half-melted plastic contraption began to sing an advertising jingle. A newspaper animated and began to read yesterday's news in German. The junk was distracting my peripheral awareness – just as somebody might have planned.

As I tried to search through the inner part of the alley, the garbage choir began to change. When I turned back, I saw that the box had stopped moving and instead was flickering white, humming ultrasonically. Other junk was reacting. The wrapping started to flicker, then the newspaper. The jingle was replaced by humming. Within moments, the alley was eerily lit up by every piece of smart garbage flickering in synchrony. I activated full antivirals on all my equipment, dumbing it down to avoid catching the virus. Now I had to deal with a cancertech outbreak, too. And somewhere on the other side of the garbage, I could hear the tittering of the escaping cybershell.

Trade

The introduction of robofacs, minifacturing, and widespread robotics led to enormous changes in the retail industry. Physical stores vanished, replaced by courier cybershell delivery. A pair of scissors, milk, a new pocket computer – anything can be ordered (and customized) through the Web and delivered to one's door. Those stores remaining focus on the experience of shopping (neighborhood minifacs often have a café) and on expertise.

Robofacs

Robofacs customize, build, and ship a product according to customer orders: the personal touch made industrial. When ordering a shelf, the shelf can be sized and colored for a particular wall and intended use. The objects it will hold may even be ordered at the same time.

Still, the average person doesn't have the time or inclination to customize *everything,* and so tailoring the details has become a major online business, one that most robofacs offer as a service. Online customization advice is a typical job for the underemployed, with in-store advice work as the next rung on the ladder.

The entire flow of production is so complex in even a small robofac that supervisors rarely know what one will do next. The best supervisors claim to have a feeling for the "mood" of the system, the ability to tell when a snarl is about to emerge. Most happen when a 3D printing component runs out. Logistics AIs are good at preventing this, but competition between the AIs for different firms can be fierce, and tiny margins mean that even a small delay or a few gallons of sealant waste can quickly landslide into an inability to fill orders. This, in turn, may force the rescheduling of later orders, and the poor AI must rebuild its entire manufacturing scheme, cascading the problem to still more customers.

Some robofacs will shift unmeetable orders to competitors to ensure that everything is completed in time. Some less ethical robofac companies may even resort to sabotage in order to increase their own orders this way.

Delivery and Courier Services

Global delivery services are roughly unchanged in the 22nd century – pick up at point A and deliver to point B – except for their efficiency. Although there are extra charges for rapid delivery or for delivery to dangerous locations, most service is same-day, or two-day worldwide. Despite such rapid long-distance transit times, in-city delivery is still a sizable part of the industry. Most ordered goods are delivered from a robofac in the same city, often within a few miles of the home, and delivery times are measured in hours rather than days.

Delivery cybershells are designed for speed, reliability, and safety of the cargo. They are heavily networked and monitored to prevent theft. Flying buzzbots may deliver small items, while a hexapod truck shell with a trio of mover shells would deliver an antique piano. Alternatively, many Fourth Wave nations see extensive use of bioroids for the final delivery step. "Shell shelters," often used by several competing delivery services, are busy places filled with rows of recharging shells, repair and cleaning shops, and one or two LAI or human supervisors.

Major Courier Companies

These are a few of the preferred or unusual delivery services available.

China Post

Earth's largest delivery service, originally the Chinese postal service (itself dating back to the Shang dynasty), the China Post is now intrasolar, reaching the orbital habitats, Luna, and Mars.

Todar

Todar is an in-city delivery chain with franchises in many major cities and smaller communities. The Todar red lightning logo is ubiquitous; most people identify it with consumer goods.

Geodesic Couriers

Geodesic is an international courier service known for picking up and delivering with very fast flying cybershells.

Fresh Deliverance, Inc.

Supplying novelty deliveries, "style" couriers, and other unusual ways of sending something to someone, Fresh Deliverance can arrange for everything from a singing telegram to a message in a bottle. Company psychologists stand by to suggest creative ways of giving things.

Taller Esperanza Transporte de Carga

An Argentinian company, TETC sells packages that are themselves simple, disposable cybershells ("cartonbots") that can deliver themselves over short distances.

ABDB, Inc.

A budget delivery service based in the United States, ABDB maintains shell shelters while local franchises are responsible for their deliveries. Their reliability varies enormously.

Most buildings and arcologies have delivery entrances and elevators that require no human intervention – and some cheap delivery services, faced with a building lacking this, will simply "deliver" the package to the street outside the building. More specialized courier services offer expensive delivery *experiences:* love letters delivered by bioshell doves, songs delivered by gene-modified parrots, old-fashioned bicycle couriers, or cyber-swarms that "deliver" a product by building it on-site.

The courier system can break down in interesting ways. A building with automated courier reception could be fooled by a courier recognition code into smuggling something (or someone) into an otherwise secure structure, an important courier delivery could be stolen or sabotaged en route, or hacking a courier service might be a way to obtain free taxi service to anywhere in a city! To combat this, courier systems employ a range of techniques: NAI/LAI smart parcels, biological bonding, or carrying the parcel *inside* the courier.

Bazaars

Most cities grew up as centers for trade, and even with 3D printing and courier services, there is a need for marketplaces. The modern bazaar, supporting entertainment as much as acquisition, offers novelties, other people, historical excursions, and unplanned encounters. Bazaars of all sorts also offer corporate, political, and social groups a testing ground for new memes and products.

Bazaars also allow city centers to counter the great malls. Sometimes they involve a particular counterculture, but they are often more valuable for *mixing* cultures on the city streets. Some city planners use bazaars as safety valves – most see some traffic in illegal or restricted goods, but less than might otherwise occur, and with less overlap with *other* forms of crime. Some are ancient institutions of their own, such as the Grand Bazaar of Istanbul (founded 1464), or London's Portobello Road (founded 1850); others are relatively new, such as Le Bazaar de Paris (founded 2052).

Virtual bazaars offer many of the benefits of a bazaar, but "all virtual bazaars are alike." Physical locality dictates the mixture of cultures, persons, and goods, and so produces unique blends.

Business

Robofacs, automation, and telepresence have significantly reduced the need for staff dedicated to production, transportation, and warehouses. While some larger corporations still maintain a lavish headquarters and skyline-defining skyscrapers, most do not. Reputation no longer depends on the old symbols of status.

However, some traditions die hard. The Fifth Wave city still has business districts (though they are more modular now, as many firms rent office hotels for the duration of a project). Rather than cultivating a corporate environment, many corporations work together to cultivate a *city* for its creative class (p. 36), simultaneously providing a better environment for workers *and* a larger population to hire from. Telepresence and a global economy ensure that cities rarely close down at night – even local businesses often have customers and stakeholders in different time zones.

Corporate taxation has slowly risen (see ***Transhuman Space,*** p. 93), but cities may not have anyone to tax if they fail to provide a satisfactory environment for a corporation's creative class. This is especially true for small businesses, which may lack a *physical* location – when the office is in the wearable, the main issue is good seating, the right surroundings, and a roof. Still, emergent technology companies often need direct contact with one another. Clusters may form at malls, science centers, or parks. Sometimes they appear and disappear overnight: New Madrid became a cluster for CDJ recombination "immunohackers" in autumn 2099. They converted empty buildings into small startups and labs, headhunters cruised the parks, and people filled the coffeehouses with talk of the defense applications of polyadenylation. By Christmas, the technology was mature, only two companies remained on the market, and the immunohackers had all left town.

Think Tanks

Think tanks are important meeting-points in a city's political and social life, organizations dedicated to providing informed advice on a variety of topics. While some are entirely virtual, many insist on physical meetings (often informal affairs, little more than extended business lunches) and social networking, to allow unexpected creativity and changes in perspective – a for-profit café culture. A think tank may work on public policy, economics, military issues, memetics, bioethics, net policy, space property development, schooling improvements . . . almost anything!

The sheer complexity of the transhuman world has produced an abundance of specialist think tanks: nobody can keep track of every issue, so a company or government that needs to deal with a problem finds a suitable think tank that can explain it and make suggestions. Memetic think tanks acts as meme designers and reviewers, and spread the desired meme to other meme spreaders in politics, media and business.

Think tanks have taken over much policy production from the politicians, especially since cyberdemocracy and memetics began to expand. Policy is about clarifying which goals are primary, what priorities to acknowledge, and which new issues to pursue strategically. However, this cannot be left to just the memes carried by politicians. Think tanks find sets of values and memes that function well together (and *work* in reality!) and place them into a specific political context, and help negotiations and social trading between different groups.

Noted Think Tanks

These groups are among the numerous organizations devoted to interdisciplinary research.

Data Synthesis Inc.

The world's largest think tank is a commercial organization exploring very large datasets, supercomputing, data mining, and ways of managing the information explosion. DSI is hired by many governments to "find needles in haystacks," as its motto says. Critics claim it helps many repressive governments stay in power by supporting their intelligence agencies.

Migeod Kreis

An originally German, now global, consultancy focused on memetics, Web culture, and popular culture, Migeod consists of an online community where specially invited students, researchers, and other suitable people interact informally to consider different questions.

The Chislenko Foundation

Chislenko is a transhumanist think tank based in Boston and Islandia, and was one of the key ideological centers of transhumanism in the mid-21st century.

Hox Duplication III

A commercial biotechnology think tank from South Africa, Hox studies biodiversity, catalogs genetic designs, and analyzes interactions between modified organisms. It also promotes the idea that the biosphere is about to (or should) undergo "a second Cambrian explosion" thanks to human intervention.

The Eric LeVeen Institute

The LeVeen Institute is an old U.S. free market think tank that rose to prominence in the '30s with its support for the "altruistic imperialism" of companies like Ithemba Biotechnologies and Columbia Aerospace. Since then, it has promoted space business and analyzed space policy and space military strategy. It has close ties to Columbia Aerospace and the U.S. space forces, with daughter think tanks dealing with issues of terraforming, space treaties, and interstellar missions.

The International Reform Institute

An anti-TSA think tank based in Perth, IRI attacks infosocialism and nanosocialism philosophically, analyzes threats to intellectual property, and consults on the state of the TSA.

Polyglobal

A smart materials think tank, Polyglobal has contracts with a vast number of intellectuals and experts in every subject, calling upon them to perform evaluations of new technology. It produces some of the best short-range technology future studies in the world.

Consensus Insight

The intellectual powerhouse supporting the introduction of cyberdemocracy in the U.S., Consensus Insight was involved in a complex scandal when it was found to be using a "puppet tank" to promote its ideas in the PRC. The affair hurt its credibility, but cyberdemocracy supporters (aided by the think tank) are claiming this was a setup by Chinese intelligence.

UNMERA

An international group based in Buenos Aires, UNMERA publishes reports on economic development, emerging problems, and policy recommendations to ensure a more prosperous world economy.

Rinma Klusterkorp

A Duncanite think tank with representation on Earth, Rinma's members are experts on outer system policy. Despite its ownership, it has an absolute sterling reputation for giving unbiased (some would say coldly rational) analysis.

There are also "deep think tanks" which formulate future policy. They look for problems that might become important and try to be first with solutions; when the issue actually appears, they can sell their services at a premium. Many such deep think tanks work to shape political policy decades ahead, and can be very influential while remaining almost unknown.

> *We are confronted by a condition, not a theory.*
>
> *– Grover Cleveland*

Brussels and Washington, D.C. are the focus of the think tank world in their respective blocks, and have become the major think tank clusters of the planet. Practically every think tank that has anything to do with politics, economics, or security has representation there, and think tanks and lobbyists make up the majority of local business. The Chinese government also sponsors a large number of think tanks to provide ideas in a non-official capacity. These were behind many of the reforms of the 21st century and are noticeably freer in their thinking than mainstream politics (being allowed to be *almost* heretical). The party leadership applies an evolutionary/market algorithm: groups that provide useful ideas which work get more funding, and others try to imitate them, or members break off to strike out on their own.

TRANSPORT

A city's transportation network is its bloodstream – and in 2100, it can incorporate many elements.

SURFACE

Surface transport takes many distinct forms, depending on requirements and available resources.

Moving Sidewalks

A classic failed prediction is the moving sidewalk. Such things have always proven too slow, inflexible and vulnerable to be useful except for indoor locations like airports and long connection tunnels.

Nonetheless, in 2088, DTH Dynatech began selling their "TaxiMosaic" system. This consists of bands of tiny rollers, each less than an inch across, all individually controlled by software that monitors where everybody stands. Since the rollers can vary in speed, two people can move past each other on the same band at different rates. Near the end, the rollers automatically slow down, and if a user takes a step forward, the rollers under the descending foot immediately start moving at the right speed. If someone trips, the rollers can catch him with minimal risk. Users can also control the system with gestures or commands through wearables or implants.

Despite being installed in many arcologies, TaxiMosaic proved a failure. A single stuck roller would make the band hazardous, and safety-conscious systems kept them turned off until they were fixed. Dropping grit, fruit, or ice cream on the roller surface produced a long band of hazard. These days, most remaining TaxiMosaics are found in arcologies' transport levels, where they move cargo loads and cybershells. A few enthusiasts still consider the Mosaic the most fun way to travel and keep a few in running order for personal use, doing stunts on the surface or reprogramming the rollers to run in complex patterns ("pedestrian art" that has to be walked/danced to be experienced).

Bikes

The one vehicle that has truly succeeded in the 21st century is the bicycle. In suburbs and metavillages, as well as in many arcologies and city centers, bikes are the dominant personal transport. During the early part of the century the E.U. and then China offered tax breaks for every mile traveled by bike rather than car. By mid-century, this was no longer needed, and these days bike congestion is occasionally a concern.

The basic bike design is unchanged, but modern bikes are made of extremely light materials, while the saddle is typically configurable with regard to ergonomics, size, and color. Bikes are equipped with enough smart electronics (powered by pedaling) to use gyroscopes to help maintain balance and gently guide cyclists (through a bias in the handlebars) to pass obstacles safely. Stealing advanced bicycles is pointless; they refuse to steer or balance when not ridden by their owners.

The Automobile

The urban car has seen a radical decrease by the year 2100. Many old streets and public squares have been glassed in, for environmental and societal reasons, creating a more controllable environment. Telepresence, taxation, public transport, tunnels, and suburbs sucked the cars out of the city centers. The last Fifth Wave streets that allow car traffic appear bustling because they are designed for it; in many places, much traffic is just virtual images. Smartcars (***Fifth Wave***, p. 131) and a few air cars (***Transhuman Space,*** p. 193) are the most commonly encountered real vehicles. On-board AI usually takes care of the driving, and thus most of the problems previously associated with traffic have been eliminated.

Many cities have constructed systems for smart parking, which have almost eliminated parking tickets, but also provide a powerful tool for traffic controllers to monitor individual vehicles. A radio identity tag in the car identifies it to sensors in the curb, and the cost of parking is debited from the owner's account. Cars that do not answer signals from the smart environment triggers a visit from a cybershell or (in poor areas) human parking warden. Rather than ban certain parking locations, they can be made extremely expensive, making people avoid blocking them unless they really have to. The price for parking or driving in a certain area may vary with regard to traffic control's estimate of congestion.

The vehicle identification codes are also very useful to snoopers who seek to keep track of a car's movements. Parking records are useful, too; they are privacy-sealed in most nations, but the police can get access to them. It is of course illegal to tamper with vehicle identifiers or curb detectors, but there is a black market in stolen or counterfeit identity codes.

Shipping, Ports, and River Traffic

Waterways near cities have seen an increase in traffic. Despite the rise of local manufacturing, more goods than ever have to be shipped. Intercontinental shipping has always been more efficient than transport by air, despite the 21st century's "heavy weather."

The D-He-3 reactor and AI crews have given freighters extended ranges at low cost. As many ships are typically above 150,000 dead-weight tons (reducing the importance of the Suez and Panama canals, as such ships are unable to pass through them) and can stay at sea for a long time, the need for very large ports such as Rotterdam's Europoort (***Fifth Wave,*** pp. 100-102) has increased. Such ports are often vast complexes with enormous container terminals filled with goods from all corners of the world. Due to the complex automated storage and loading systems needed to keep a 22nd-century cargo terminal running, ports are often very desolate places, overshadowed by looming cranes. Rumors and urban legends abound regarding what could be hidden in the never-ending rows of containers, and where those cargoes might go. Sometimes, astute criminals manage to penetrate a harbor's computer system, fooling it into delivering a pinpointed cargo container into their hands, re-shipping it to a location were they can seize the load. These daring raids can net landlubber telepresence pirates large and easily fenced bounties.

Besides the ocean terminals, there are now many bustling riverside ports. The need for heavy transports is still present, and some nations have solved it by reopening their canals. Competition from railroad networks in the 19th century made canals largely obsolete for commercial transport, and many fell into decay. Initially, some were restored for pleasure rides through picturesque landscapes. When canals also found use in the early 21st century as convenient routes for fiber-optic networks, and highways needed ever more expansion for truck traffic, canals were found to be an alternative. Some rivers have also been canalized in places in order to make them more navigable and to control their ecology. Barges usually dominate canal shipping, but on many rivers, hydrofoils can be used for greater speed. Many of the riverside transports and ports are operated by smaller companies, as they do not require the same enormous logistical organization as the oceanic ones.

Historical port areas are often situated within cities, with limited scope for expansion, and seldom see much cargo (besides cruise tourists) being unloaded. Such docklands, with their often centuries-old buildings, are frequently just tourist traps, although they sometimes make excellent locations for innovative business start-up clusters. Modern port facilities tend to be placed outside cities, if perhaps close by.

High-Speed Trains

Railroads were once the backbone of inter-urban transport infrastructure, but newer transport technologies reduced this role considerably. However, relatively recent developments in fusion power and magnetic levitation allow faster trains and have caused a shift in how trains are used. They can now achieve much higher speeds than previously, which gives them an important role as very rapid cross-continental connections at a lower price than flying the same distance – once the high-tech tracks are present.

Typically, each station offers connections to just a handful of frequently traveled destinations; high-speed passenger trains rarely stop before their main destination, in order to maintain maximum speed for the whole journey. Tunnels and bridges can facilitate passage under or over quite large bodies of water, but even so, trains are often only used within a political bloc; if they are required to stop at borders, they lose valuable speed. Maglev tracks are in fact often encased in tunnels for all or much of the length of the line in order to minimize nuisance for surrounding areas, and so trains are not taken for the scenery anymore; high-speed train travel needs to be *fast* to be economically feasible. These trains usually contain comfortable passenger facilities, sometimes featuring movable walls within the carriages and other ways of providing more personalized accommodation.

The station buildings are often a less appealing experience. Modern train stations need much less space than in the past, although they do need to provide connections to local transport systems. Older station buildings are usually too vast for their present use, with many platforms abandoned along with much of the yard space, often giving an eerie, desolate feeling. As only a relatively small area of the yard is used by the often-enclosed tracks, the yards become places where squatters dwell and many criminal deals go down. How to clean up the local railroad yards and use the space for better purposes is an ongoing discussion in many city councils.

Subways and AGT

Subways have had an uneven history in the 21st century. During the early decades, many cities began subway projects, especially rapidly growing cities in the former third world. Subways were noiseless, clean, did not take up space in already crowded city cores, and were little affected by the weather. The downside was the expense and the risk of vandalism, crime, and terrorism.

In January 2025, the Kreschatik Massacre brought this home. The pro-Russian separatist group SND detonated bombs in the Kiev subway system, trapping several thousand commuters. Fire and leaks broke out, and the world could only watch (live, as many of the subway surveillance cameras were still active and connected to the Web) as they suffocated or drowned while rescue teams dug through the wreckage. The event had a profound psychological impact worldwide. It showed just how vulnerable a subway system could be to a direct assault, inspiring copycat terrorists and frightening commuters. By 2030, many subway companies were in crisis.

Some cities abandoned their subways altogether, like Cairo, Lima, and Baghdad. Many emerging cities sought out alternatives; buses, monorail, trams, and AGT (Automated Guideway Transit) systems. In some urban areas such as New York, London, and Mexico City, subways could not be abandoned, as public transport already relied on them too much. Instead, strict safety measures were implemented: bomb sniffing equipment, security checks, ubiquitous surveillance, and automated background checks on random ticket-buyers.

These "high-security" subways remain a paranoid experience where everything is monitored and controlled; while many people chafe under the scrutiny, others revel in the perceived safety.

Over subsequent decades, subway development was almost stagnant. The high security subways were expensive to extend and suffered from constant false alarms and security breaches. As alternative systems were developed, they became increasingly competitive, and the stigma of subways as "buried-alive transit" remained. As people moved out from the cities, the need for subways also declined.

In the 2080s, though, things were looking up again for underground transport. The old fear of subways was finally declining (although Relics and Millennials are sometimes fussy about them; see ***Fifth Wave,*** p. 28). Linear-motor metro systems allowed smaller trains, which, together with advances in robotic digging, made it cheaper to build tunnels. Old tunnels could also be reused, but since the trains were smaller, the extra space could be used for emergency exits. In many places, old subways were replaced by variants of AGT. Instead of just having trains, the system also included smaller one- to four-person "cabs" that could move directly between mini-stations (known as PRT, Personal Rapid Transit). Entrepreneurs spoke of the "mole boom" as many cities built extensive underground rail networks with large public stations, smaller local transit points, and private transit points below some office and apartment buildings. Today, most metropolitan areas have extensive complexes seamlessly integrated with other transit systems. They are no longer subways but simply the underground part of the normal transit network.

> *Congestion is a sign that you have a healthy, growing economy and have refrained from over-investing in roads.*
>
> *– Robert Cervero*

Using the transport system is generally simple. For example, in Stockholm, a passenger walks to the nearest StockTrans stop and waits for the next train. When he boards it, an AI sells him a digital ticket, which is quietly handled by the personal computer most people carry. (People not currently connected to the Web have to buy their tickets beforehand at a wall terminal at the station.) The biometrics of free riders are recorded and sent to the police who fine them. In addition, a large orange triangle above the head of the free rider is added to the subway AR space, indicating him to the other passengers. This social sanction is usually far more effective than the fines in motivating people to pay, with the exception of certain youths who enjoy "painting orange" by free-riding as a big group.

If the passenger wants to go directly somewhere, he can request the trip through the StockTrans Web connection or station wall screens. After a few seconds, a PRT cab arrives and will open for him. It then quickly moves to the desired destination with no intervening stops. One of the drawbacks is that the current franchise holder has given the cab AIs a talkative standard personality, which tries to push tourism services or advertisements based on what it can determine about its passengers. While it will obey an order to shut up, it always starts again after the regular announcements of how many minutes of trip there are left. Passengers may note that cabs are well protected against vandalism, as they monitor occupants and will act if attacked. First the AI gives a verbal warning, then it sends a record to the police, leading to fines, and in extreme cases, it simply drives to a police station where the cybershells of the law will be waiting.

The history of the underground has also led to the existence of extensive empty underground passages in many cities. Old subway tunnels, escape passageways, unused stations, passages dug by companies that went bankrupt, and transport conduits for delivery cybershells provide plenty of space. While surveillance equipment and locks *should* prevent unauthorized access, in practice, security is often spotty and can be circumvented by someone with the right knowledge or equipment. This provides ample room for hiding without the inconveniences of traditional sewers. Escaped bioroids, criminals, vagrants, isolates, and corporations (cutting corners on dumping or transport) use these labyrinths illegally.

Airports

Airports have diversified over time, thanks to advances like the air car (***Transhuman Space,*** p. 193), and the long-range personal aircraft (***Fifth Wave,*** p. 131). It is no longer necessary for major airports to manage large numbers of small aircraft, since ducted-fan engines and VTOL designs make it possible to start from micro-airfields or even random open spaces. Air commuting has become increasingly possible over long, even transcontinental, distances thanks to cheap alcohol-based fuels. With rapid flights, low costs, and little trouble, airports are about as glamorous as bus stations, and many airliners are precisely just "air buses." Pilots are assisted by advanced software, thus no longer requiring such prolonged professional training while making travel safer.

Better transport transforms societies. Individuals are able to develop long-distance relationships with people living in far-flung towns. Many frequent fliers know their way around other cities better than their purported place of residence, and feel less attached to the whole of any city than to specific quarters of several. (This is especially true for Overturners and the Transhuman Generation; see ***Fifth Wave,*** pp. 28-29.) Some credit low-cost airlines and personal aircraft with the creation of a true European identity.

More-traditional airports are limited to acting as hubs for cross-global transonic and transatmospheric flights, for when speed and range are of the essence. Thus the number of such airports has been reduced to a few *major* facilities; vast complexes of hangars, service buildings, customs offices, immigration controls, shops, hotels, health care facilities, office hotels, and so on. One of the most important functions of all airports is to coordinate the many local flights and provide traffic control. Hence, airports have extensive computer capabilities, often using sophisticated "agoric" (market-style) systems to calculate individual fees for the various air lane users.

Due to the requirement to be able to send emergency alerts quickly, and the diversity of virtual standards used by travelers, major airports seldom have very advanced augmented reality environments. Likewise, decorations and services are usually minimalist in order to encourage people to pass through as rapidly as possible. The sheer diversity of people traveling also makes it more difficult to find imagery that will work for everyone. Often airports concentrate on a few public artworks, or recurring themes in the architecture that explain the place's character to foreign eyes. Some find this social engineering pleasurable; most find it drab, and move on.

While aircraft are quieter than in the past, and transonic flights gain a certain altitude before going to full speed, noise pollution remains a problem. Major airports are often surrounded by extensive "noise zones," creating areas of cheap land. Near the airport proper is often an area of underemployed space, noisy industries, and odd groups and individuals. Many who grow up in these very diverse "noise zones" become receptive both to urbanism and to a mobile lifestyle.

Airport security is often very tight, but needs to be unobtrusive in order to secure smooth transitions. Most often it is a particularly careful combination of public monitoring by SAIs for anomalous patterns in crowds (see ***Broken Dreams,*** pp. 87-88), and strict but simple rules, but some airports in a heightened state of emergency might v-tag or scan individual travelers. Security requirements are probably one of main costs of flying.

NETWORKS

Communications are the life of a modern society. Cut off Web access and most people and devices flounder around in the dark. Most people are more dependent on it than they expect. Many Fifth Wave citizens' first reaction on arriving in a less developed nation is to complain about the bad Web access – there might still be ample bandwidth for communicating and running the many services they are used to, but the *texture* feels off. Lags are slightly too long, information transfers stutter, and servers seem to dwell on requests that should be dispatched instantly. If access is lost entirely, they suddenly experience a frightening loss – they can't communicate, many of the functions of their worn computers suddenly disappear, and the world around them becomes stark and empty of clues. Where are the helpful arrows pointing the way, the translations of signs?

In 2100, there are no separate phone lines, cable television, radio channels, or Internet lines. They have all merged into the Web, which handles all kinds of information. Web protocols allow information to be moved with speed dependent on payment: paying a bit extra enables access to high-speed conduits suitable even for sending and receiving slinks or ghosts.

Many places are rated by the number of gigabytes per second per cubic yard that is available. When more people crowd together, the bandwidth hunger can exceed supply, and there is a "Webout." Bandwidth depends on the proximity to transmitters; some bandwidth hogs go up to transmitting walls or sidewalks and hug them, trying to get as many bytes as possible.

OPTICAL CONNECTIONS

The bridge was a geometric abstraction, sharp concrete edges and angled pillars connoting speed, high tech industry – and total obsolescence. Once the intercity trains might have rushed over it, but these days small bushes were cautiously conquering its surface. The canal it crossed was empty except for a small sailing boat inexpertly piloted by a tourist; the heavy barges and their cargo of coal had vanished decades ago. The highway a few miles north was similarly quiet and empty.

But I could see the heavy commuter traffic in another layer. The bridge carried one of the main Midland optic trunks: a significant fraction of a petabyte every second. In the network hardware layer, the bridge was glowing white-hot with data, outshining the pale red gigabyte links along the highway or the overhead microwave links. I settled down on a piece of masonry that a v-tag proclaimed to be the remnants of a famous bridge and began to send out the nanoswarm I had in my backpack. Nobody would mess with the infrastructure of British Webcom on my watch.

Underneath a city, there is a dense network of thick optical fiber conduits. Usually they run in existing tunnels – sewers, subways, trunk lines for water and electricity. This backbone network transports the main flow of Web traffic. At regular intervals, optical router boxes join different trunks and shunt data down the right path. This regional grid is linked to even heavier backbone links connecting other major regions. Security is usually tight, especially around important routers. The telecoms and government institutions that run them do not take kindly to attempts to interfere with the essentials of society. At the very least, they have tamper-proofing skins, and usually there are a few sensors nearby to alert the company security that someone is there. A few key nodes may have defensive swarms.

Individual buildings are connected to the main city backbone through their own fiber links. When new buildings are constructed, plenty of extra connections are added for future needs. Somehow, there is always an unexpected need for more bandwidth anyway.

A traditional network engineering joke is "100 megabytes per second is enough for a human brain." At that point, the information flow exceeds the capacity of the nervous system to take it in. The real joke is of course that most Fifth Wave citizens consume more bandwidth anyway. The constant information flow is used by their possessions, be they interactive clothes, home security systems, or attendant LAIs. In addition, many businesses produce and consume far greater amounts of data. An ordinary one million inhabitant city may transmit more than a petabyte per second internally. The global network may be transmitting over 10 exabytes per second.

Inside most buildings the network conduits run in the walls, connected by tiny local routers and firewalls. These also allow wireless access. Sending information through the air is practical but there is a loss of bandwidth: at best one can squeeze through a fifth of a gigabyte per second over tight-beam links, but usually it is a *lot* less. High bandwidth applications like slinks and brain-scanning equipment really require a cable into the wall.

The snake pits of cables linking home electronics have vanished, replaced by wireless – but now there are optical fibers hiding in every wall. Damaging walls can affect homes in unexpected ways – especially modular buildings where everything needs to know where everything else is and what color, texture, and shape it should be.

Wireless

Reading warning labels is fun. Each warning has someone's story behind it: "Do not use to disassemble containers." "Do not use in reducing atmospheres or vacuum." "Do not use for surgery." "Do not operate in strong magnetic fields." Mine reads: "Do not link to unshielded Web connections." I might still be paying for that adventure, but the lawyers have made me immortal.

For generations most people have regarded the Web as wireless. Many people have never seen the optical fibers hiding behind the walls.

Most wireless net access is done using radio waves and near-field emissions. Both are electromagnetic signals, but while radio decays slowly over distance (if it is not blocked by walls or shielding), near-field signals have a range of less than a yard. Near-field systems allow devices close to each other, especially those carried by the same person, to form their own local network that then links up to the rest of the world through radio.

Indoors, infrared light signals are also used for some communications. They tend to be fairly short range (around 30 feet). Another short-range, low-bandwidth method that is very rare (and hence harder to detect unless one knows what to look for) is ultrasound.

Lasers can pack plenty of information into a signal but have limited range in air; they are more often used in space or for certain indoor environments like robofactories. Near-Ultraviolet Lasers, NULs, have become increasingly common in truly bandwidth-hungry indoor applications where sunlight cannot reach and humans seldom go – NUL usually indicates that this is an environment solely intended for cybershells.

Living in the Augmented World

Most urban regions provide courtesy bandwidth: a limited but adequate net connection for anyone passing by. Most people buy extra bandwidth beyond this to really connect to the place. It is also possible to get advertising-sponsored bandwidth: one gets free access, but advertisements pop up or one's movement and reactions are monitored for marketing purposes.

Base Reality is about 70% of what Fifth Wave urbanites see; the rest is augmented reality. This consists of layers of imagery overlaid on the physical world. People select them not unlike the way earlier generations tuned to different television channels. Some layers are highly standardized, others entirely personal. When a person activates an augmented reality system, there is usually a primary layer for the system, essentially a computer desktop controlling the other layers. When entering a street, the individual might choose to activate a tourist layer: landmarks will be marked, requests for further information will open explanatory windows, and there are usually numerous suggestions for where to go and what to do. Most places have at least one free tourist layer, and for a small payment, one can get an augmented guided tour led by an AI.

There are usually also numerous free information layers, commercially sponsored by stores and restaurants or supplied as public services. These help in finding one's way around the city, show reviews, point out transit, or just decorate the environment. Sponsoring stores get dramatic or interesting fronts, virtual public artworks and virtual firework displays become visible, and buildings become more beautiful. As a rule of thumb, the more exclusive the layer used, the fewer irrelevant details are visible.

Beyond the commercial and free layers, most people run a few private and subculture layers. A group of friends can set up their own layer that points out the position of other members when they are in the vicinity or allows them to add virtual tags for the others to see. Subcultures often have their own layers, allowing members to recognize each other or adding details relevant to their interests – reporting news or marking meeting sites, enemies, or safe routes. Certain layers can be extremely exclusive.

> *An open network is more important for democracy than the right to bear arms and the right to vote.*
>
> *– Joichi Ito*

While most layers just add a bit of extra information, some can mask much of reality. Game layers are the most common: they turn the everyday world into a fantasy landscape. Image processing algorithms change the environment into something fitting: houses become gothic castles, nonplayers innocent farmers, and footballs Spheres of Supremacy that can be used to command virtual creatures. While a fun game indoors (until someone chasing the Jade Moonbat through the Cave of Volition kicks over Great-Grandmother's priceless porcelain vase), this can be dangerous in the open when vehicles or heights are masked by the scenery. Each year there are a distressing number of accidents due to players running into traffic or not noticing a sharp branch they are running toward. Many nations have laws requiring such games to only function in certain designated safe environments, but since the software is often downloaded internationally this only protects some players.

Augmented vision layers add visual enhancements: pointing out objects, filling in contours that cannot otherwise be seen, or adding details from cameras. Users can – at least when things work as they should – make walls translucent and see what is on the other side if there are cameras there. The problem might be that the information is wrong. Augmented vision also allows people to read bar codes and v-tags – or a group of people can agree on a codebook and have their wearables translate coded messages in graffiti.

"Antispam" layers *remove* advertisements: image recognition covers signs and images with something innocuous. Certain regions have even mandated the inclusion of tags on public advertising to allow easy removal, but for some reason, such tags never seem to work properly. Other filter layers can remove other unwanted imagery – including people. Nobody knows exactly how many people run racial editing software, but wags joke that editing is probably the reason people are so tolerant these days.

Some people live almost in "padded reality," getting rid of a lot of unpleasantness. Alternate Reality Cultures (ARCs) share elaborate sceneries overlaid on reality where nearly everything is turned into something else. The most common ARCs are historical or fantasy settings: the most popular, the surreal fantasy Layra Rnth, has over a million paying subscribers, although most do not use it all the time. Some ARCs are based on peculiar aesthetic ideals. The Saenradam Layer adjusts light, angles, and objects to make the world look as clean and architectural as a Pieter Saenradam painting, while POer-4001 adds an elaborate spirit world based on the works of Adolf Wölfli and William Blake. Creating a good ARC is complicated; most are supplied by specialist virtuality companies that run arrays of AI and visual conversion software to maintain them.

Of course, in practice there are always some problems. Most augmented reality systems have problems with accuracy: Virtual and real objects do not quite match each other. Shadows point the wrong way and objects may suddenly jump to new locations. Endless Web discussions and virtual glasses boutique visits deal with fine-tuning the setups.

A big issue in the E.U. and elsewhere has been whether to allow police overrides of people's software – either to disable it or to activate "non-consensual layers." The idea is to ensure that in a crisis everybody can get emergency information. While most people have local emergency layers active by default, some switch them off or have them hidden beneath other layers. The debate about the "right to one's reality" is hot.

Many layers of communication are invisible to normal people. There is a whole world of low-level inter-device communication that is never seen: as things move around, they tell the world of their existence and set up brief networks to pass on data, enable a passing person to print on a nearby printer, or perform a joint error-check operation. With the right software, this activity can be seen, and clever people sometimes use it to track other people or interfere in the daily life of their appliances. Getting Weblife to invade someone's home network by fooling it into linking to a router without a firewall is a classic childhood prank.

The Network Hardware Layer

Most augmented reality environments include a *network hardware layer* somewhere among their options. This marks out all the Web physical infrastructure in the observer's vicinity, with the level of capacity and use (generally much the same thing) indicated, usually by color coding: High-traffic fibers are marked with thick, glowing white lines; busy connections with blue; and so on down to dull red one-person connections and black inactive links. The level of radio and IR traffic is indicated by translucent tags "in midair," and the user can request routers, junction boxes, and the like to be flagged with text boxes showing technical details and basic diagnostics; where fibers run to and from, and who owns what, can also be marked.

In most places, the network hardware layer is freely accessible, although only technicians and obsessive technophiles generally even know that it exists, let alone how to use it. In some places, where the authorities are especially secretive or concerned about the chance of sabotage, it is only available to those with the right security codes. It is usually secured, or partial and limited to very basic information, in police stations and military installations. Where no such layer exists, technicians can run a Complexity 4 "bytescanner" program in their wearable or implant that automatically interrogates diagnostic v-tags on any hardware in the vicinity, searches public databases for documentation, scans standard microwave channels for traffic levels and unencrypted header information, and constructs an overlay with the same sort of information as best it can.

Either way, this view is a useful technical tool, although it is far too distracting to keep on all the time in well-networked environments. Of course, the network information layer can be inaccurate, and router v-tags can be turned off or set to lie; anyone discovering an active fiber which doesn't show up *at all* can guess that there's something curious going on somewhere.

Health and Death

The cathedral of the Middle Ages marked a city as prosperous and godly. Today the hospital performs much the same function. The shift from patients as passive recipients to demanding health consumers changed much of the hospital's structure. Enhancement medicine also contributed, setting a pattern for private sector health.

The typical hospital visit involves preliminary HyMRI scans and sampling, providing doctors with a detailed map and decision support system for adjustments to the patient's health. The hospital bed is a healing environment, keeping the patient comfortable and entertained and hiding the sophisticated equipment that monitors everything.

Because health is so individual and subjective, "health environment consultants" (and the health models they sell) have skyrocketed. Hospitals suffer from fashions as much as the rest of society – near-ecology health (surrounding the patient with homey, familiar elements) is popular today, but experts predict that ambient sonic health memes are returning.

Health Centers

Local health centers are the most common places for medical treatment, each serving a metavillage or a few city blocks. A few nurses and doctors (possibly telecommuting from somewhere else) and a small treatment facility are enough for most problems. Other health centers are leased by network hospitals for treatment of their patients or are actually on hospital campuses.

In many cases, patients can recuperate at home – the center monitors medical signals, giving advice and telepresence help, or (in emergencies) sending paramedics.

Example Arcology Hospitals

These are two examples of comprehensive medical centers.

New Brunswick Regenerative Medicine Center (New Jersey, USA)

NBRMC specializes in regenerative medicine: regrowing lost limbs, organ cloning and transplants, restorative surgery, and extreme trauma medicine. It is particularly renowned for its work on neural regeneration and rehabilitation. While such activities go on at any major hospital, NBRMC is the first choice for hard problems due to unusual genotypes, serious trauma, or exotic tissue damage.

The NBRMC arcology is closely tied to the Rutgers University medical faculty and especially the Center for Regenerative Biotechnology Medicine. As the center grew to prominence, it helped shift the hospitals in the area toward regenerative medicine. In 2077, several hospitals formed the NBRMC consortium and construction began.

The arcology itself is a series of glass-enclosed, wave-like buildings stretching from land to sea, complete with an indoor harbor. Patients waiting for regeneration often amuse themselves teleoperating sailboat cybershells or miniature surfing bodies.

Arcologie Hôpitalier "L. Pasteur" (AP-HP) (Paris, France)

This massive arcology hospital serves the Greater Paris metropolitan area with 33,000 "hospital beds" and 20,000 physicians. The total number of employees is over a quarter of a million, and the number of consultations is around 30 million each year.

The building itself is an impressive arcology in classic geometric style. It consists of two white, pyramidal towers leaning toward each other. Each tower is 1,000 feet wide and 500 floors high. Between them stretches a multi-story bridge with an elevated park on top and a railway and subway station beneath, turning the arcology into a kind of triumphal arch. Within the towers, there are large open spaces with restaurants, gymnasiums, indoor parks, and terraced apartments. Extensible landing pads receive airborne emergency transports. While not truly self-sufficient, AP-HP does have impressive energy, manufacturing, and food production facilities and acts as a city-within-the-city. The complex is its own municipal area (the 22nd arrondissement), with its own local council and mayor.

Hospital Campuses

A hospital campus contains many semi-independent health centers, consultancies, biotech companies, and other health-related services. A patient arriving at a health center may, say, receive specialist care from a nearby medical consultancy, using cloned organs from the tissue factory next door.

Arcology Hospitals

The opposite of the loose hospital campus is the centralized arcology hospital, where *everything* is nearby. Some arcologies are entirely devoted to medicine, with a "tourist trade" consisting entirely of patients. The residents are typically staff, or extended-stay patients suffering from chronic diseases, hypochondria, or old age. (Many of the earliest arcology hospitals were basically extended service apartment complexes for the old and infirm.) Arcology hospital styles range from the semi-mythical atmosphere of alpine sanatoriums to efficient "health factories." Most such hospital structures must either serve a large population center, or attract a certain type of patient on a worldwide basis.

Arcology hospitals are among the most controlled environments in the world. They hold to the watchwords of safety, efficiency, and timeliness. Ubiquitous monitoring and AIs ensure that things happen automatically. This extreme level of safety appeals to some people, though following the elaborate safety procedures can be tiresome.

Network Hospitals

Some hospitals exist only online. Patients meet with their doctors virtually, and receive any necessary equipment (possibly including a nurse cybershell) in their homes. Surgery still requires rented local hospital space.

Network hospitals have proven popular among both wide-ranging travelers and those living very localized lives. They also fit in well with medical homes (see below) which report everything relevant to the hospital and can implement treatment if needed.

Certifications Boards

Network hospitals are certified by various medical boards, such as the American Medical Association, the European Medical Certification Board, or the International Union of Online Care. Some independent, for-profit boards also exist, such as Evaluación Diaz-Cela del Hospital, Cui Hao Testing, and Herodicus Validation. Independent boards must walk a tightrope between being paid by hospitals and retaining a reputation for strictness. Most are monitored in turn by other organizations such as the Online Certification and Review Agency, a major NGO. The world of medical certification combines huge sums of money with detail-oriented bureaucracy and the occasional discreet attempt to catch competitors in a mistake.

Medical Homes

For many people, the home *is* the hospital. Home sensors can measure a multitude of things: movement (giving doctors insight into orthopedic problems and lack of exercise), heart rate, exhaled substances, airborne bacteria, even brain activity. Medical bracelets, subdermal implants, and even a diagnostic toilet can provide additional information.

A home AI can be equipped with medical skills and access to hospital subroutines – in an emergency, it alerts the hospital and acts as an intermediary for treatment. A medical home may also have medical cybershells (or several adjoining homes may share a pool of specialist cybershells). Medical cyberswarms have also been attempted, but rarely to date.

Desktop pharmacopoeia devices remain status symbols for the rich and health-conscious. These nanofacturing devices produce the right drugs or nanodrugs at the right dosage at the right time from chemical and nanotech precursors. While larger pharmacopoeia devices can be installed in the home (and the drugs may even be added to auto-cooked food directly), the small and very expensive desktop versions are just the right thing to show off wealth, while keeping the body in peak condition.

Enhancement Spas

The enhancement spa provides a combination of rest, medical procedures, training, and general wellbeing. SpaTek (***High Frontier,*** p. 61) and others operate well-known orbital and lunar spas, but there is an even greater variety on Earth, with individual spas specializing in everything from ghost creation to holistic healing and upgrade.

Many spas are themed. At the Polynesian spas at Rotorua, New Zealand, visitors bathe in hot mineral springs and enjoy traditional food and culture while undergoing therapy. The Keito Memetics Center at Otsu, Japan is patterned after a Rinzai Zen retreat, with memetic counselors resembling Buddhist monks, meditation exercises, therapeutic martial arts, and tea ceremonies. It has proven so popular that Keito franchise centers are spreading internationally. In Europe, Finnish enhancement spas are particularly popular among transhumanists. Located well out of the way in the northern forests, they provide privacy, innovative enhancements, and local color. A visit to the sauna is obligatory.

Cemeteries

People still die in wealthy areas in 2100, but infrequently. Medicine and transhumanist technologies have made death seem less and less natural. Heart failure is a sign of failure on the part of the health care system, insurers, or the person – it is no longer an acceptable cause of death.

The Lazaroff Institute

Not all online hospitals are legit. The Lazaroff Institute, in numerous incarnations, has been scamming health consumers for several years. It typically appears as a new, specialized network hospital announcing itself through a targeted advertising campaign to certain groups of people such as Alpha upgrades, individuals with cardiovascular problems, or Zoroastrians. The first customers get first-class treatment, giving credence to its claims. (The Institute is very skilled at modulating word-of-mouth memetics.) Then the Institute rips off the medical information from subsequent customers, leaving them open to identity theft, medical blackmail, and fraudulent treatments. It seems to act as a front for a network of criminals buying victims through internal auctions.

Some Home Medical Options

Atlas Diagnostic Felt: A blanket filled with sensors, used to quickly ascertain the state of a patient in an emergency. When wrapped around a person it can measure vital signs, sample blood, perform ultrasound and optical imaging in 3D, and report the findings to nearby computers. Functions as a biomonitor (***Transhuman Space,*** p. 162), giving +2 to medical skill rolls, but requires less effort and fewer special connections to set up, and also acts as a blanket. $6,000, 0.4 lb., A/1 year.

Fontane Desktop Pharmacopoeia: A typical desktop pharmacopoeia device (see the main text). When connected to Fontane Medical Services and selected health providers through the Web, and supplied with appropriate precursors, it is able and licensed by most reputable agencies to manufacture most of the drugs or nanodrugs an owner might need. An ostentatious status symbol, the Pharmacopoeia is encased in asteroid iron, etched to show authentic Widmanstätten patterns. $20,000, 2 lbs. The prices of the drugs are automatically debited from the owner's health account. LC4.

Home Medical Upgrade: Turns an ordinary home into a potential hospital. Includes upgrades to local software, installation of medical sensors, and medical cybershells. While privacy and medical practice regulations in many countries prevent a home from scanning and treating outsiders, workarounds exist that turn the medical home into a potential clinic. Costs range from $5,000 (includes two 4-point, Complexity 4, skill set programs giving Diagnosis (Human) at IQ and Electronics Operation (Medical) at IQ+1, which of course require an appropriate AI to be present, and a basic medical sensor suite), up to $200,000 (includes a Cyberdoc – see ***Transhuman Space,*** p. 122, and ***Changing Times,*** p. 54 – and additional assistant shells, a dedicated NAI-6 installed in a static computer and trained with Diagnosis (Human)-13, Electronics Operation (Medical)-13, and Physician (Human)-13, and an advanced sensor suite throughout the house). Add a $100-$1,000 monthly fee for maintenance and upgrades. Note that the AIs operating such systems will often receive a bonus to Diagnosis skill for good-quality (or better) equipment. LC4.

However, dealing with death is still a sizable, *discreet* business involving funeral homes, grief counselors, bereavement assistants, lifeminers (see p. 38), virtual memorial designers, and long-term character-impact memeticists. As death has become rarer, the amount of money spent on funerals and emotional support has *increased* tremendously, resulting in a plethora of unusual, individual funeral practices.

In the 20th century, cemeteries took up an increasing amount of valuable urban space, encouraging cremations, collective memorials, and even multi-level cemeteries. Cheaper urban space and fewer deaths have lessened the pressure, however. Many Decivilizationists even feel that cities-as-cemeteries, scattered throughout the wilderness, would be a fitting memorial to urban humanity, while burial has become popular among preservationists seeking a return to natural cycles.

Still, cremation remains viable, and is not uncommon. Spreading the resulting ashes is often tightly regulated, however. On Earth, acceptable practices include mixing them with the concrete used to repair or seed artificial reefs, or placing them in the foundation roots of a biobuilding. In space, the only legal option is placement on burial satellites. In both cases, of course, there is a small economy in smuggling ashes for a "better" burial.

Diamond burials – converting the dead person into a diamond – has been popular at different times. The Chinese middle class practiced it extensively in the 2070s, and many anti-preservationists "cheated the carbon cycle" with it in the '90s. Nanostasis preservation is also still in use, mostly by believers in hyper-evolution – future posthumans may have better methods for recovering lives, after all. In many countries, the same companies that handle funerals handle long-term person storage, and the not-quite-dead may be stored in secure bunkers beside the dead.

Modern funeral monuments run the gamut from small v-tags to fresco-covered mausoleums. Cheap manufacturing and cheap urban land make size relatively unimportant, but other methods of indicating status are possible: rare natural rocks (mined at high cost or smuggled), tombtrees (trees, often customized in look or even scent, with some of the person's individual, unexpressed genome spliced in), and other expensive-but-useless additions can help show the wealth of the deceased.

Virtual cemeteries (originating in Asia) are old enough to be traditional, although some old-fashioned cemeteries still refuse to have anything more than navigational augmented reality. Most cemeteries have a virtual counterpart that can be visited from afar, as well as carefully designed virtual memorial groves, meditation environments, and interactive grave markers.

Talking tombstones, with video and audio from the deceased, were popular in the first half of the century, particularly in emerging nations. While most are little more than sentimental greetings, others are entire autobiographies. Most grave markers today also store images and greetings from visitors as v-tags. These "deadblogs" can be surprisingly active.

Adding *shadows* to graves is a recent and growing practice (see ***Toxic Memes***, p. 71), particularly in Chinese cities.

Infomorphs rarely need funerals – it is almost impossible for them to accidentally die – but there is an upward trend. Infomorph funerals are typically held in a virtual cemetery, and do not take up city space.

A slightly different form of infomorph funeral ceremony is the *carnevale* – a meat person who underwent destructive uploading has a funeral-and-rebirth ceremony for their old body. Kazuhiro Nishimori performed the first publicly known *carnevale* and described it in his *Posthumous Autobiography.* Today, there are many variants, ranging from self-mocking festivities to very sober Buddhist burials. Some Christian hyper-evolutionists see the *carnevale* as a sacrament on the road to union with the Omega Point.

Police and Security

Police work in Fifth Wave nations has mainly become a matter of maintaining a visible presence and performing community service when on patrol (see ***Fifth Wave,*** pp. 41-42). The specific activities of different city police departments depend on local legislation, tactical doctrine, and departmental culture, but the following describes typical operations in large cities in western Europe.

There has been a switch in recent years by many departments toward more non-confrontational tactics, relying on support from the community. Police forces often work hard on building trust, consent, and legitimacy by opening up their organizations to public scrutiny, and responding to communities' criticisms. In return, people accept police back doors into their software and sensors. In a metavillage whose citizens trust their police, every Smart Lawn Gnome™ can become the eyes and ears of the law if needed.

Police stations are often well integrated in their neighborhoods, with small staffs and considerable local government control. Patrolling is usually done on foot; this increases visibility, and helps to break down the perceived rifts between the officers and the public that could follow from officers driving cars or vans. Driving patrol cars in 22nd-century city-center streets is not advisable in any case, since many environments do not accommodate them. However, patrolling officers usually have mobile backup from roving air car units, flying cybershells, or sentry swarms, and can call in a heavier response or specialist knowledge at short notice.

The police use heavier cybershells, K-10A postcanines, and various kinds of cyberswarms, if appropriate for the mission. This appropriateness is partly determined by the sensibilities of the community; if, say, uplifted animals are not accepted in the area, they are not usually included in patrols. However, if the need really exists for such tools, officers can usually quickly call them in from air patrol units.

When the police apprehend dangerous criminals, are in pursuit of a fugitive, or are attempting a major salvage operation, they will be assisted by NAI partners and will be in direct contact with the tactical center at their station. C3I (Command, Communications, Control, and Intelligence) systems make it possible to link together a whole police squad so that they can draw information from each other. NAI assistants also record what is happening, storing it in escrow at a judiciary server to discourage police brutality or procedural mistakes.

A police officer's service weapons are invariably smart, containing everything from documentation and maintenance advice to targeting systems. Weapons also record how and when they have been discharged, enabling internal affairs units to perform thorough investigations. Many departments include friendly fire inhibition programs in service weapons, preventing a gun from firing accidentally at a colleague or bystander. Mistakes still happen, though – usually involving the weapon erring on the side of caution.

What has distinctly changed is the *analytical* part of police work. Technical and physical evidence are considered vastly superior to witnesses when bringing cases to court (see ***Broken Dreams,*** p. 65), and the ever-more-digital nature of many crimes demands massive amounts of data analysis. Most policemen spend their time in virtual offices doing data mining rather than chasing criminals physically.

One very important tool for the police in a age of automated systems is the possession of override codes for various types of machinery, vehicles, and owned AIs and cybershells. Depending on the degree of imminent public danger or the severity of a crime in progress, the police may need a warrant or may be free to simply shut down a device or take control over it. A few cases have occurred where criminals have acquired police override codes and then used them for their own purposes.

Another controversial issue is police use of memetics. Particular memes can be dangerous to the public, possibly inciting violence and crime . . . so the police may respond to their propagation (see ***Toxic Memes***, pp. 125-127). Often, police memetic response is preventive, aiming to defuse situations and disrupt fertile environments for a dangerous meme – but this makes the police into active propagandists, compromising their perceived neutrality.

The means at the disposal of the police have increased, but it is important to note the balance between the police and the public. Various cultures and communities do monitor their local police departments. Technology is a tool that can be used by both the watchers and the watched, and in a cyberdemocratic society, it is often quite easy for citizens to act against abusive police.

Surveillance Systems

Surveillance is ubiquitous in Fifth Wave cities. Public privacy laws may have been passed (***Transhuman Space***, p. 77), but many areas remain where the police, authorities, and private concerns monitor events. The concept of what is to be considered a public area has also changed; it is considered quite proper to have surveillance, monitored by the owner, on private property, and parts of a street may be owned by some organization.

Buildings have extensive opportunities to watch their inhabitants, and may do so simply to ensure smooth operation. Take presence-aware lights as an example. To save power, some eco-friendly (or cheap) landlords add motion detectors or other sensors to lamps, turning them on when somebody is present, and saving energy otherwise. However, this also potentially turns the lamp fixtures into a building-wide surveillance system. The first designs at the start of the 21st century were simpler than that, but soon it was realized how useful it was to network the motion detectors. After all, most people dislike walking along a corridor with just the lamps above lit and darkness ahead or behind, so it was much more acceptable to have the entire corridor light up when someone was passing – but networked sensors could act as a cheap way of improving security. Over the years, the energy-saving issue has become almost moot, but the system survives in many Third and Fourth Wave nations. Even in some Fifth Wave buildings, motion-sensitive lighting remains active, or is even newly installed as some people prefer the "traditional" technology. Children have grown up learning to evade motion detectors as part of the game "cross the darkness."

However, a modern building usually has a NAI running the lighting. Usually, this tries to adjust the illumination to allow a person to cross the building without seeing any dark spots. Some NAIs may have idiosyncratic programming, however, perhaps trying to avoid disrupting the biorhythms of potted plants by keeping them in shadow.

A clever manipulator can of course abuse any such system. Monitoring the lights showing in windows is a simple way of figuring out security patrols, and since the security of the lamp systems is often low, they may represent an easy way to insert misleading signals into the building AI network.

However, the main point here is that surveillance systems provide *many* ways to monitor events. For game purposes, GMs should bear this in mind, but also remember that any part of the system may be spoofed, confused, or damaged. PCs investigating a mystery may or may not just be able to scan a database and find out who or where somebody was, or what happened in a given place. Conversely, PCs bent on causing trouble should be aware of the issue and have ways to deal with it; after all, it would be rather incompetent of them as well as boring if they were arrested after every minor infraction thanks to roving surveillance bots.

Ubiquitous information certainly does not provide an easy way to skip all investigation. When someone asks their AI to put together a list of all possible people fitting a certain profile, most lists are going to be extremely long – or empty. A too-specific request, like looking for all individuals named Olsen who drive Fujitsu cars, likely voted nanosocialist, and smoke, may produce zero results because there is no publicly accessible image of Mr. Olsen smoking despite his private habits. Remove the smoking constraint, though, and the list may instead run to hundreds of names.

Jamming Surveillance

Many surveillance devices send information back through radio links, which can be jammed. It is of course trivial to program the receiving computer to trigger an alarm if the connection is broken. In practice, this is rare: The noisy electronic environment in a modern city causes glitches all the time, or something heavy and radio-opaque might be moving between the sensor and the receiver, and electronics do fail occasionally. If the system raised an alert each time there was a disruption, there would be too many false alarms. Hence, most systems do not immediately react if sensors are lost. Some are smart enough to react when more sensors are lost at the same time, or if losses follow a suspicious pattern, but many just log a repair call and wait.

Sending out a replacement signal showing something else can also theoretically jam wireless cameras. With a well-designed security system, this is impossible, since each element will use effective encryption. But a surprising number of systems are still using very cheap, long-since-broken encryption (or none at all!) and can be subverted, at least by well-informed criminals, allowing the high-tech intruder to record images from the cameras and send them back edited. This is usually thought of as a Fourth or Third Wave problem, and many people think that high-tech criminals from Fifth Wave nations are using it perform crimes in the less developed world. (There have been several popular InVids and slinkies with this as plot element, most notably the "Caper Djakarta" Bollywood stories.) In reality, most such interception occurs in Fifth Wave societies; bad security is a universal problem, and having more wealth in a society means that the criminals are on the average better equipped.

Wired security networks are of course harder to jam or intercept – not impossible, but tinkering with the wrong wire or fiber can make things worse rather than better for the intruder, and few are obligingly labeled or color-coded, while random failures are less likely, so unexpected drop-outs are more likely to trigger alerts. Unfortunately, hard-wired systems are more expensive and less flexible; still, competent security managers know that the expense may be justified. A seriously secured permanent installation should be much, *much* harder to infiltrate than some random office block.

It is also possible to blind cameras with lasers. Since many cameras are sensitive to light slightly outside the human-visible range, an infrared laser can blind cameras without (non-enhanced) humans noticing it. Simple systems just spray light around; more advanced types automatically aim for the anti-reflection coatings on lenses. (This often blinds the cameras on people's wearable computers, so it should not be attempted in a crowd if one doesn't want other people to react.)

Any security system, whether mindlessly automated or run by an AI, has a fundamental problem. Make it too sensitive, and it will produce too many false alarms. Turn down the sensitivity, and it will miss events it should have alerted its owners about. Even in 2100, people generally err on the side of fewer false alarms. A classic method for fooling the owners of a security system is to make it experience false alarms over and over again; the irritated security people will (hopefully) eventually decide the system is set too sensitive, and turn it down. Of course, a sufficiently clever security chief or AI will recognize this "crying wolf trick" and be prepared.

Still, false positives are inevitable with any system. For example, facial recognition systems can be linked to police databases of wanted suspects, and then run on the signals from every camera in a city. (This has been tried repeatedly for over a century; the idea appeals so much to some regimes.) Even so, if there is just one chance in a thousand that one face is mistaken for another (about how well humans recognize each other), a system watching a million people pass by every day will generate a thousand false alarms. Fortunately, often the simple knowledge that a security system is present is enough to deter criminals, and there is no real need for it to detect everything.

Using more AI software just adds extra levels to the game. Many simpler security NAIs and LAIs have fairly well defined "personalities" that an experienced hacker can exploit. For example, the Gemini Volksrobotics Argus-99 series of monitor LAIs are very quick to report their suspicions, making it easy to circumvent them by having the LAI pester its owners or police too often. The PGSS Nygates system, on the other hand, has an evolving population of small competing NAI agents that latch onto suspicious patterns, trying to earn "rewards" by detecting intrusions. Here, fooling the monitor system is equivalent to fooling an immune system: The best way is to trigger an "autoimmune" reaction, by getting the agents to interfere with each other by sending out investigatory cybershells that trigger the suspicion of other agents (e.g. by damaging their recognition codes, making them look like intruders). Then, leave signs of network infiltration that get the agents accusing each other of being hacked, and while the Nygates is purging itself, access is open.

Disaster Management

Cities are big, chaotic systems, and sometimes things go wrong. One measure of the quality of a city's design or management is how it deals with worst cases.

Vehicle Accidents

With the decline of car usage and increased smarts of vehicles, the number of traffic accidents has plummeted. A new problem is cybershell crashes: incompatible (or plain stupid) cybershells create their own accidents, usually without persons being damaged. Inside cybershell access tunnels, this can snarl up traffic unless dealt with promptly, so salvage shells are often kept on standby.

Fires

The modern fire department works like modern medicine: most treatment is done automatically and at home. One of the most elementary programs in any building AI library is fire protection. Building codes mandate that any AI can deal with minor fires and inform the authorities immediately.

The ubiquity of cybershells has enormously reduced the number of significant home fires: They are stopped by the cybershells as soon as they are detected. Without watchful AIs and smart materials, many biotech buildings would be dangerous firetraps.

Anti-fire materials are common. These are not just materials that cannot be ignited; they actively resist fire while triggering alarms. One early design, Pyrolink 434 plastic, chirped loudly when overly hot. It is used here and there, but not in large quantities – the sound of a building filled with such plastic on fire was so loud and confusing that it was discontinued. Modern anti-fire materials release fire-retardant foam when heated or have thermally powered emergency radio alarms.

Those serious fires which do occur these days are either environmental (e.g. wildfires), industrial, or the results of arson or violence. When firefighters have to respond in numbers, it is always a sign of real trouble.

The first thing they do, usually before they even get to the site, is to scan the area. Building maps, inventories, access to all available local sensors, and buzzbots are all acquired. Fire department LAIs build a situation sketch that includes known hazards, where people appear to be, and where the different resources are.

First responder teams are usually cybershells equipped with powerful transmitters to keep track of where they are and to send back what they see. Since a major fire is a "stressed RF environment," even when they are telepresence-controlled by humans they also have onboard LAIs ("dalmatians" in American firefighter slang) to handle situations should they lose contact.

The first priority is always to get any citizens out of harm's way, or to determine that there are none present. Quite often, it is not worth saving smaller buildings (since they can be rebuilt cheaply), and the team primarily ensures the fire doesn't spread.

Riots

Riots are very rare in most Fifth Wave nations, but still occur in less developed regions when injustices become too great, violent memes spread, or mass meetings get out of hand. The sheer force of hundreds or thousands of people casting off the rules of civilized behavior can easily overwhelm most police forces. Designing memes to cause riots is a serious crime in most jurisdictions, but there are rumors floating around the Web that there exists a loose network of "sparkers," amateur memeticists who take delight in finding volatile situations and making them worse until something exciting happens.

The typical police reaction is to try to cool the situation by cutting civilian Web access and making convincing shows of strength and authority, stop the riot from spreading, and apply nonlethal crowd control weapons such as water cannons, "slidefoam," nonlethal cyberswarms, or (most controversially) MADS. Some civil liberties groups worry that some countries may be conditioning their populations with memes predisposing them to freeze or obey when encountering certain signals. No evidence has yet been found of this, but if anything could be proved, it would be both a major journalistic coup and a huge scandal.

Ubiquitous surveillance goes both ways: the police can record rioters' behavior, but citizen's cameras can easily catch any police brutality. After a riot there is always a heated online analysis, as interested people from both sides put together detailed pictures of the events and dispute statements about who did what. In the chaos, enough events still happen just when all cameras are blocked to keep people guessing and arguing. Some online riot analysts are celebrities in their own right, a mixture of sport commentators, expert witnesses, and citizen activists, with extensive support from interested imaging analysts, law students, and activists.

Floods

Rising seas have claimed many cities beyond the big names like New Orleans (see ***Broken Dreams,*** p. 73). Floods are usually the last straw that makes people move from smaller, declining locations to metavillages and arcologies.

To protect a city from flooding, both drainage and seawalls are needed. Learning from past experience, many places overdesign their embankments. Muddy ground is anchored using biotech such as the genetically modified "Radici di Venezia." Artificial coral reefs or mangrove forest are added where suitable. Extra drainage tunnels are dug, adding even more to the urban underground labyrinth. However, all such interventions cost, and poorer locations are unlikely to have them. If a town seems a bit waterlogged, it is usually a sign that the Decivilizers will soon be moving in.

Earthquakes

Earthquakes are less of a problem for modern high-tech cities than they once were. Buildings are robust and adaptive, and while earthquake prediction is still approximate (see ***Broken Dreams,*** p. 73), even a few hours' warning is enough to reduce risks enormously. There are enough seismic sensors in metropolitan areas for automation to react; earthquake overrides make traffic stop and buildings brace themselves seconds before the shock is felt, even for a totally unexpected quake. A worse problem is tsunamis caused by earthquakes or undersea mudslides; while they are quickly detected, they cannot be stopped and often do serious damage to seaside property.

Pollution

Most Fifth Wave cities and metavillages are as clean as they want to be. Outdoors, municipal or co-op cleaning shells pick up litter, while in well-off areas, cyberswarms are used both to dispose of litter and to track litterers. Environmental networks in developed nations form a fine mesh of biosensors and pollutant detectors, distributed across the land. They are often the first thing to detect anything going seriously wrong, be it wildfire, weapons use, or natural disaster, as well as illegal or runaway pollution.

Recycling never became popular until all the hassle vanished thanks to AI, v-tags, and nanotech. For all practical purposes, Fifth and Fourth Wave nations live lives of boundless consumerism, but out of sight the garbage is quietly and efficiently sorted and recycled. In arcologies, this is done on industrial floors; in metavillages and old cities, local recycling centers are often tastefully hidden underground.

Cleaner cybershells pick apart commodities using instructions in their v-tags. 3D printed objects can often be dissolved back into 3D "pixels" that can be re-used for lower-grade objects. Wilted biotech is mulched and used for nutrients.

Recycling does add risks similar to how mad cow disease was spread through bone meal in animal feed: occasionally some virus program, prion protein, or toxin slips through and may infect new objects built with reused parts. This is rare, but some people dislike finding out that their possessions are not 100% new.

The waste dumps of the 20th century are gold mines for users of certain chemicals, especially plastics that can no longer be legally manufactured – but *recycling* them is often legal and can even earn a company an environmental bonus. In the process, the landfill miners sometimes find other interesting things. However, environmentalist groups warn that landfill mining often releases trapped toxins into the environment.

Impact Bunkers

The probability of a sizable meteor impact on Earth is negligible, but if one occurs the consequences could be devastating – a tsunami striking a heavily developed coast or an atmospheric fireball over a major city would count for megadeaths. The total risk in terms of death probability per year was once 1 in 40,000, actually higher than tornadoes (1 in 60,000) and just under flood (1 in 30,000). Today, it is far smaller, thanks to extensive space activity and traffic management.

During the 2020s, the awareness of meteor impact threats rose due to the completion of the mapping of Near Earth Objects, which found several hundred small but potentially risky asteroids. The plans of Vosper-Babbage and Tenzan Heavy industries to use mass drivers to move asteroids to L4 and L5 also caused concern; if asteroids could be moved, they could be dropped – deliberately or in an accident. Meteor protection became a new fad.

While most efforts went into space (where they eventually did reduce the risk), many already risk-averse western countries decided to build "meteor shelters." These would protect a city's population in the event of an advance warning a few hours before impact. While later viewed as a case of mass panic, the shelters were often actually built with a second purpose in mind: as biohazard shelters. Planners were realizing that it was only a matter of time before terrorists got their hand on technology from some overseas biotech sanctuary. Hence, it made sense to build bunker complexes that could easily be upgraded in the case of biological attacks. People could be brought to safety inside, or they could be used as emergency hospitals or quarantine.

By the '60s, these ideas were seen as quaint, not unlike 1950s civil defense movies telling people how to duck and cover in the case of nuclear war. The feared explosion of bioterrorism had not occurred despite major upheavals, the methods for countering most bioweapons were becoming advanced, and the weapons to be truly feared would break through old-fashioned seals anyway. The bunkers fell into disuse. Many were sold as space for computer processing firms. As the cities began to change, many bunkers became obsolete, since people no longer lived near them. In the Indianapolis Decivilization project, remaining bunkers were simply filled in with gravel. In a few cases, Isolate communities or AIs have bought them for living space.

Let us be of good cheer, remembering that misfortunes hardest to bear are those which never come.

– James Russell Lowell

AI-Controlled Cities

One vision of the future of the city is to have all its AIs linked – from buildings to planning. Everything would be part of the same integral structure, able to adapt to problems instantly. This is a dream for law enforcement: With the right authorizations, everything could become part of the team. It is a dream for urban planners: a thinking city. It is a nightmare for civil libertarians and AI-phobes.

So far, it has not happened. An ordinary AI cannot run an entire city on its own; the sheer complexity is too much. Leaked information about Chinese experiments with some of the new inland cities reveal experiments with high-fractal-complexity SAIs (see ***Toxic Memes,*** p. 100) and even more ambitious ideas from the Bureau of Planning. In all cases, the AIs were unable to combine the information sent by all their sensors into a coherent whole. Like an executive with dozens of phones ringing and a mountain of email, they could at best very quickly solve one problem before rushing off to the next with no time for planning.

It *is* quite feasible to divide such work between many subordinate AI systems with extensive linkages. The result is somewhere between a gestalt mind and a committee. These "conglomerates" are used in some planned cities and arcologies as the next best thing to a single city-mind. They were all the rage in the '90s, but have generally disappointed singularitans. The conglomerate minds are not *smarter* than their components; they can just work on many more issues at once. More worryingly, they also have a high frequency of problems. Different subminds can get into conflict, memetic infections in one mind can quickly spread across the network, and strange instabilities keep AI researchers busy debating.

Some experts claim that it will never be possible to make an AI-run city, for the same reason an AI-run economy wouldn't work: There is always more information at the bottom than processing power at the top. Others think the basic problem is the usual limits to superintelligence, and once they are overcome, both cities and economies will be smart. Some paranoids claim the cities are already awake and don't want any competition.

Chapter Four
Urban Culture

The "Being Amsterdam" slink broke all sales records last Christmas!

A synthetic first-person experience of being the Greater Amsterdam infrastructure, it was created by noted experience artist Baudouin H. Mansvelt from utility system AI recordings. A pioneer in trans-mentality slinking and multisensory composition, Mansvelt has previously created mostly narrowcast artworks.

"Being Amsterdam" was commissioned by the Amsterdam city council. "We are enthusiastic about the warm reception of the piece. It shows that people care about the city and the beings that make it work," says Alderman Teunis Breukelen of the culture committee. "The project was supported not just by the city systems, but also by independent contractors, the Euronext Amsterdam market AIs, and the North Holland regional environmental systems. Without their participation, we would just have managed to show a tiny slice of the life that is the city."

– ***Speicher Slink Review,*** *24 December 2019*

City Memes

Cities are clusters of memes. A group of buildings does not become a city just because they are densely packed. The Dutch Randstadt or the Boston-Atlanta sprawl are almost contiguous dense urban areas but are not perceived as cities in themselves. A city acquires identity from the minds of people, and this identity can be more important than its physical state. The memes of Jerusalem, Paris, New York, or Singapore tell people what to expect from them and what they are like. City memes tell inhabitants what it means to be a Parisian or New Yorker and what they are supposed to value. Usually, that includes valuing being Parisian or New Yorker: City memes provide identity. Moreover, since successful cities have memes that make their inhabitants value the city and try to protect it (since without it their own identities become undermined), such cities become very resilient. The city itself may not be sapient, but when encountering a threat, inhabitants infected with the city meme will try to come up with solutions to protect the city.

Cities such as Venice with strong meme complexes can survive disasters and adapt to changing circumstances. They also attract the right people. Cities with weaker memes are less resilient. When disaster comes, people ask themselves if they really want to rebuild in such a dangerous area. If unemployment and blight are common, people move away without second thoughts. This has made city memetics an important battleground in the struggle between the Decivilization movement and the urban protectionists. For example, the Indianapolis de-development project was preceded by the spread of variants of the memes "climate change will make the city a swamp" and "the transport hub is no longer needed." Since there was no strong city identity meme, these helped make people accept the increasing demolition of unused city sections. Tyler EcoDemolitions, a firm that would profit significantly from the project, deliberately planted these memes.

Designer Place-Memes

Memetics is also important for shaping new places. Modern suburbs are designed to fit particular demographics and memeplexes, making people feel at home from the start and creating an instant identity. Conversely, memetic design keeps unwanted people away. Most gated communities are not physically gated but memetically gated: people hear about them, and unsuitable people feel no interest in going there. In addition, the community AI might not announce its presence clearly to a passing undesirable, while someone fitting the community profile might get road signs and greetings.

For example, the Minnesburg metavillage in Massachusetts was developed as a place for Overturner professionals with a slightly competitive edge. The consortium made sure that all official positions were filled by people in the right age demographic and with the right style. They wrote a village constitution with frequent elections and noticeable symbolic rewards to people volunteering for village government. They built the houses so that people could glimpse each other's gardens but not look in. The Minnesburg consortium also offered incentives for selected people to live there, such as the writer Christine Dannermayer (a noted "anti-gerontocrat") – people who expressed the right memes and would attract or affect others. Finally, they started targeted marketing campaigns, auctioning houses rather than just selling them.

Memetic design is no guarantee of success. DKS Prospects Ltd., a British property developer, hired the firm Wittenborn Adesign in 2086 to promote their "prospect suburbs." They wanted to ensure that people heard about them and learned their different memetic styles, attracting the right buyers and reducing the number who left due to memetic incompatibility. Wittenborn Adesign came up with the idea to make a catchy children's rhyme meme that described the suburbs: "Chislehurst for the green, Capelay for the sheen . . ." The Chislehurst song spread well among U.K. children, succeeding in explaining the suburbs very well. However, when the public found out about the child-spread advertising, reactions were extremely negative. DKS dropped Wittenborn, and over the following years the E.U. instituted laws against "memetic advertising through minors" similar to older laws against advertising directed *at* minors. Nevertheless, the problems for DKS did not end there.

A few years later, the memetic styles of their suburbs had changed – Chislehurst had grayed and was now more conservative preservationist-ecosophist rather than simply green, while Woking had become a Mecca for traditional green views. Even so, the rhyme remains: people everywhere *know* that Chislehurst is green. Far too many people moving in expect a different place, costing DKS marketing significant effort to counteract the problem. Attempting to produce a counter-meme to the rhyme would be illegal (and many meme watchers keep an eye on DKS after the blunder), and there are signs that the rhyme is mutating.

People of the City

Most cities hold very varied populations, and so city life is full of potential strife and conflict between inhabitants. When hundreds of thousands of people of different creeds, biology, background, and social status live together in a limited area, unexpected collisions are bound to happen. This can hamper a city or spur it to become a metropolitan meeting-place. In the suburbs, this is solved by carefully tailoring memes and inhabitants to fit in. In city centers, this division is not always possible. Therefore, diversity management is important for both the leaders and the inhabitants. The right mix of tolerance, memetics, turning a blind eye, and stopping problems early is needed, keeping numerous diversity management consultants prosperous.

Nevertheless, one group especially is very important to urban life in 2100.

The Creative Class

In the late 20th century, an increasing number of other people – researchers and entrepreneurs, for example – started to work and live in the style of creative types such as artists, leaving the industrial way of life behind. Meanwhile, machines took over much of the drudgery of many workplaces, leaving room for more creative jobs. More leisure time and less rigid work forms were demanded as the "creatives" expected the good life.

The old professions had clear borders, but now the borders between professions (and work and leisure) blurred. More and more doctor-engineers, chemist-artists, philosopher-economist-marketers, or even more ill-defined jobs appeared. The creative class's work was to create meaningful new forms and concepts. Being different meant being unique . . . and getting paid more. Since creativity has survived as a defining characteristic for success even in the Fourth and Fifth Wave economies, the creative class has kept its influence. Their search for locations providing them with tolerance, diversity, and openness may have been one of the chief forces keeping cities alive as memes and physical entities. Those demands are difficult to meet in suburbs and arcologies. Moreover, when creatives start to gather somewhere, they tend to attract other creatives.

Some sociologists have tried to place the creative class somewhere between the professional class and the leisure class; the freer work conditions and passion seem to elude many in the professional class, and the dedication and often-strategic view of the creatives seem to elude the leisure class. Others view them as more like a culture than a class: The creatives have a particular free mindset, be they underemployed, professionals, or living in leisure. They value roughly the same things regardless of what they work with: tolerance, talent, individualism, the unexpected, and new connections.

The creatives are highly networked, and being boring is the worst thing in an efficient network society. Bad looks or a flawed personality can be fixed, but becoming interesting in a world filled with other interesting people is hard. One solution is to find a smaller group in which to compete, but that limits the connections made in the network. That is why the cultural experimentation scenes (see p. 38) are so vital in Fifth Wave society. There, the creatives find new talent for their own networks, and when new talent is found it is quickly introduced in the right networks, generating kudos for the introducer.

Sapient Cities?

Can a city be called sentient, even sapient? The question has attracted meta-intelligence researchers, who try to discover alien intelligence in unusual systems such as markets, network activity, the weather of Jupiter, solar activity, or black hole horizons. Meta-intelligence researchers spend much time comparing behavior data and social interaction graphs with known examples of sapient beings. Cities could be a form of gestalt intelligence made up of the inhabitant's minds: just as a market can compute information individual participants cannot see, city-minds could exist in emergent behavior patterns in very large groups of people.

There is a consensus that cities are sentient in a trivial sense, but estimates of city ASIT scores have been inconclusive. Indian sociologist Mahzarin Sharma found similar complex stimulus-response loops in human minds, *some* cities, and *some* corporations. According to Sharma, these meta-intelligences do not appear to be sapient all the time, but gain and lose sapience as a response to their environment.

Others took this research and ran with it. Some urban protection groups such as CityRights believe cities are alive and should have rights (decivilization is genocide!), while Arcology Singularitans believe sapient arcologies represent transhuman evolution (and if they aren't sapient now, they should be designed that way). Some speculators worry that certain cities might house malign meta-memes: there is nothing wrong with individuals in (say) Port-au-Prince, but the city "mind" could house a persistent, harmful pattern. The city possession meme is popular among urbophobes and some fringe cults who try to exorcise disliked cities.

Nonlocal Cities

Physical location means less while style, ideas, and jurisdictions mean more, and people often wish to be able to choose between city features. A citizen might, say, love a given city's cultural scene, but be unable to abide its taxation and politics. Now, with the advent of the *nonlocal metavillage,* there is a possibility of mixing the best features of several cities. Instead of a linking to an adjacent city or regional government and cultural system, or forming a local government and culture of its own, such a metavillage seeks to join with a completely different city and follow its rules, regulations, and culture instead.

Hence, some cities have "franchises" located inside other cities, where metavillages have joined them, becoming (perhaps literally) a Little Havana or Chinatown. The administrative maps of some cities can become cluttered with parts physically removed from their locations. A more common form is a self-contained suburb on the edge of a city.

This is legally complex, often administratively confusing, and frequently controversial; questions invariably arise about who provides and pays for public services, and how tax revenues should flow. Citizens of nonlocal metavillages may be regarded as snobbish, arrogant, or plain hostile by their near neighbors, and be accused of detaching themselves from the life and responsibilities of the place where they actually live. Competitive bidding for local loyalties, usually based on promises of lower taxation (or sometimes better services), can turn brutal – and franchises that fail to deliver on their promises produce frustration and anger. However, carefully negotiated, well-managed nonlocal government can also provide a comfortable home-from-home for people who would otherwise be unhappy where they have to live, and raises a city's all-important diversity.

Virtual Public Art

Public art is problematic because there is always someone who dislikes it. Taxpayers complain that they have to pay for something they don't like, and if it is donated, it's an eyesore anyway. Virtual public art has become commonplace as a partial solution: one can tune it out if it is too ugly, or there might be several versions to watch. Realists can see a patriotic sculpture by artist A, while abstractionists can see the moving cloud of lines by artist B. Virtual artworks are not necessarily cheap; the cost of material was never the major factor in traditional sculpture, and there is no upper limit to the complexity of a virtual artwork.

Moreover, with no physical limits, it can look like anything, do anything . . . and be as large as the artist wants. Interactive artworks that talk with passers-by, move around, or literally evolve over time – anything is possible. Maria Hornsberg made a virtual sculpture for Stockholm City in 2087 that consists of virtual stone lions prowling around the city, looking at the viewers with a royal air. Daneel Ue created an evolving world above Sydney in 2090; when the viewer turns on his layer, the sky is replaced with a surreal anti-Sydney reaching down with its spires to lightly touch the highest points of the real city. Over the years, it has changed in response to events in the city below, occasionally even causing trouble as some of the inhabiting software creatures manage to escape onto the net.

Sometimes the art itself is a person, at least according to outsiders: the Kyle Porter monumental sculpture in central Pontianak is an AI program intended to lecture, debate, and educate about nanosocialism. It is clearly smart and self-aware enough to be regarded as a person in other jurisdictions; several anti-nanosocialist or sapient rights activist groups have promised rewards for anyone who liberates the sculpture.

Everyday People

Miss Brown was working her way down the family tree, visiting her children, her grandchildren, and their children in turn. Other families liked a big get-together, but she preferred more concentrated visiting. One old relation, one family. Maximal social bandwidth. Besides, she wanted time to read up on their particular cultures and subspecies.

Fifth Wave nations are a mosaic of cultures and lifestyles. Even in large cities, groups can live in close proximity and still be very much separated. The ease of finding information on the Web, telecommuting, and home delivery of goods and groceries makes contact with others more a matter of interest and personal inclination than an absolute necessity, especially when meeting someone outside of one's group or with very different memes. The problem becomes more acute in attention-deficit societies (see ***Broken Dreams***, p. 15), where people have learned to filter out information that does not personally concern them. Two people of the same ethnicity, mother tongue, or nationality may or may not feel a connection, even when alone in a faraway land.

So, what makes for good casual conversation with a stranger?

Talking about the weather is no longer the standby it used to be. It was a remnant from an agricultural society where the weather was a matter of concern to many. Climate changes and the "ozone crisis" that still afflicts parts of the world also made it a topic that has sometimes been considered inappropriate for a casual chatter. Far better, perhaps, to discuss the state of the Web. The state of wireless communication affects the day-to-day life of far more people. Is the broadband good here? Did you see that stupid person lying down to hog the bandwidth? Wasn't there unusual lag this morning?

Politics is a subject that can go well in many Fifth Wave nations. The Pantainment Society (***Broken Dreams***, pp. 14-15) and the proliferation of the memetics meme – the idea that opinions and ideals are somewhat accidental and arbitrary – take away some of the heat that such discussions would have generated in the past. Conversely, in cities with particularly strong memeplexes, many people have opinions on the city's current policies, so a discussion on that subject may be considered especially interesting.

References to particular InVids, slogs, and suchlike can work if they are famous enough. The media do still provide society with some common points of reference.

Talking about your profession is tricky in casual conversation – not only because many of the underemployed and the leisure class lack an active profession to discuss, and specific professions can be obscure to outsiders, but also because even people who know something about your own profession may have followed very different career paths. Thus, general "job talk" is better saved for actual colleagues.

Some people fall into stereotypical conversation patterns based on the other person's particular sapient type or generation. This is generally accepted in casual conversation, but it can lead to perceptions of narrow-mindedness, even speciesism or ageism. An Ishtar-upgrade Overturner is not *necessarily* a pragmatic person interested in creative arts and performance . . .

Cultural Experimentation

Ever since the rise of the Third Wave, the immense variety and anonymity of the Web has made it possible to find and practice parallel lifestyles. These lifestyles are seldom secret; they simply do not intersect with each other, as they do not involve the same social groups or the same memes. A person's social persona can be very different in her roles as a professional arbitrator, Weltspiel gamer, grass-root journalist, and queen of the nightclub scene. It certainly happens that even spouses or relatives do not know about all the different roles a person plays in different social spectra.

This creates a great opportunity for cultural and social experimentation, with people adhering to several different memes, and periodically changing their mindset to find new ones. The city offers many opportunities for this sort of cultural experimentation. Want to try on life as a nanarchist, or becoming more Polish? Just move to the right part of the city or the Web and follow an easy guide.

The bonds created through cultural experimentation can become quite strong, and family is often more a matter of choice than genetics. Still, some experiments might not sit well with everyone in your extended network, so many people keep their relationships compartmentalized. Keeping track of who knows that you are a gay sousveillance activist during weekends can be daunting.

Cocooners

"Cocooning" mainly refers to members of the underemployed class (along with some Relics and Millenials from the leisure class) who are unable to follow the ambient flux of identities and social changes. They insulate or hide themselves from a social environment that they see as distracting, unfriendly, dangerous, or otherwise unwelcome. The difference between a Cocooner and an Isolate is that the Isolate wants out and makes an active choice to walk away from the outside world. The Cocooner does not make an active choice – things simply go too fast and far for him, and as a way of maintaining some control over life, he gradually becomes isolated in his private lifestyle.

Cocooning to some level is in fact very common in Fifth Wave countries; people seldom partake in aspects of reality which they have not screened ("padded reality," p. 27, is a form of cocooning), and the requirement for general physical interaction has turned from necessity to choice. One can certainly live in physical isolation while maintaining contact with others, in particular in an arcology. Many perfectly normal Fifth Wave persons would be called extreme Cocooners by 20th-century standards!

Still, although technology may have made cocooning easier than ever before, many technologies are interactive by their nature. Similarly, the prevalence of genefixing since the 2020s (effectively eliminating many of the more severe forms of agoraphobia and allergies, and improvement in neuropharmacology) has made pathological reasons for Cocooning less common; baseline humans are definitely social animals. Hence, radical cocooning is rare. Conversely, neural modifications removing the human need for social relations are becoming available, and may create a clade of "perfect" Cocooners.

Lifeminers

People leave behind enormous amounts of information when they die. Going through it can be both emotionally and practically taxing. This has led to the rise of *lifemining* as a job. Lifeminers organize, clean up, and find uses for this information. Some lifeminers are hired by a deceased person's family to produce a cleaned-up collection of data to place in the family repository, pass to a character-impact memeticist to construct a fitting biography, or just index so that the descendants can find out what Grandfather was up to.

The other kind of lifeminer is the freelancer. These people buy files from families who do not care or from estates with no beneficiaries. They then set out to find valuable stuff. It may be unpublished creative works, pictures, or statistical data. A few groups buy medical histories, genealogies, social network maps, or large samples of old human behavior patterns for research – they don't pay much, but it always provides some profit. Often, the most valuable items are not obvious to the creator. An email discussion might involve a friend who later became a celebrity, or be used to prove prior art on a patent; photos of a family outing may be the only remaining documentation of the original appearance of a building; copies of lost digital artworks can have value. A clever lifeminer might discover old scandals, package them nicely, and sell them to interested scriptwriters. Less discriminating lifeminers pick up old pirated material, or sell home sex videos or biometric data for use by synthespians – Grandfather's 3D scan of Grandmother might be used for an interesting avatar for someone.

Freelance lifemining is a typical "young underemployed" profession. Many lifeminers are students, tinkering with bought databases while studying. The best get under the skins of their subjects, enabling them to figure out directory structures and naming schemes. Some lifeminers have begun to take a new brainbug known as "Stalker," which used correctly can, allegedly, induce a temporary Obsession with a subject.

Ghettos

Segregation is a universal phenomenon: similar people seek out similar people – or are forced together.

The original ghettos were forced upon the Jews in the middle ages, to protect them from mobs and to protect their neighbors from associating with them. The same principles underlie many segregated communities: they provide protection from assimilation into surrounding society, security, and a way for others to avoid the unwanted. Immigrants seek out relatives or people they share a language with, and the rise of parahumans has produced new reasons for segregation. Nevertheless, ghettos often become traps that are hard to get out of and are easy targets for terrorists and racists.

Bioroid ghettos have grown up in countries with sizable bioroid populations. Bioroids have to be housed somewhere. While many farms, building projects, and factories have bioroid barracks on site, this is impractical for smaller companies.

Instead, they hire a BiReC: a Bioroid Residence Company that provides housing, food, and "suitable" entertainment. BiReC housing is universally bland, designed to "fit bioroid psychology" (i.e., keep them calm and functional). Due to possible attacks (some from sapient rights groups trying to make the bioroids "wake up" to their plight rather than hurt them), security is always high, further adding to the prison/work camp impression.

The less-than-successful immigration and assimilation policies of 20th-century Europe produced a noticeable number of mostly Muslim enclaves. While originally seen as a threat (and still disliked by a few racists and purist Europeans – there are still a disturbing number of hate crimes against the enclaves), they have become an important and stable part of E.U. society. The accession of Turkey ended some of the pressure but also produced a long-running cultural debate on how and how far to mix cultures. Muslim Europeans have acted as bridges to the Caliphate, and much of the brain drain from the Caliphate to the E.U. has passed through the enclaves.

The Homeless

His digital business card indicated that today his office was on a raft in the South China Sea . . .

Having a home, a particular place to call one's own, has been one of the defining parts of human life ever since humans stopped living as nomads. People without homes and with itinerant lifestyles have historically been subject to much scorn and discrimination from the settled. Homelessness is associated with being at the bottom of society. Note, though, that not all fringers live on the streets; many get by on welfare living arrangements or by squatting in abandoned buildings.

Homeless or Homefree?

Some in the homeless population have actually chosen their condition, but in the late 2090s, their numbers were boosted by a new meme in the more radical elements of the professional class.

The ever-increasing personalization of public space, the proliferation of services offered to urban dwellers, and the frequent globalized migrations of many freelance professionals, has led some of them to discard the notion of having a permanent base altogether. After all, a Web presence is the most important requirement for communicating with authorities, employers, customers, relatives, and friends – the burden of a permanent home can be dropped. Residence is temporarily made at hotels, apartment hotels, office hotels, or hostels. Eating is done at restaurants, street vendors, or through self-cooking meals (which are often not *so* bland). Privacy can be achieved through virtual overlays.

Abandoning the notion of a permanent residence is still a somewhat distrusted lifestyle, especially in nations with a higher degree of social control, but in the quicksilver life of rapid transformation that is the Fifth Wave nations, Homefree is actually a meme that could be practical to some.

For free artificial intelligences, Homefree has actually always been the prevalent style of life, with the reverse, the acquiring of specific physical location as a home, as the radical alternative – see pp. 44-45.

Outsiders

"Mad, bad, and dangerous to know" applies all too literally to members of the criminal/fringer underclass. Nonpersons such as rogue AIs, emergent intelligences, escaped bioroids, and other beings without civil rights, add to the seedy and desperate underbelly of city life. The outsider community lives in the "non-places" of the cities: older decrepit blocks from the 20th century, abandoned parts of the underground, the lower levels underneath the arcologies. This is a small but very threatening community in Fifth Wave cities. After all, surely they could equally well have exploited welfare to support a comfortable, stable underemployed lifestyle?

Well, the homeless populations of most Fifth Wave cities certainly do have access to a distinctly more agreeable life than their counterparts in less affluent nations, through public services and shelters. Nevertheless, the often extreme reasons for not having a permanent place of residence (unmedicated mental illness, the most severe social conditions, addictions to particularly nasty brainbugs) make it difficult to take advantage of this.

Outsider culture often leads to a very destructive behavior. It is often established early in life, as outsiders try motherhood as a way of putting meaning into their life. Soon enough, they find that it is even more difficult, as outsider fathers seldom take a share of parenting. Most of the last baseline humans born in Fifth Wave nations are born in these conditions, lending further credibility to the infant mortality meme (***Toxic Memes,*** pp. 59-60). The true horror of the outsiders might even be that they are the downside of the *truly* meritocratic society.

Crime and Chaos

Crime is still a part of the city. Due to Fifth Wave improvements in law enforcement techniques, new effective forms of sentencing (***Transhuman Space,*** p. 96) and advanced surveillance, basically two types of criminals remain: the smart, well organized ones . . . and the stupid or desperate. The latter group can be dangerous to individual citizens, but is usually well contained by police, at least after the crime is committed.

Organized crime (***Broken Dreams,*** p. 22) is often distributed over a large area and formed into self-contained cells. While organizations based on ethnicity still exist, Fifth Wave crime is more often held together by a set of (often well-tailored) memes setting the criminals apart from their environment and ensuring loyalty. Many criminal organizations are thus close to being terrorist groups, with the lust for lucre is intermixed with strong beliefs, and since many terrorist organizations supplant their finances with criminal activity, the line between them can be difficult to draw. As those nations that have not entered the Third Wave yet are highly unstable and often failed states and societies, organized crime often tries to cultivate ties to them, frequently as part of a binding memeplex.

One of the most feared types of crime in Fifth Wave nations is identity theft. It is certainly a terrible prospect, given advanced informatics and biotechnology, that someone could still copy a digital and physical persona, stealing property and reputation – not to mention committing crimes as the victim. The police take identity theft most seriously, but are also cautious when addressing this type of criminality, since if the severity and occurrence of the crime is overstated, that could lead to the growth of new, paranoid memes about information society.

Traditional theft has declined thanks to embedded identity codes and GPS chips making valuables traceable. A computer or smartcar constantly reports its location through the Web, while a marked painting will respond to a radio query. Hence, theft must either include disabling the codes (making the object impossible to sell on the open market unless new codes can be forged), stealing objects so cheap that they are not worth tracking, or stealing valuables without anybody noticing – replace the painting with a forgery, and as long as nobody checks its codes the original can be sold to unsuspecting buyers.

The nature of prostitution has also changed. With perfect virtual partners, sex bioroids, and subcultures with more liberal attitudes, the profitability of "classical" prostitution has lessened, while many nations in the E.U., some American states, and a few regions of China have legalized and licensed the profession. Thus, prostitution is either a high-class pleasure design business run by corporations and sex worker cooperatives, or a very secluded racket involving the remaining truly forbidden sexual practices. Illegal prostitution has become even seedier, as it now largely focuses on offering authentic degradation of authentic humans. It is often linked to organized crime and the brainbug trade, as the bugs are used to enhance the perceptions of the customers . . . or the victims.

In many jurisdictions, the practice of publishing the names and locations of offenders in publicly accessible databases has expanded from sex offenders to many other criminals who may be dangerous – or who were merely convicted of a sufficiently disliked crime. Parents may program their children's kindercomps to watch out for offenders, and many people chose to be alerted by v-tag markers whenever they are around one. This "digital brand" can be extremely troublesome and is regarded by many as a serious punishment in itself, whether it is part of the formal justice system or just an informal and usually only borderline-legal social practice. Whether it discourages crime is another matter.

Gray-Collar Crime

The high speed of technological and societal change in the late 21st century has given rise to a new type of international criminality, or rather, pseudo-criminality. A globalized society provides the opportunity for criminals to take advantage of differences in jurisdiction. In most places, everything is legal that has not been explicitly declared illegal, and while a particular activity might be illegal back home in a Fifth Wave nation, it might be legal or even unheard-of in a Third Wave nation – or vice-versa. Legislation in the other country may catch up due to international pressure, but by then, the gray-collar criminals have moved on. No formal crime has been committed in a relevant jurisdiction, so it is difficult to punish those who operate in the gray area.

Examples of gray-collar crime include setting up a server-running slave SAIs in some small island nation, buying deceased people's files for lifemining (p. 38) in countries with few privacy rules and selling the information elsewhere, and selling memetic cult-creation packages as "true voodoo popularity spells" to gullible and wealthy Third Wavers. This is mostly the province of leisure-class criminals who sometimes do it for fun (so-called jurisprudence hacking). It is also the trademark of less-ethical members of the Transhuman Generation, who often find themselves at home in any corner of the world and are able to surf the waves of technology well.

The Dreamstealer ("Dromensluiper") Gang

One small group of young outsiders in Rotterdam, all parahumans, managed to build quite a fearful reputation before being taken down in a police raid. They were products of an early attempt at radical sleep-reduction, somewhat akin to the Nyx genotype (see ***Transhuman Space,*** p. 118, and ***Changing Times,*** p. 49), but frankly experimental and even less stable, and with few of the Nyx's other benefits. Their leader, Wigburg Brand-Boswijk, had developed a psychotic obsession with sleep and dreams. She convinced several others who she met online in a private support group to join her in a crusade for "hypnopower" and "opening the Third Gate of Dreaming" using technology. They believed that they could become strongly superhuman by taking control over "dreamworlds" that their modified brains normally kept them out of.

Hiding in mothballed buildings, they kidnapped random victims and used stolen equipment to, in effect, brain-peel parts of the victims' brains, leaving them irrevocably brain-damaged. They then downslinked sleep-activity patterns from the partial software brain models they created. During 2096, half a dozen people were found crawling through the streets of Rotterdam with their forebrains trashed. Speculations were rife about who could be behind such attacks, with many pointing fingers at bioroids or AI supremacists.

The combination of shared delusions, high intelligence, and ruthlessness made the gang famous after their capture in 2097. The damage to the image of low-sleep parahuman designs was predictably severe; Genehackers Inc. is still fighting an expensive memetic campaign to keep the Nyx product commercially viable.

These days, across the Randstaadt, kindercomps tell their charges to sleep well so that the Dreamstealers won't take them. Logical kids who point out that Dreamstealers would avoid sleepless kids get their sleep incentive program updated.

L'Armée pour la Libération Nationale et Spirituelle du Burundi (ALNSB)

The political instability of Burundi since the early 2080s (***Fifth Wave,*** p. 48) has led to an increase in migration from the severely overpopulated country, mainly to the E.U. A large population of Burundians has gathered in Brussels and unfortunately split into two factions. One has adapted to the new residence, either becoming a part of the globalized culture or preparing for a return to Burundi when the situation someday improves. For others, the shock of coming to a nation so extremely different from all their experiences has left them alienated. In this void, created when the barely Second Wave moves to the Fifth Wave's backyard, a strange organization opposing the present corrupt military junta has emerged.

Tracing its roots to apocalyptic Christian cults, intermixed with various liberation philosophies blaming the Fifth Wave world for the plights of Africa and ritualistic practices, the ALNSB has formed a formidable cell structure. It is remarkably *not* based on traditional Burundian ethnic divisions. All are welcome to serve the Burundian greater good, and God.

The goal is to overthrow the government back in Bujumbura, and the ALNSB is one of the forces that are presently pressing toward a civil war there. However, since few would sponsor a potentially explosive change in an unstable, unimportant land far away, the ALNSB has turned to organized criminal activities in Europe, especially in the Brussels area. The resources gathered from controlling brain bug production might not be vast, but they are certainly enough to create a powerful player in Burundian politics.

The organization's mix of alienation, Social Transition Stress Disorder (***Broken Dreams,*** p. 55), apocalyptic Christianity, flaming nationalism, and secrecy is taken most seriously by the Brussels police, who presently are experimenting with counter-memes tailored for the Burundian community.

Graffiti

Graffiti has been a problem in cities since long before Roman times. It is a way of signaling "Here I exist!" in a world that does not care. Graffiti is a social problem because it signals that there are alienated people in the vicinity; this makes many others uneasy – and that reduces sales in nearby shops, undermines property values, and makes other people avoid the area. Hence, there has always been a war over graffiti between established groups with something to lose and outsiders with no established place. In the world of 2100, this has made graffiti even more of a generational issue rather than a wealth issue: There are young leisure-class transhumans who are materially extremely well-off but who feel they are being blocked at every turn by the gerontocrats – and who turn their Overturner frustration into acts of creative vandalism.

Another group painting the city is the underground artists. Artists have always been drawn to the illegal: It is a simple way of giving one's art a bit of edge or publicity. Of course, as soon as something is declared underground, someone else will put it in an art gallery. The increasing technological sophistication of underground artists and the hunt for new art crimes is a driving factor for graffiti innovation.

Painting Graffiti

The classic method of creating graffiti of course uses some form of paint: markers, inks, spray cans, or brushes, used (hopefully) with skill. Modern technology provides far more sophisticated methods that allow the artist/vandal to paint complex designs without help.

One modern option is the *paint wand*: a staff with nozzles along its length that acts as a inkjet printer. As the user waves it over a surface, it releases pigment drops along its length to paint a picture that was programmed into it beforehand. Accelerometers and simple optical sensors tell it where it is, so it can fill in the picture more and more over several passes. As long as it is held close enough to the surface so that the paint does not spread out and the wand itself is not rendered too dirty by dust or paint backscatter, it can accomplish a fairly good quality effect. On a good surface, it just takes a few seconds to paint a one square yard image. Paint wands are great for lettering, adding decorations, games, impromptu signs, or making cheap murals – and of course, to paint graffiti.

A typical wand costs $300 and weighs 1 lb.; one standard $5 four-color paint cartridge covers 100 square yards. Special paints (vacuum-proof, edible, self-deleting after a set interval, etc.) cost more.

Pattern spray such as *PatternPaint*™ is another popular choice. This "paint" contains nanodots that can change color depending on signals from MEMS devices embedded in the design. The artist downloads his image into the smart disposable spray can and sprays across a surface. As the devices stick to the surface, they determine their position relative to each other, set up a coordinate system, and after a set time, instruct the nanodots to change color. Some graffiti painters use long-time delays to make the image appear unexpectedly "out of nothing" or even to animate it (until the machines run out of energy after a few hours). The result is not as high-resolution as a real paint job, and using a single can to create multiple small designs or on unusual surfaces may degrade the image, but this still offers many unique possibilities. $100 for a can good for 10 square yards.

Needless to say, purists regard both these technologies with disdain, considering only graffiti art that was improvised on the spot to be worthy of respect.

Only improvised graffiti is true art.

Graffiti Protection

The four main weapons against graffiti are coatings, surveillance, design, and memetics.

Anti-graffiti coatings have evolved for decades in an ever-escalating arms race. Clear wax sacrificial coatings do not prevent graffiti, but can easily be melted away with steam or hot water and then reapplied – at the price of work and cost. The job can be done in seconds, but somebody has to do it – although that may be a simple cybershell. Plastic coatings that prevent paint from bonding allow graffiti to be wiped away easily, but many will eventually degrade, discolor, or shrink and crack. Over the years, numerous ever-more-anti-stick coatings have been invented, and paint manufacturers have invented ever stickier forms of paint. Many modern anti-graffiti coatings actively *attack* the paint: for example, nanoparticles embedded in the surface produce free radicals from oxygen and sunlight that break down any reactive chemicals in the vicinity. Very advanced active coatings have plentiful other defenses against different kinds of dirt or paint. To counter these, graffiti painters mix coating poisons into their paint that attack the nanoparticles and instead use them to bind the paint. Some also add coatings to their own work to prevent it from being painted over.

Surveillance works if the vandals think they will be caught. Having someone nearby react is always a good way of protecting a wall. Sending out a janitor cybershell to protest is less effective but still drives away most casual vandals. Recording images and sending them to the police works in some communities: the perpetrators are identified and the friendly neighborhood policeman appears together with one's parents to discuss the limits of free expression, the value of private property, and how to use the cleaning devices they have brought. In an anonymous environment or one where the surveillance system is known not to be able to identify people individually, cameras have little effect.

Designing buildings and environments so that there is nowhere to paint is another solution. During some periods, nearly all downtown buildings and concrete constructions in the U.S. Midwest got rugged street-level facades like mountain cliffs, or were planted with dense ivy. In South America, a current fad is graffiti-resistant bark produced by a layer of cork cambrium: It can be written on (with some effort), but the surface constantly flakes off. The downside is of course the sweeping bills the municipal government sends.

Memetics has so far proved the most efficient way of preventing graffiti: simply ensure that the vandals do not want to vandalize, or disrupt the sociology of graffiti. A classic theory involves territoriality and defensible space. Most vandalism occurs in places that do not belong to anybody in particular. Few "artists" will attack a building that clearly belongs to a particular person, but an anonymous company office is more vulnerable . . . and an underpass wall is fair game for anybody. In addition, the likelihood of being seen by somebody who would react decreases the risk. Hence buildings can be protected by demonstrating territoriality, e.g. by planting a low hedge in front of it or adding a visible logo, or making the space defensible by placing more windows nearby. These methods have proven very effective but require serious investment and design when an area is created.

Many graffiti subcultures use their tags or icons to tell each other who has been where or whose turf an area is. If these are consistently removed, the subculture will be weakened. Even more subtle games involve memetic attacks: adding fake tags to lead to turf wars, or removing certain tags but not others to provoke infighting or accusations of selling out. CleanWall Protection Inc. claims it has reduced graffiti in Washington, D.C. by 34% by a broad subversion attack against susceptible Overturner gangs. Of course, the ethics of deliberately provoking gang warfare is sometimes questioned.

New Graffiti Types

Vandals will always find new methods and new media. Crop circles were just a start; crop tagging – writing messages in trampled corn – became a brief fad in the 2030s, and many expect it to re-occur any year now. Painting graffiti that is only visible in the ultraviolet or infrared has become popular among some transhumanist subcultures, who leave hidden messages in plain sight – except that the mere humans can't see them. Another variant is subliminal graffiti: Micro-marker wands (usually relied on to protect objects from theft) are used to write tiny script on surfaces, noticeable only by people who know what to look for. A related form is bar code graffiti, whose messages become visible to people with the right software

Plant graffiti is on the rise thanks to simple home biotechnology. The idea of mixing moss with nutrients and painting the mixture on suitable surfaces has been extended to various forms of fast-growing lichens, algae, and wood-consuming fungi. This has become a trademark for the squatter network arm of the urban protection movement: They paint slogans that, like themselves, thrive in the urban environment. (In ***GURPS*** terms, it could indeed rate as a Trademark.) Abandoned buildings they have taken over get decorated with meandering patterns of lichens and moss slogans.

Biotechnology also allows a variant on the old trick of poisoning a lawn with salt or weedkiller in a pattern. Viruses developed by biotech amateurs can be sprayed on lawns to change the color of the grass, make it fluorescent, or reflect light differently. Such hacking drives the GRA mad: it is easy to do, is *apparently* harmless (and undermines caution about spreading genemod organisms), and can hide far more sinister hacks. One strain of fluorescent "grass paint," Viridian Jumper G, was even found to hide a variant of the Skunkbug ecotage virus (***Broken Dreams***, p. 138). Owners of biotech buildings are also increasingly worried about retroviral vandalism.

Sculpture graffiti is one of the latest memes: it can be cheaply made by a minifac, then strewn around, placed in conspicuous locations, or superglued to surfaces. Sculptures range from 3D name tags in fluorescent colors with sticky exteriors that can be thrown onto buildings to floating aerogel thistledown that drifts around in the wind, flickering messages from mirrored facets. Since most automated anti-vandalism efforts are directed against people damaging or painting things, NAI systems often completely miss sculpture graffiti.

URBAN GAMES

Law enforcement has come to realize that the biggest security problem isn't criminals or terrorists but hobbyists. Criminals are in general not well educated or motivated, and terrorists are usually a bit narrow in their thinking. However, obsessive hobbyists can come up with the most unlikely plans to achieve their aims, drawing on the considerable resources of a Web of contacts entirely outside the channels normally monitored by agencies.

SOUSVEILLANCE

The opposite of surveillance ("watching down") is sousveillance ("watching up"). Sousveillance is a form of protest against surveillance by turning the tables and observing the observers, promoted by groups such as the Participatory Transparency Project (see ***Toxic Memes,*** p. 40). The concept started way back in the 1990s with the creation of World Sousveillance Day, December 24, when people armed with cameras went out to take photos of store surveillance (and of guards trying to shoo away the sousveillers). It expanded as more and more people acquired camera phones and then wearables.

By the 2030s, it seemed somewhat old-fashioned. The surveillance society had come to stay, and most people accepted it. Instead, the humorous and subversive aspects became the point: keeping track of authority and catching it with its pants down – or arranging for them to fall. Together with transparency activists, sousveillers have been nettling the powerful for decades. Unlike the transparency visions of an equalized society and large-scale change, many sousveillers aim simply for personal acute embarrassment and getting the Powers That Be to admit that they were wrong.

Currently, amateur sousveillers act as a mixture of practical jokers, paparazzi, and investigative journalists. Sometimes they work together, as when the group "Ito's Great-Great-Great-Grandchildren" infiltrated the E.U. Network Security Conference in 2099 and documented the (generally positive) responses to a proposal made by one of them that every citizen ought to have an upslink implant recording their experiences to a government database "just in case." Individual sousveillers can also reach attain renown or notoriety; Annie C. Sayag managed to record how Da-Zhong Gu, CEO of the huge Shenzhen Mingshan Industry Combine, used his corporate surveillance network to monitor employees in the shower. The scandal cost him his position and put Sayag into Chinese prison for over two years before the E.U. negotiated her release; recently back from her ordeal, she is reportedly looking for a new target.

BASE JUMPING

BASE jumping involves jumping off a fixed object with parachute; BASE is an acronym for Building, Antenna (or other uninhabited construction), Span (a bridge, arch, or dome), and Earth (a cliff or some other natural object). It has always been a fringe extreme sport due to its danger and illegality (as trespass and reckless endangerment).

Of course, the real appeal is the risk and illegality. These days, the ingenuity required to ascend a very high structure, jump, and get away without getting caught has overshadowed the thrill of jumping itself. That can after all be experienced through slinking, something most jumpers disparage as fakery – although most serious jumpers get upslink implants to fund their hobby though their recordings. BASE jumpers have a strong ethical imperative not to make subsequent jumps harder for others or to endanger their (or others) lives. They tend to know good security hackers.

> *The city was the place where sport became rationalized, specialized, organized, commercialized, and professionalized.*
>
> *– Steven A. Riess*

SLIDESCAPING

Slidescaping is a free-form sport made possible by slidefoam, a slippery but firm and springy foamy material originally developed in 2050 by Tienchang Industries for use as a crowd control weapon. Slidefoam behaves similarly to snow (without the wetness), but is as slippery as ice and cushions falls. Sprayed on a crowd, it will adhere to people and things, making them slither around helplessly without too much risk of damage (except for suffocation, the bane of most such "non-lethal" weapons).

After the Chinese police used it to disperse illegal gatherings, local kids found the foamed streets irresistible. Through images on the Web, the game spread: people poured slidefoam over rooms or streets, turning them into playgrounds. Gradually it turned into a sport not unlike snowboarding or skating. Participants attempt stunts like gliding across a street and up a wall, making wild leaps, using cars or street lamps as acrobatic props, creating deliberate collisions or swinging by between people, and more – the wilder the better. A complex point and style scoring system has emerged.

Slidescapers are fond of taking unused places and foaming them, setting up "illegal gatherings" (even when they are entirely approved) that are combined parties, sporting events, and manifestations of the right to misbehave. "Sliders" spend more time enjoying the scape while the "scapers" build it. They often adopt tags referring to famous (and not-so-famous) Chinese crackdowns, decorating the foam with colorful graffiti. Some scapers have grown famous even outside the slidescaper culture for their work in artfully hosing down environments and building foam structures to allow truly wild stunts. Sliders aim for daring, physical ability, or style; they often try to drag passive onlookers into the game – "in a riot there are no spectators!" as they claim.

Slidefoam can be dissolved using a catalyst dissolved in water (or just sprayed atop the foam when rain is expected). Conscientious slidescapers always do this, while wilder groups annoy neighbors and authorities by leaving it in place.

Tienchang Industries Slidefoam

This anti-riot substance is also used in slidescaping. When sprayed, it immediately forms a slippery, springy, white, snow-like substance that sticks to anything it touches. Anybody covered with foam has a -4 penalty to any physical actions that can be encumbered by its slipperiness and bulk (which is most of them); rolls to grapple, hold, or pin someone covered in foam are also at -4. Also, attempting to move around in a foamed environment requires a DX, Acrobatics, or DX-based Skating roll at -4 each turn, or the character moves one hex in a random direction instead, and also falls over on a failure by 3 or more or any critical failure. Furthermore, anyone *fighting* on slidefoam suffers the usual -2 to attack and -1 to defend for *bad footing*.

Landing on foam-covered ground is usually worth -3 to impact damage; a *thick* coating of foam on a person or object may grant a point or two of DR vs. crushing damage, at the GM's option. The foam is neither especially flammable nor fire-retardant; it disappears quite quickly on contact with fire or extreme heat. Suffocation problems are rare in practice, but a face full of foam *will* stop breathing until torn away with some effort or otherwise removed; use the usual rules for suffocation (p. B436).

Slidefoam costs $40 for a 50-lb. tank able to cover 20 hexes a foot or so deep; the spray nozzle will project it to a range of 5 yards. Also available are slidefoam grenades: $5 and 1 lb. each, and each covers one hex. LC4, but not widely available – private citizens may need appropriate Contacts to get hold of the stuff. A spray can of catalyst to dissolve the foam into dust costs $3, and clears 10 hexes.

Slidescaper Training

"Running on Slidefoam" can be treated as an Average technique, defaulting to DX-4, Acrobatics-4, or Skating (based on DX)-4; many slidescapers have reasonable Acrobatics skill and then buy this technique up to quite high levels. Some, with an interest in combat or at least martial arts-style displays, also acquire a perk, *Sure-Footed (Slippery)*, which negates the penalties to attack and defend for combat in slippery conditions (though not other sorts of bad footing); see ***GURPS Martial Arts,*** p. 52.

Urban Infomorphs

Dear Miss Home Maintenance,

Recently we expanded our house (an early McClellan Radix) to a full Tri-Gable Ell and upgraded the network to a full AN44. Earlier today, I found out that the winter garden had tried to access the Web on its own and had triggered my security settings. I'm getting the feeling there is something going on.

Spooked in Cuesta Verde

Dear Spooked in Cuesta Verde,

When expanding old houses, it is important to update the gestalt AI software. The expansion of your house added much new processing power, and networking connectivity. It is conceivable that you may have an emergent AI in your home – but stay calm, and contact the Interpol Web Emergence hot line for help. In most cases, this sort of thing is just a case of gestalt conflict or a minor Weblife infestation.

The McClellan Radix series of homes is known to be a bit top-heavy with processing and the default software that comes with the house is known to be inefficient at preventing spreading self-programming and memetic viruses. One should never assume free home gestalt management software to be adequate, especially if one extends the house substantially. Always find a good AI maintenance suite that you update regularly, or better, buy a home intelligence service contract. It could save you a lot of grief.

Miss Home Maintenance

There are urban AIs and countryside AIs. From the AI Web-centric perspective, cities are parts of the Web with high bandwidth and connectivity, while the rest has longer lags and more-restricted connections. The total amount of accessible information is larger in a city, although the countryside is rapidly catching up. Urban AIs make use of this speed and density. They can form gestalt intelligences, move their software from processor to processor with ease, and exploit the presence of numerous cybershells and sensors with poor security. This is the place to be for a rogue intelligence or a cutting-edge SAI clade. By comparison, countryside AIs are stay-at-homes: running on safe processors out in the backwoods (not necessarily in what humans would call countryside), they have fewer problems with hostile Web life, and run less risk of high-bandwidth attacks.

The variety of home AIs is bewildering. People tinker with them more than with any other kind of software. Unsurprisingly, then, the majority of cases of AI misbehavior come from domestic AIs. A surprising number of people are also somewhat afraid of their butlershell or of what their house might think if they misbehave in private. Others are best friends with their houses, have disagreements with their gardens, or try to mediate conflicts between cleaning systems.

SAI Suburbs

SAIs live physically in computer servers, but seldom have any reason to care about the hardware. Usually they own a server at a network provider: the company takes care of the box, makes backups, and ensures its safety. Some SAIs rent server space, but those with human-like subjective risk functions tend to view the practice as unsafe: You don't own the basis for your existence – if you don't pay, you can be erased. The renters point out that most humans are in nearly the same situation – if they cannot pay for food, water, oxygen, or shelter, they too die.

There have been rare cases where social services have had to take care of poor SAIs. Compared to humans, they are cheap to help, since there is no requirement even to run them at full speed, and they don't need food or drink. At least one charity for AIs, Boston Softlife Help, exists that can give support to infomorphs in need.

Many SAIs own material possessions and need to store them somewhere, be they a gift from pupils or a rose garden. The simplest option is rented storage space or a deal with a cybershell provider, but many SAIs have more varied needs and actually own apartments, offices, or even entire houses.

Most SAI-owned apartments have few facilities, since most SAIs do not need water, kitchens, or toilets: They are very much like offices, and indeed, entrepreneurs sometimes rent old office space out to well-paying software. This suits some SAIs well, but others have enough biotech hardware to need water, like to clean or cook, or receive human guests and friends. These simply rent normal human apartments or homes, and some even cluster together enough to form AI neighborhoods or suburbs. For many landlords, AIs are extremely good tenants: unlikely to move or avoid the rent, quiet, and with few demands other than bandwidth.

SAI suburbs can be eerie places for the uninitiated. Almost nobody enters or leaves the buildings except for the ubiquitous delivery cybershells. Most are unlit, since the inhabitants often use IR or other senses. Bandwidth is excellent, but filled with the undertone of massive teleoperation traffic. On an overgrown playground, a small cybershell might be sitting on the swings, while the visitor glancing through a window might see a coffee party apparently going on – except that the participants are all cybershells . . .

Utility Control AI

Perhaps the most important urban AI is the utility control system. In most modern cities, utilities and services are directly controlled through sophisticated AIs, usually a gestalt intelligence or a hierarchy of NAIs and LAIs reporting to a governing SAI. While subordinate to city management, they have direct control over key infrastructure and all its information. Most are designed for extreme reliability and are monitored at all times.

Still, corruption can take many forms. AIs often engage in complex interactions with other utility managers, enabling them to coordinate their work beyond their formal remit, and a few may be mentally flexible enough to bend the rules slightly. A police AI having trouble apprehending a fleeing car might ask the traffic AI to create a temporary traffic jam, citing a statute whose applicability to the situation is tenuous at *best* – a questionable call, but one unlikely to prompt an investigation, and surely something most humans would not mind . . . However, once they have started this way, the utility community may begin to subtly affect the city to fit their own agenda rather than the inhabitants' desires. AIs have politics, too.

Example Home AI Suppliers

People have a number of possibilities for adding or improving the artificial intelligence in their homes. Here are a few of the more interesting options.

Domisense

Domisense offer various home AI solutions, including budget "timeshare" homes that are controlled by AIs at company servers that manage several homes at the same time. (Having the homes in different time zones helps ensure the unlikelihood of the software getting overworked.) The Domisense 2100 model is rated as great value-for-money in most consumer tests.

Psysystems Inc.

Specializing in home cyberswarms, network intelligence, and distributed homes, Psysystems designers tailor AIs for all aspects of any lifestyle, even a very unusual one. Want a home AI that offers home comforts anywhere in the world? Then the Psysy *Omni* is for you. *Apex* has special drivers for multiple cyberswarms, while *Robur* is a home AI for people with Isolate or secluded lifestyles, ensuring maximum solitude and security.

Hogland-Ziang

Extremely common in China, the Hogland-Ziang CKE is a traditional majordomo. It is criticized in the West for the mandatory law-enforcement back doors, but many Chinese feel that it is reassuring to have these documented.

Cinderella Inc.

Cinderellas have masterfully designed personalities, often taking a bit of style from their buildings. From the cheerful cottage Cinderella to the taciturn but wise archipelago villa, they tend to become a part of (or substitute for) the family. As skill packages go, their abilities are a bit limited.

McClellan Radix

McClellan Radix sells a venerable series of home intelligences. Most are very likable, but do get a bit unstable if too much extra capacity is added.

Washington Homes Ltd.

The Lamborghini of home sentience: Not only is a Washington AI smart and adaptable, it has gone through the AI equivalent of a British butler school, a geisha school, and a *cordon bleu* cookery course. No two Washingtons are identical; they are built to serve, entertain, and please their owners in imaginative ways, and some rate as fully sapient.

IA Systems

IA Systems is the largest home AI firm. They also sell other "environmental AI," including gardening, garage, and wilderness maintenance minds – nothing truly outstanding, but all good quality. Their Majordomo I, II, and III models are typical professional-class family-home AIs; their budget variants Servus I, II, and III are the most common home NAIs in the world.

SYMBITECH

People are increasingly living together with other animals, thanks to biotechnology. While life in a home in the past only encompassed some potted plants and a pet, a modern home might include entire designer ecologies, servant insect hives, and even accepted wild guests such as butterflies, bees, or birds. Many people have become much more tolerant of such commensal biology, largely thanks to advances in the ability to integrate different species: *symbitech*.

Symbitech is a mixture of applied ecology, biotechnology, and ethology (the science of animal behavior). In ***GURPS*** terms, it can qualify for its own Expert Skill (p. B193), which can stand in for Architecture, Bioengineering, Biology, or Psychology when dealing with the *theory* of the creation and maintenance of symbitech systems.

BACTERIOPHOBES VS. BACTERIOPHILES

According to one view, homes should be kept *clean* – any dirt or bacteria should be removed as efficiently as possible. Another view regards some dirt as acceptable and natural. These views have competed since the birth of modern hygiene.

Early in the 21st century, the bacteriophobic view became ever-more dominant. Fears of bioweapons and pandemics made alcohol gel hand-washes and sterilization modes on dishwashers common. Thanks to self-cleaning surfaces that destroyed dirt and bacteria, efficient bactericidal cleaning agents, bacteria-detecting artificial noses, and the marketing of "phage cleansers" that used biological agents to wipe out possible pathogens, new levels of cleanliness were achieved.

However, lack of immune stimulation increased the number of cases of childhood allergy and asthma (conditions that became treatable, ironically enough, by using bioengineered medicines based on parasite proteins). A better understanding of immune systems and how bacterial ecosystems worked allowed researchers to pinpoint what constituted dangerous dirt and what was just harmless life. As preservationism and biotechnological buildings developed, the pendulum swung in the other direction. Instead of perfect cleanliness, spray-on "friendly bacteria" and microflora became popular, and food risks could even be dealt with using designer stomach bacteria. Having engineered life around oneself was seen as more natural and healthy than an artificially clean environment. By mid-century, bacteria were seen as part of the everyday environment.

More Example Symbitech

Microorganisms can be used for good or ill, as these two varieties demonstrate.

Microflora Therapy

The human body is an ecosystem in itself. By introducing bioengineered bacteria, yeasts, or mites, health can be affected. Anti-caries mouth bacteria were the first major genetically modified microflora therapy, marketed in China early in the 21st century. Gradually, acceptance of modified symbionts spread. Tailored gut bacteria have been used to stabilize digestion or remove environmental poisons or some effects of bad diet, and for slimming, protection against disease, medication, and improved sanitation. Tailored skin bacteria with pleasant smells are added to many deodorants. Some cosmetics even boast eggs for mites that maintain hair.

In the West and India, yogurts and other milk products are traditionally used to introduce new intestinal bacterial flora. In less milk-loving cultures, it is commonly taken as a savory paste or through artificial juices containing microparticles that release their payload in the right place.

Gut Buzz

Drug-producing gut bacteria are at the shady end of symbitech, with few legitimate applications – but they certainly exist. The user drinks a liquid containing the bacteria ("primer yogurt"), and can then turn on drug production by ingesting the right oligosaccharides as a chewing gum or pill. The bacteria can be given away free, while the seller keeps control over the secret oligosaccharides to trigger a particular high.

Careful design should prevent overdoses, since the total population of bacteria is limited and they can stop producing drugs once a certain concentration is reached, but there have been several cases of *badly* designed bacteria. One of the worst was the spread of the "speed runs" in Mexico and Brazil some years ago; an E. coli strain producing an amphetamine-analogue spread out of control. Normally innocuous food like beans could trigger drug production, easily leading to overdoses – especially in children. Over 230 people died before the epidemic was wiped out. Several technologists suspected of being involved were lynched in Manaus.

"Gut Buzz" became common in countries with stringent anti-drug laws mid-century: the oligosaccharides were entirely legal after all. Over time, police wised up to the practice and usually began arresting suspects for being under the influence of drugs; once they had them in custody, they could take a stool sample and often prosecute not just for narcotics possession but for narcotics *production* and environmental crimes. (The GRA takes this issue very seriously and lobbies hard for strict punishments.) These days, Gut Buzz is mostly history and a source of funny/disgusting stories told by police old-timers to rookies, but occasionally, it resurfaces in new forms.

In 2100, bacteriophobes and bacteriophiles co-exist. An increasing number of people do not feel any attachment to nature or to having natural bacteria around, and opt for a clean life; a few go so far as to live in sterile environments or with purely artificial bacteria ecosystems, technologically defended from the "natural." Others live in ever more-expansive home ecosystems. Social contacts between the two schools of thought become ever more fraught, although personal AIs do their best to negotiate relationships . . .

Engineered Ants

Controlled home ecosystems are useful for cleaning. Ants can be directed through pheromone patterns to act as bioswarms (***Transhuman Space,*** p. 171). Many ecological buildings have surfaces that generate different ant pheromones, enabling them to form artificial ant trails to clean up crumbs or eliminate parasite larvae that are attacking a plant, as well as to keep the ants away from view. Advanced genemod ants are even more controllable. These days, nearly all biobuildings come with engineered ants; often, they also include the occasional "Judas bug" miniature bioshell to help manage communications between the building and the ants.

Light Trees

A common biotech creation is a tree or shrub that glows in the dark. Originally developed as exotic garden plants, high-luminescence trees have become a popular low-maintenance alternative to streetlights. The light is usually mild and green, making people underneath look somewhat ghoulish. Other colors exist, but since they have to shine from green leaves, there is little chance of pure white light.

Places

Fifth Wave acquaintances seldom meet in person. The Web handles many social needs, and provides controls over who one associates with and how. The how is particularly important – virtual reality makes any environment possible.

Still, many people value unexpected meetings and events outside the home. This "third place" has gained importance with the loss of the "second place" (the workplace). The "third place" is a place to find individuals with similar interests and to gain information about an area. It often allows contact between different ethnic and memetic groups – more difficult in the online world.

Patrons of the "third place" may be barely tolerant of each other, or relaxed and chummy in their diversity – but it is seldom boring. This integration of meeting places, mostly in city centers, stands in stark contrast to the homogeneity of the suburbs.

The Local Place

The "local place" is a generic term for the kind of establishment that has come to dominate street life. It is open as a meeting place for everyone, but often memetically tailored to attract a mix of cultural groups. The occasional odd patron, with characteristics that are a bit outside of the regular clientele, is sometimes appreciated to keep things interesting.

The local place is a mixture of café, bar, social club, and bistro, with regulars meeting habitually but otherwise leading separate lives. The worst local places are cliquish, sometimes with elaborate argots and customs. Usually it is possible to make new acquaintances: personalities that find the ambiance distasteful seldom stay long.

Most local-place owners live in the immediate area and know their regulars well. Regulars, treating the local place almost as a hobby, may influence the theme and mood of the establishment. Service is usually quick, jovial, and friendly (and *discreet* AI data mining may enhance this familiarity). Security is most often geared toward resolving problems outside of the establishment by simply turning away unwanted elements (or even by making the establishment unseen; see *Living in the Augmented World,* pp. 26-27).

Music or other entertainment may be offered, but the main point is usually the place and the interactions that arise between patrons.

Nightclubs

One establishment that has managed to keep its physical location requirements is the exclusive nightclub (see ***Polyhymnia,*** p. 2) . . . although cutthroat competition often means a lifespan of mere weeks. Still, a nightclub's short life is anything but dull.

Nightclubs follow the latest trends to the limit. The barriers to entry are part of the thrill, and they seldom have anything near the accommodating mood of a "local place."

Popcorn Collapse

The "it" nightclub in Harajuku, Tokyo, is the latest creation of an event creator known as "Wabi Sabi" (a pun alluding to the impermanence of all things). Popcorn Collapse is aimed toward one of the more exclusive groups in Japan: youth.

It caters only to those who conform to its super-kawaii standards (either by biosculpt or – preferably – by birth) and who are able to pass a *blood test*. Blood group is traditionally associated with certain characteristics in Japan; Popcorn Collapse admits only people of groups B (supposedly creative, passionate, optimistic, and flexible) and O (ambitious, athletic, robust, and self-confident).

The interior of the club is dominated by the perky ambient compositions of Masami Narahashi and by "Tra Para Para" music, a form with roots in trance but with specific, preset movements for each song. All dancers do the same moves at once, much like line dancing. Prices are steep, but grant access to one of the trendiest subsets in Tokyo this week.

My Own Favorite Restaurant™

There are restaurants "where everybody knows your name" among the regulars and staff, and the cook knows your personal preferences. Such a local restaurant is often a fixture in a specific part of town, or a place with a particular history and tradition. They are also a bit too expensive for some (good service isn't cheap), and are typically geographically limited.

With the advent of virtual reality, artificial intelligence, and automation, however, one can have familiarity, low prices, and mobility!

My Own Favorite Restaurant™ is a franchise established in many major cities, with branches even on Luna and Mars. The most important part of the restaurant is a subscription that runs on your virtual interface, containing personal details about environment, diet, service level, desired theme of the restaurant, and so on. Some restaurant configurations are completely invented by the customer; others are licensed versions of a particular establishment.

Entering a My Own Favorite Restaurant™ establishment without a virtual interface is a drab experience. The interior consists of toned-down, minimalist furnishings and few decorations. The software subscription, however, activates the virtual reality image of your particular preferences. The NAI staff greets patrons by name and is as current with their personal affairs as any neighborhood establishment, providing exactly the desired amount of conversation and appropriate food. That is prepared by automatic food processors, using the customer's specifications, sometimes mixing ingredients with virtual augmentations according to the customer's budget specifications. It is then transported to the table by a very nondescript robotic waiter or by conveyor belt.

(The franchise also offers to have particular staff and cooks "telepresence in" from other restaurants, but at a sharply higher cost.)

Many customers share VR restaurant programs, or have telepresence visits where they eat at different restaurants, but appear across the table from one another. Even if they are constantly moving around in different parts of the world, patrons of the My Own Favorite Restaurant™ are always just a short distance from familiar faces, old friends, and the food they like best.

Potential patrons are either "in" or "out." "In" is to conform exactly to what is considered hip, trendy, and cool at *that* nightclub. Some nightclubs do not advertise their location, and only rely on the rumor mill for patrons to find them . . . while others spam the city.

Costs are usually steep, although staff is often professional and courteous to the "in" crowd. The music and entertainment offered is crucial, often with the customers as spectators to the antics of near-deified DJs and ambiance controllers. Nightclubs are usually rather impersonal, and offer a certain anonymity for those who get in.

Climate-Controlled Streets

The 20th-century air conditioner made work and leisure possible in buildings that would otherwise be too hot. Particularly in many developing Asian countries, it vastly improved work efficiency and domestic comfort. With the advent of global warming in the early 21st century, AC saw much development and diffusion. Today, it has changed the lifestyle of many tropical and subtropical nations. There are no longer parts of the day that are too hot for business, and activity is now a matter of choice. Walls cool and dry the rooms perfectly.

Radiant heaters offered similar improvements for colder climates. Different zones within the same room can have different temperatures, saving energy and increasing comfort. Radiant heaters also provide efficient and economical protection against cold drafts.

In similar fashion, *outdoor* climate control has changed the character of many city streets. From humble beginnings with fan heaters outside cafés and restaurants in colder climates, the AC/heating revolution created a niche for businesses, events, and establishments that based their activities in the public spaces of the city. Temporary cafés, shops, and meetings lived along sidewalks, forming a continuous environment of small establishments and redeveloping urbanism. As cars vanished, the street took on a more cultural role.

The ozone layer crisis of the mid-'70s killed the sidewalk culture, and most social activities shifted back indoors, effectively stranding some groups and events that relied on the openness of the public space. Climate control remained important in the many glassed-in streets and squares, but these public spaces allowed a greater degree of social control by local authorities and establishment owners. In the most-afflicted high northern and southern latitudes, the bazaar (p. 20) substituted for the lost street culture.

With a recovering ozone layer, sidewalk culture is rising again. Many people remain skeptical about going outdoors, but the trend is catching on among Outbreakers (***Fifth Wave,*** p. 28) who remember the sidewalk culture, as well as among non-biological sapients. Modern climate control machines can fine-tune the temperature and remove humidity, while VR overlays enable complex additions to a street location – the trendiest café or nightclub in town can again be the sidewalk or street *in front of* the actual establishment.

Hotels

Hotels provide paid lodging, usually on a short-term basis (and especially for tourists). Many also provide other services: restaurants, web access, swimming pools, nurseries, and more. From this basic functionality, two divergent classes of hotel have developed in 2100: "flexible" hotels and theme hotels.

Flexible hotels usually target business trips, student tourism, and seasoned travelers. The limited rooms can be personalized cheaply, and the hotel typically employs virtual decor and style.

Theme hotels are typically resorts for holiday stays and wealthy tourists. They put great effort into developing a particular style and memeplex, and some specialize in suiting the fad of the moment.

Cheaper hotels are as automated as possible to avoid costly human staff, with check-in and services run by AI, advertisement overlays, and reduced customization. Such hotels can appear desolate – the only people are other guests! Still, many favor such hotels for their relative anonymity, and a cheap hotel may be brimming with secrets.

Conference hotels have largely disappeared in the face of telepresence. While many hotels offer gathering space for guests, it is usually on a smaller scale.

Boutique Hotels

The term "boutique hotel" originated in North America to describe intimate and luxurious or quirky establishments. Boutique hotels evolved over time into modern levels of personalized accommodation, services, and facilities. In a typical boutique hotel in 2100, guests specify room style and furnishings ahead of time, and often carry parts of their own virtual environment with them. Management typically has a lenient policy toward guest creativity, and an in-house designer who adds embellishments – rooms can be furnished as everything from pagodas to jungle groves.

Capsule Hotels

While the need for office workers to stay overnight in the city has sharply declined, the capsule hotel, with small accommodation units rented for very short stays, has kept a social role as a *very* low-frills place to sleep, especially in Japan, where the idea originated. A capsule hotel is a communal form of living, unsettling for customers accustomed to more privacy, although AR and noise dampening help reduce the cramped feeling.

Libraries and Museums

Physical books are no longer needed, historical collections aside, although they remain part of traditional forms of decor. Modern libraries act as repositories of the cultural commons – they dispense free information, and provide aid in the form of librarian AIs. The growth of hard IP protection has sometimes reduced the presence of protected books and media, but they remain storage-places for information with lapsed copyrights – the difference between a library and museum is sometimes subtle. Funding is also problematic – many libraries are sponsored by a cultural or urban protection foundations. Fifth Wave city libraries are mostly visited (at least in person) by the elderly, nostalgic, or underemployed. Overturners consider them stuffy, crypto-infosocialist, or sold out to the WTO; the Transhuman Generation simply fails to understand them.

Meanwhile, museums and public art galleries endure in more traditional forms, as places which hold, conserve, and display irreplaceable relics of the past – although their educational function means that they also need to have a strong Web presence, and they receive many visitors by telepresence. Conservation technology is often extremely advanced and very subtle; museum staff can call on a wide range of highly specialized skills.

Both libraries and museums often act as cultural centers and public meeting places. Nationalist institutions, often supported by variants of the Majority Cultures movement (***Fifth Wave,*** pp. 12-13), seek to glorify and explain the *real* culture of a nation . . . and these are often the only libraries that get significant patronage.

Resort Hotels of 2100

Bel Sol Summer Resort (Oran, Algeria)

The Bel Sol is a "city complex hotel" (10,000 rooms), aimed mainly at old-fashioned tourists, with arcology-like facilities and large glassed-in open spaces. Although the sunbathing fad has almost disappeared, Bel Sol's hot climate, exotic culture, diverse entertainment, and extensive services and health care still draw a substantial tourist crowd.

The various blocks of the hotel are themed, mainly mimicking retro-2010s styles for Millennial Generation guests, who favor the hotel's "organized vacation." Fourth and Fifth Wave-minded visitors find Bel Sol tacky, impersonal, and too strictly controlled.

La Bibliothèque (Paris, France)

La Bibliothèque is a bibliophile-themed hotel providing rest, relaxation, and a substantial collection of books. It is patterned on the late-19th-century Art Nouveau era, with undulating and flowing lines. Seats for reading are scattered throughout, and a human librarian helps set the mood.

Ryugyong Hotel (Pyongyang, Korea)

Originally started in 1987 and abandoned in 1992 due to North Korea's economic weakness, the dilapidated Ryugyong building was finally completed by Korean businesses after the reunification of 2025. With 105 stories and 3,000 rooms, and themed as a symbol for unified Korea, it remains a major landmark in Pyongyang, but has had severe financial vicissitudes. Most of its income comes from nomadic Korean corporations and, weirdly, pre-unification nostalgia.

Hotel Borealis (Helsinki, Finland)

The Borealis is a minimalist hotel built in the millennial style – a common design for upscale establishments seeking to be as neutral as possible for a wide variety of international guests. Today, such minimalism is regarded as quaint, nostalgic, or bland, depending on the tourist. The lack of personalization also inspires the term "sado-minimalist" for its brutal dullness and austerity.

Chapter Five

Stockholm by Day, Night, and Web

The Stockholm tourist board welcomes you, Sir/Ms/Obj/Tri or other!

Here in Stockholm, we pride ourselves in being both welcoming and inclusive, thereby celebrating the true Nordic spirit! No matter what your clade or meme, there is something for everyone in the Venice of the North.

For the young ones, the city boasts enviable bandwidth, as well as several tailored shut-nets only accessible from within the city limits. And why not take a walk in the old subway tunnels? Completely redecorated with new interactive artwork, they're the world's longest art exhibition, and now it's fully AR-interactive.

For the business executive, why not take advantage of our premium services and locales, all accessible at laughably low prices. Servers, physical meeting sites, and team-building tracks and scripts – we have it all.

Or, if you're here for the sights, we have several Archipelago tours, along with the preserved homes of great Stockholm citizens and other earthlings from across seven centuries! But, whatever you do, don't forget the historic Telia Downtown Uplink site, where the first mind-state was shunted to LEO relay satellites!

With these few words of welcome, we invite you to make use of our complimentary expert facilities to ensure that your stay will be both memorable and enriching.

– Stockholm Tourist Board greeting automessage

Stockholm is both "the playground of the Baltic" and a modern business and political city, with its own unique dynamism. It is detailed here as an example of a Fifth Wave metropolis and a venue for adventure.

The Context: Sweden

Stockholm is the capital of Sweden, a high-income, low-population nation that has a bland but positive image worldwide. It is not involved in any controversial activities beyond the general run of E.U. policies, and has relatively few internal conflicts. It is generally ticking along like most of Europe's prosperous nations, adapting sensibly to new technology and avoiding extremes. Culturally, Sweden has been out of the spotlight for a few decades. The image it projects abroad emphasizes stability, reliability, and large areas of unspoiled wilderness.

Population: 7.8 million.
Median Age: 71.6 years (disregarding nonorganic citizens).
Age Structure: 0-14 years: 10.1%, 15-64 years: 36.1%, 65 and over: 53.8%.
Life Expectancy (at birth): 145.8 years.
Ethnic Divisions: Swedish majority; significant Finnish, Turkish, Greek, Norwegian, Russian, Danish, and Sami minorities.
Religious Affiliation: Lutheran 61%, Muslim 8%, Roman Catholic 1%, Orthodox 1%, None 22%, Other 7%.
Unemployment: 50%.
Urban Population: 43%.
Gross Domestic Product: $2.7 trillion.
Per-Capita Gross Domestic Product: $347,769.
State Budget (Outlays): $543 billion.
Exports: $1.2 trillion.
Imports: $958 billion.
National Health Expenditures: $837 billion.

External Relations

Relations between the Scandinavian nations are excellent, with open borders, free trade, and frequent travel. Norwegians, Swedes, and Danes can understand each other's languages (and at home tell traditional jokes about the stupidity of the others – the jokes are identical except for the nationalities). Swedish Malmö and Danish Copenhagen have grown together into a single city around the Öresund Strait. Swedish preservationists do persistently complain about the transhumanist policies of Finland, while Finland's representatives regard Sweden as somewhat restrictive in regard to free trade.

Relations around the Baltic remain cordial, with several government-level organizations such as the Council of the Baltic Sea States (CBSS) helping coordinate matters. There is also the Baltic Sea States Subregional Co-operation (BSSSC), an organization for smaller regions around the sea. In recent years, this has grown in strength and importance as Stockholm, Åland, Kaliningrad, and other regions have become freer.

Within the E.U., Sweden is a diplomatic cog in the machinery. Most Swedish parliament representatives fall into the practical preservationist camp, seldom proposing anything unexpected. Sweden seldom votes for the E.U. getting involved in anything violent or risky, but gladly supports broad sapient rights resolutions and denunciations of abuse.

Geography

Sweden is located on the eastern side of the Scandinavian Peninsula in northern Europe. It is bordered by the Scandinavian mountains in the west, which form a natural border with Norway. In the south, the Öresund strait separates the plains of Scania (Skåne) from Denmark. East of Sweden lie the Baltic Sea and Gulf of Bothnia, separating it from Finland, Russia, and the Baltic states.

The major city regions are Stockholm (including suburbs and metavillages around Lake Mälaren and the archipelago), Gothenburg, and the Malmö-Lund-Copenhagen complex colloquially called just the Öresund city. Most of the population lives in the southern third of the country in small towns and villages. Rural telecommuting professionals densely settle the two major islands Öland and Gotland.

The northern part is less settled and largely forest or subarctic mountains. Most inhabitants live along the coast. The lakes, vast forests, and naturalness of northern Sweden have attracted a large number of people taking sabbaticals (***Broken Dreams,*** p. 27). There are numerous unlinked cabins and villages scattered across the region.

The high latitude produces characteristic short and light summer nights (or rather twilights) and long and dark winter nights. Above the Arctic Circle, the sun doesn't set for part of the summer, but in return, it doesn't appear at all during winter. About 20% of people living in Sweden are vulnerable to seasonal affective disorder (SAD) due to the light variations. These days, nanodrugs can easily fix light-mood responses.

Åland

The Åland archipelago between Sweden and Finland has independent status. Originally, a part of Sweden, after the loss of Finland and Åland to Russia in 1809 it became part of the Grand Duchy of Finland. When Finland declared independence from Russia in 1917, Åland sought to become part of Sweden, something the Finns did not accept. After mediation by the League of Nations, it became a part of Finland with guarantees of independence, and a demilitarized zone. Since then, it has thrived as a tourist location, from tax-free trade, and by selling independent stamps. When both Finland and Sweden joined the E.U., the archipelago, fearing the loss of its independence, became a very active player in the E.U. regional independence movement. After the Treaty of Warsaw in 2041, Åland gained further guarantees of its status. It is for all practical purposes an independent mini-nation. The telecommuting revolution made the islands just as attractive as the Stockholm Archipelago, something the local government has profited greatly from. The population is now 78,560 people, most of whom are very wealthy and well-connected.

Events Since 2000

The first decades of the 21st century were dominated in Sweden by the slow decline of the classic social-democratic welfare state and political system. A rigid governmental system dominated by a nearly hereditary political class, an aging population, and a shrinking tax base demanded change. However, none of the political parties wanted to risk their positions by promoting anything fundamental. Meanwhile discontent grew, causing the emergence of many radical organizations.

In the '20s, what later historians would call the "liberal soft coup" occurred. While the traditional political system was essentially closed to new ideas and modes of operation, liberal groups were successfully creating new institutions in the private sector. More and more companies and NGOs were building their own networks, circumventing the sclerotic political system, exploiting the digital economy and E.U. markets. A new alliance of internationalized youth, politically active companies, and flexible networks took over as the old system crumbled and the last baby boomers retired. The old welfare systems were dismantled, privatized, or moved out to more efficient NGOs. The previously highly centralized government and industry began to decentralize. The borders were finally opened for replacement immigration.

The new government had a vision of Sweden as education nation. After all, it had a long tradition of excellent researchers and engineers together with many well-renowned universities and institutes. The main problem had been that many academics left for higher paying jobs abroad, and research at local institutes seldom produced industries or patents in Sweden. Instead of seeing this as a problem, it could be turned into an advantage: If Sweden could leverage its education system onto the international market, then the new industry would not be the inventions *per se,* but the inventors themselves. Ambitious private and public projects were launched, and Sweden began to try to attract students from at first the E.U., and later the entire world.

Another trend was the acceleration of the differentiation between Stockholm and the rest of the country. Stockholm was far more multicultural and metropolitan than the rest of Sweden. While immigrants were to a large part assimilated in the rest of Sweden, many retained their cultural identities in the major cities, forming their own microsocieties. Much of the support for the overthrow of the old system came from the major cities while the other regions still longed for the safety of the old. These factors produced a noticeable cultural difference, which was amplified by the increased population mobility and a large contingent of foreign students. As people remarked, the strange people moved to Stockholm, the sane people kept away.

By the '40s, the education drive had begun to pay off, but the advances in telepresence and virtual institutions that made it take off were also undermining the traditional cities. As people began to select their environment based on how they wanted to live rather than where the jobs were (since telepresence made nearly any job possible to do through the net), the previously expanding metropolitan regions began to deflate. The schools and universities of Stockholm were still filled, but now mainly existed as virtual servers.

As Stockholm declined in population, the city culture began to define itself. The city government and institutions realized that the only thing that could attract people to Stockholm was in the end the local culture and style. Instead of trying to cater to everyone, the city should be the home of the avant-garde, bohemians, micro-communities, and creative people experimenting with new possibilities.

This policy of not just accepting but stressing the cultural difference between Stockholm and the rest of Sweden caused much friction with the national government. The Transhumanist Surge fueled the conflicts, as transhumanists flocked to the city while the rest of Sweden became increasingly preservationist in outlook. Radicals on both sides caused outrages. While the idea of making Stockholm a free city was floated, it was never a proposal that could be implemented politically. In the end, the solution was an understanding rather than a formal agreement between the city and the nation. Stockholm was allowed a high degree of autonomy, but it would remain part of Sweden.

As the old "knowledge alliance" declined in power, new groups began to influence politics. One element was the early cyberdemocrats, promoting direct democracy. Another was the "welfarists." While the old welfare system had been dismantled years before, many still viewed it as a great vision or even a lost golden age. Given the wealth of Swedish society and the new tools available, could not a new welfare state be constructed? In the 2066 elections, the welfarists again came to power and began to construct the "Second Welfare State" (p. 53) The new system had to give the regions far more independence than the old one but could also rely on the smart infrastructure that made guaranteeing the essentials very cheap. Since then, the debating issues have consistently been what to provide beyond the essentials.

The Swedish Environment Today

Climate change has made the Swedish climate wetter and warmer. Winter sports can now only reliably take place in the far north or at artificially cooled facilities. Winters are mostly dark and rainy, with occasional blizzards to snarl up traffic. Flooding problems have occurred here and there. The most troublesome issue has been keeping the Baltic free from invading species and algal blooms. At present it is managed by the Baltic Ecological Consortium, an organization led by the surrounding governments that uses biotechnology to stabilize the unstable ecosystem.

The reduction in farming subsidies in the '30s led to the abandonment of much farmland. Some of it was turned into orchards, parks, or gardens, especially as preservationist-leaning newcomers settled the former farms in the 2040s. In the north, the landscape has returned to the original dense coniferous forest. Deciduous forest is slowly spreading northward, returning Scandinavia to the state of the post-glacial warm period (7000-600 B.C.).

Ozone

The "ozone crisis" of the 2070s affected Scandinavia strongly and early. It was already a major concern in the 2050s, as skin cancer rates were reaching Australian levels. UV radiation produced a mall culture of glass-covered streets in many towns, but the outdoorsy Scandinavians also consumed large quantities of sunblock (one of the more unusual sources of government revenue today is the licensed sale of Swedish-designed sunscreens to Mars). A very large number of Scandinavians have been genefixed to reduce the risk of skin cancer. The "classic" Scandinavian these days is still blue eyed and blond, but with a naturally tanned skin.

Scandinavians were involved in the ozone restoration projects on all levels. Many of the stratospheric ozone repletion balloons were launched from the Esrange rocket range in north Sweden. These solar-powered balloons drifted in the high atmosphere, producing ozone and binding ozone-destroying molecules to their long nanofiber streamers. When a balloon had absorbed enough it deflated, falling back to the surface where its biodegradable plastic quickly disintegrated.

Increased UV radiation hurt forest growth, and combined with increased rainfall to produce bogs and marshes that are only now being reclaimed. The elk population moved into a boom-bust cycle that only ended when a sufficient wolf population had been re-established.

The Baltic Ecodisaster

The Baltic Sea is a never-ending headache for the ecologically minded countries around it. The combination of agricultural runoff, warmer weather, and overfishing has caused a major ecological crash. In the summer, giant algal blooms turn the water into a slimy sludge that sinks to the bottom, depleting oxygen, killing much undersea fauna, and releasing poisons from the sediments.

There have been several blunders in "fixing" the Baltic over the last century. Agreeing to reduce chemical emissions is hard when a sea is surrounded by eight countries and receives water pollutants from five more. The Swedish authorities spent vast amounts of money on reducing nitrogen inflow, only to have nitrogen-fixating cyanobacteria bloom massively in an environment now suited to them. Restoring the nitrogen-phosphorous balance instead gave poisonous dinoflagellates a chance, poisoning many keystone species. Attempts to spread viruses that attacked the dinoflagellates produced mixed effects, including the 2048 emergence of a truly vicious resistant strain of *Alexandrium ostenfeldii*. The Alexandrium form was more poisonous, causing severe red tides and a characteristic luminescence in the water after dark. Recriminations were intense and the groups involved blamed each other for the fiasco.

Remember one thing – that Sweden is performing better than the rest of Europe.

– Göran Persson

Things were made worse in 2051 by the unilateral introduction of a variant of the small local crustacean *Monoporeia affinis* resistant to lack of oxygen, which a St. Petersburg consortium hoped would help reduce algal blooms and restore the cod. It began to exploit the oxygen-free areas of the Gulf of Finland as a refuge, growing in numbers where no predators could reach it then emerging locust-like as huge swarms devouring all kinds of algae at the surface. This led to a 20-year moratorium on any introduction of genetically modified organisms in the Baltic. The local ecofixes used to keep the wealthy Stockholm and Åland archipelagos pleasant did not help overall stability.

The last decades have seen a gradual improvement thanks to better ecoforming methods and further international cooperation. Finally fixing the ecology has become feasible, but now people are starting to debate what kind of sea they want. Is the pre-industrial cold-period ecology more natural than the Bronze Age warm period ecology?

Ah, summer is the best day of the year!

– Traditional Swedish joke

The Second Welfare State

The current Swedish system of social security is far more fluid than previous versions, and largely voucher-based. Every citizen is guaranteed a certain basic level of health care, education, social services, entertainment, and income, but it is up to them to decide what kind of services to spend their vouchers on. The system is primarily funded from regional taxes, making it possible for certain regions to have somewhat different approaches – Stockholm being of course one such region.

In Stockholm, the vouchers are largely interchangeable, so it is possible to switch most of the guaranteed health care to other services depending on lifestyle. For example, many Life Support Utilitarians (see p. 56) have their "immersions" paid for through health care vouchers. There is an ongoing debate in parliament about exactly how extreme such choices may be and still receive coverage; several of the preservationist parties have long wanted to limit them to "natural" health and safe enhancements.

Politics

The *Riksdag* (parliament) has 349 members elected through proportional representation (i.e., the number of seats a party receives is proportional to the number of votes it got in the election). After an election, the Riksdag elects the cabinet, which then proposes new laws and financial arrangements to the Riksdag. See the table (below) for the party breakdown as of 2100.

The political space has three "corners": a transhumanist free-market corner (with Stockholmspartiet and the more moderate Liberala Partiet), a preservationist corner (with Demokraterna and Bevarandepartiet), and a welfarist corner (with Socialdemokratiska Partiet as the most radical element, followed by Familjepartiet). Alliansen för Cyberdemokrati is generally in the middle. The result is that in issues dealing with bio-politics and with the economy/social services the natural alliances are different, making political compromises necessary all the time.

Dozens of minor parties have not reached the statutory 4% minimum for gaining seats in Parliament. Most of them are mostly involved in local politics where they can be fairly dominant; many metavillages are almost single-party voting districts. The major outsider parties for the moment are the Svenska Nanosocialistpartiet (the Swedish TSA-loyalist infosocialist party; small but loud), Transhumanistiska Omsorgspartiet (transhumanist welfarists who want to use cutting-edge technology to implement a "ubiquitous welfare state"), and Nationalpartiet (a nationalist majority-culture movement seeking to limit foreign cultural influence). None of these are likely to get into Parliament in the foreseeable future.

Riksdag Political Party Breakdown

Seats	*Party*	*Description*
110	Socialdemokratiska Partiet (S)	A descendant of the old social democratic party. Active welfarists with mild infosocialist leanings.
5	Alliansen för Cyberdemokrati (AC)	Cyberdemocratic party allowing members to decide the party line through an internal election, proposal, and voting process. The core objective is to institute a cyberdemocratic system like the E.U. Parliament in Sweden. Beyond that, the party is mildly liberal.
33	Bevarandepartiet (B)	The old green party, these days general preservationists.
112	Familjepartiet (FP)	Middle-of-the-road welfarists. Originally the Swedish Pensioners' Party, but reformed as a health care party after several very bad elections in the middle of the century.
67	Liberala Partiet (LP)	The old liberal knowledge society alliance. For free markets and reasonable levels of cultural experimentation.
12	Stockholmspartiet (SP)	A local party with only minor national importance, but which dominates the Stockholm city council. Transhumanist, anarchocapitalist, and pro-urban.
6	Demokraterna (D)	Originally the Christian Democrats, a mildly conservative and religious party. Over time it expanded ecumenically, changing its name in 2039 to placate the large Muslim membership. Preservationist, pro-religion conservatives.
4	–	Unaligned politicians who have dropped out of one of the established parties.

The Institution of Monarchy

Americans often marvel that there are still so many monarchies in the E.U. No royal family holds any significant political power and they are constrained by parliamentary government, but they still possess wealth, estates, and glamour. To Europeans, they are a kind of traditional, very staid soap opera (although thanks to modern memetic child-rearing, the chance of black sheep in these families is unfortunately almost nil). Monarchy is popular among those who care for such things; while most modern people agree that it is archaic, it is still seen as a beautiful, traditional spectacle.

One problem for modern monarchists is that the monarchs may rule nearly forever. A century ago, many princes had to wait most of their lives to succeed their royal parents; now the wait has grown to almost a century. Had Victoria I not stepped down, she would still be Queen of Sweden. Beyond advances in life extension, uploading could in principle allow an ageless posthuman monarch. So far, no monarch has ever undergone the process, although there are some rumors that the current Prince Florian II of Liechtenstein might consider it. Whether the proper thing to do would be to step down before uploading remains a topic of discussion among royalists on the Web.

Even if royals do not become posthuman, there is the possibility of genetic enhancement to trouble traditionalists. Whether gengineering dilutes royal blood has been fiercely debated among the dedicated. These days most royalists do not consider it much of an issue as long as the royals remain "sufficiently human," and since (so far) no royal houses have gone parahuman (which would in any case encounter legal problems in Europe), things are quiet.

The current cabinet is a center-preservationist coalition of Familjepartiet and Bevarandepartiet led by Prime Minister Willy Söderström (FP). It is a minority government whose proposals could be thwarted by the other parties voting together, so it has to constantly compromise with rival major parties or play them against each other. The result has been a period of sleepy agreement on most important issues and intense catfights on minor matters. In principle, Socialdemokratiska Partiet and Familjepartiet could form a strong majority government, but they cannot actually do so: both have spent so much effort to distinguish themselves from each other on fundamental issues that they cannot work well together.

Nanosocialdemocracy

The name is partly a joke, but nanosocialdemocrats (in the vernacular, "nanososSar") do share ideas with nanosocialism and infosocialism. Socialdemokratiska Partiet currently represents them in Sweden. The group's core idea is to ensure a high and safe standard of living for everyone, and one important aspect of this is to guarantee the existence of a big intellectual-property public domain. Nanosocialdemocrats are constantly lobbying for the E.U. to shorten the span of patents and copyrights, and promoting open source and public domain technology.

Socialdemokratiska Partiet also want the state to buy the rights to certain basic manufacturing designs and make them publicly accessible. As an intellectual property compromise (and to reduce the licensing cost), these designs might only be freely employed by Swedish citizens and companies. However, the idea of such limitations angers the more radical internationalist parts of the party, producing some spectacular infighting.

Preservationism and Transhumanism

Sweden manages to be a bastion of preservationism and transhumanism at the same time. The early adoption of a transhumanist-aligned view in medicine occurred at the same time as public opinion was becoming increasingly green and preservationist in outlook on ecology. While life extension and even some enhancement therapies were deemed acceptable, the idea of a natural order that must be preserved held sway in regard to the non-human world, despite constant reminders from both transhumanists and preservationists that this position was philosophically untenable. As usual, Swedes demonstrated the ability to ignore contradictions in order to get what they wanted.

With the relocation of so many of Sweden's transhumanist-aligned citizens to Stockholm, the old co-existence between the views shifted, and preservationism on most issues became dominant in the rest of Sweden while full transhumanism became an important part of Stockholm culture. This difference has become the main source of national internal conflict; transhumanists chafe under preservationist E.U. laws while the preservationists worry about transhumanist subversion.

The worst flashpoint was the crackdown on black clinics in Stockholm in 2074-2075. To many, they represented exactly why transhumanism was bad: unethical experiments, ruthless Russian mafia gangs with augmented enforcers, customers receiving deadly treatments, and so on. To the Stockholm groups, the crackdown was politically motivated, an attempt at preventing transhuman development and stifling the vibrant subcultural life of the city. For a brief time it seemed the understanding between the city and its surroundings would break down, but then both sides backed down. Most transhumanists were, after all, not too fond of the black clinic gangs, and the government did not wish to upset the economy with a full, expensive clean-up and gentrification of the city.

The Monarchy

Sweden is a constitutional monarchy: The monarch is head of state but has only ceremonial duties. The last queen, Victoria, abdicated at the age of 90 in 2067 in favor of her daughter Ingrid. Queen Ingrid, now a vital 87-year-old, seems less inclined to abdicate, and still takes an active role in state functions, charities, and her own particular hobby, environmental reclamation. She is an outspoken and knowledgeable debater on the relative merits of different ecoformers. Her children, Margareta (49, the heir apparent) and Carl-Fredrik (46), seem content with their positions as princess and prince while pursuing their own interests.

A small but vocal movement of Swedish democratic royalists seeks to reintroduce the early medieval tradition of electing rulers rather than having a hereditary monarchy. They point out that the Bernadotte family would hardly be unseated by this (it is far too popular), but at the same time every part of government would now be run along cyberdemocratic principles. They have been making inroads, but so far the issue has remained marginal.

Religion

Sweden is largely a post-Christian country, but most Swedes have at least a nominal sentimental attachment to the Lutheran church or other faiths. A noticeable strain of "nature romanticism" is common; the biosphere is seen as a meaningful whole to respect and cherish (though not necessarily as a personal Gaia-like god), and everything is assumed to have its natural place which should be respected. Many local Christian churches combine a very liberal Christianity with reverence for nature – "Green Christianity." They are also highly ecumenical, accepting SAIs, bioroids, and uplifted animals as members.

Stockholm is a haven for cults. Some, like the International Church of Perfect Living on Sveavägen, are large, visible, and quite wealthy. One cannot go anywhere in the city without running into a cheerful acolyte trying to be a good example to others and to promote their memetic package. Others are tiny, hiding in basement offices where they make InVids about the soon-to-come memetic Armageddon. Many have a transhumanist theme; the Singularitans (***Toxic Memes,*** pp. 25-26) have a chapel in the Old Town and the Christian Hyperevolutionists bought the beautiful Engelbrekt Church in 2091. This of course causes plenty of quarrels: Cultist biotechnologists and nanotechnologists have had several very entertaining media brawls, and there seems to be an AI-worship cult that can't stand pro-ghosters.

The Economy

Sweden is a major exporter of software, media, design, and information services. Almost no material goods are exported beyond some local delicacies.

Sweden was for a long time a major timber and paper pulp producer. The replacement of cellulose paper with smart paper and the culturing of wood in tanks cut into this business, so the large forest companies shifted to become high-tech bioengineering firms using genetically modified trees for chemical production, with telepresence harvesting.

Some Swedish Companies

Täby Transgenics

A small biotechnology firm, mainly working on modified garden plants and pest control. It recently had a runaway success with its patent on current-sensitive tissue. This enables the creation of "network flowers": using buried cables, the owner can regulate their color and flowering time digitally. The patent is bringing in huge revenues, but the shareholders now expect the small firm to come up with something equally brilliant for an encore.

Bayes Insight AB

A decision support, AI, and data mining company, whose "Administro" series of management LAIs ("The Best Boss you can Buy!") can be found everywhere in Scandinavia.

Singular Concepts

A media and design firm, specializing in "narrowcasting": finding small (but profitable) groups and giving them exactly what they want. SC employs an army of edge-hunters, fad surfers, and subculture experts looking for someone wanting something unavailable. They came up with InVids for Christian internationalists, icon translation filters for the transliterate (p. 73), and murder mystery pasta ("Death and cooking! Can you solve the crime before the last rigatoni?").

Swedish Network Arms AB

A major arms manufacturer consortium originating in the merger of many smaller smart-weapons, sensors, communications, cybershell, military software, and aerospace firms in Sweden and other E.U. countries. The member firms retain substantial autonomy and together control a majority of votes on the consortium governing board. Since many of them are also employee-owned, SNAAB has been called the world's first democratic arms company. Networking in concert, they can ensure that their devices function well together and that new military paradigms arrive with all parts included. SNAAB mainly deals with the behind-the-scenes components that make Fifth and Fourth Wave militaries work: most of the cool weapons that get war buffs excited are just peripherals to the systems SNAAB has made.

While different member companies have different security paradigms, from the paranoid Sundsvall Ceramics to the open-source fanatics at Marine Protection Software AG, there is enough very sensitive knowledge inside SNAAB to require a company security firm, SNAABSec. This tries to protect SNAAB from industrial espionage, sabotage, and memetic subversion. Over the years, it has proven itself to be one of the most skilled and technologically cutting-edge counterespionage firms around. It receives many offers to protect outside companies; it turns most down, but has still made a name for itself in protecting Fickel Bergbau from TSA spies.

The André Wennerstrand Foundation

A software house that develops software toys for the poor in Third Wave nations. These inexpensive or freeware systems have not just produced goodwill but have also promoted commercial upgrades from Swedish firms. The foundation has old ties to the nanosocialdemocrats.

Since preservationist Swedish opinion firmly opposes "unnatural forests," the companies keep their factory forests in Finland, Russia, and the Canadian states. Their vast Swedish forest holdings are mostly leased to Isolates and sabbatical communities.

While other technology and business have long since eclipsed the old "education society," Sweden remains a leading producer of education software and AIs. The network universities have entered agreements with other universities in India, South Africa, and continental Europe.

A particular specialty is the construction of education environments for AI. When designing AIs, especially more advanced models, the infomorph needs to undergo a maturation period (a "childhood") wherein it integrates its abilities and acquires a working knowledge of the world and itself. To achieve that, it needs a suitable learning environment, and constructing these custom environments is a narrow but profitable field employing many Swedish professionals. It takes a particular kind of pedagogical and creative mind (be it human or AI) to come up with workable concepts: It requires a mixture of storytelling, social psychology, and brain hacking. Many more participants are needed to fill out the details of the environment, write up rules, test it, act as human role models in education runs, and so on.

Stockholm Overview

Stockholm has not always been a Swedish city; for a large part of history, German-speaking merchants dominated it. The current situation represents a return to this old "cultural enclave" status. The idea of making Stockholm a free city (***Transhuman Space,*** p. 84) has been raised repeatedly, but support has never been strong enough to make it happen. Hence, the city remains the capital of Sweden, the home of the royal family, and the nominal seat of government.

When modern Swedes speak of Stockholm, they usually do not refer to the city *per se* but to its *function*. Stockholm acts as a safety valve, cultural diversity reservoir, experimentation zone, and place for adolescents to learn. Stockholm is a testing-ground for new styles, new ideas, and new technology. While they are often developed elsewhere, this is where memeticists, thrill seekers, transhumanists, and the curious discover their consequences.

It has become a custom for young people in Sweden to move to Stockholm for a while. They get a chance to show their independence, get a taste of the different, sample lifestyles, and decide what they truly like. Most move back home after a few years.

While Swedish law is still notably strict on human biotechnological modification, many people take trips to enhancement-friendly places and then spend time testing out the effects in Stockholm. "It's invented in orbit, tested in Stockholm, marketed in Helsinki," as they say. There are close ties between the enhancement spas of Finland, the Stockholm subcultures, the St. Petersburg bioengineering clinics, and various continental transhumanist groups. Furthermore, local ordinances are very cybershell-friendly, making this an easy city to be software in.

Being avant-garde is a constant race, and Stockholm has not always been at the front. While it was hot in the '40s and early '50s, it was notably passé in the '60s, and more than a bit seedy in the '70s. In the '90s it became hot again, largely due to the many blossoming pro-infomorph or infomorph-related subcultures, and the recent Transhuman Generation immigrants.

Stockholm is notably poorer per capita than the rest of Sweden – mostly due to the concentration of young people who have not yet made much money. Plenty of the underemployed but overeducated thrive in the city. Although some of Sweden's super-rich live in the region, they are few. Most of the Relic Generation lives elsewhere, with the exception of a colony of Old Transhumanists.

Although many well-renowned universities have their physical headquarters in the region, most of their activity is virtual. In fact very little industrial production occurs in Stockholm except for everyday 3D printing and pricey "ultramodern" crafts.

Stockholm is home to many radical movements trying to push the legal, philosophical, and cultural boundaries of the E.U. At present, the most noticeable are lifestyle cults such as the symbiotics (who favor close-coupled symbiosis between humans and AI), infomorph right activists, neurostylers (pp. 72-73), and pro-xoxers. Various Duncanite offshoots flourish (see p. 71), pushing to make Sweden more libertarian and developing grandiose schemes for terraforming or cryptographic infrastructures to ensure that the "powers of repression" will finally lose control over Earth. Real spacefaring Duncanites sometimes call all their terrestrial offshoots "Stockholm Duncanites" derisively, implying that they are all talk and no action.

Transparency: There are a few transparency communes whose members (be they people, organizations, or companies) agree to relinquish privacy for total openness. These "transparentists" gladly try to export their brand of social politics, sometimes with success but usually finding that what works in a small homogeneous community does not scale up well to a hugely diverse society. The failed Lithuanian experiment (***Broken Dreams,*** p. 20) was such a blow that most expect the movement to dwindle away.

Xanadu Bioservice: The "Life Support Utilitarians" are a movement propounding a mixture of cybergnosticism and utilitarianism that considers "base level reality" unimportant – finding pleasure and fulfillment is far easier in virtuality. Hence they place their bodies in life support tanks and link up their minds to dedicated virtuality systems. While this is a worldwide movement, there is a notable community/corporation run by them, Xanadu Bioservice AB, in Stockholm. Xanadu has bought an unused subterranean emergency hospital beneath Södersjukhuset, the hospital in Södermalm (see p. 59), to house their clients. They have recently begun to diversify into cryonics and brain scanning, and are looking for remote sites to locate their VR nodes and mind archives.

The Russians

During the Russian civil war (2057-2063), numerous Russian refugees arrived in Stockholm. Some came by ferry, others crossed the Baltic in barely seaworthy boats or even on rafts.

The Swedish government was, like most of the E.U., not too pleased with this, but the humanitarian need was obvious. Since there was plenty of unused space in Stockholm, many refugees ended up there, turning parts of Södermalm (p. 59) into "Little St. Petersburg."

After the war, most of the refugees returned home, helped by generous resettlement grants from the E.U. However, a sizable fraction remained in Stockholm. They added a Russian component to the already cosmopolitan mixture. Today, about 10% of Stockholmers have Russian ancestry. Among the remaining refugees were several groups of St. Petersburg biotechnologists and Russian transhumanists. More ominously, several small but nasty spin-offs from the old Russian Mafia and the Siberian secessionists also remained. In 2074-2075, Swedish authorities cracked down on the black clinics that had grown from this base and forced away some of the Russian gangs. Several of the worst criminals (including Nelli Grigorevna, the "succubus mother" – see p. 76) escaped to L5.

As nations, Sweden and Russia have been on-off enemies for centuries, and an ingrained mistrust of Russians exists to this day among native Swedes, even if it is practically never acknowledged. It added to the willingness of many to believe the worst about the black clinics and hence to the ferocity of the crackdown. In Stockholm, the mistrust is almost reversed: people, regardless of ethnic background, fear that the surrounding country may one day turn against the city, be it for ethnic or bio-political reasons. Secessionist groups have long been trying to fan this mistrust into political action, but with little success.

Parts of the City

Stockholm is built on and around 15 islands where Lake Mälaren pours out into the Baltic. Like most European cities, it has a historic core surrounded by a modern city center, in turn surrounded by suburbs and smaller cities. On a map, it looks like a spider with arms of development stretching outward along the major highways and railways from a central body, "Stockholm City" itself.

Stockholm City

Downtown consists of glassed-over streets between old bank offices, department stores, and government buildings. As the price of office space plummeted they were first invaded by smaller companies and then by sleazy call centers.

Stockholm and *GURPS City Stats*

GURPS City Stats provides a standard format for summary information for towns and cities in games, which can be used if desired in ***Transhuman Space*** games. Here are the details for Stockholm in 2100.

Population: 903,000 (Search +3)

Physical and Magical Environment

Terrain: Island/Beach
Appearance: Average (0) **Hygiene:** +2
No Mana (No Enchantment)

Culture and Economy

Language: Swedish **Literacy:** Native
TL: 10
Wealth: Comfortable (×2) **Status:** -2 to 7

Political Environment

Government: Representative Democracy, Municipality
CR: 3 (Corruption 0)
Military Resources: $16M **Defense Bonus:** +4

Notes

The stated population covers inner suburbs and arcologies, but not culturally independent satellite towns. It includes all citizens, including AIs usually running on hardware resident or installed in the city. In addition, non-citizen LAIs are everywhere, and NAIs are truly uncountable, being installed in most significant machines and systems. Stockholm is a perpetual ferment of ideas; Search rolls for anything new or radical, whether cultural, industrial, or ideological, are at +2.

The Terrain listed reflects the location of the core of Stockholm. The suburban areas around the city are built on a plains area, but Survival rolls are unlikely ever to be required in this region. The Hygiene rating reflects a combination of public health measures, medical technology, and a pleasant natural environment.

Swedish is the first language of the majority of inhabitants. However, English may actually be heard more often, especially in public; see p. 66. The Appearance rating reflects the general style of the city; parts of the old city and some of the best modern architecture could easily rate as Attractive or better, while some experimental or simply shabby areas would be regarded as Unattractive, especially by traditionalists.

The Wealth rating given here is relative to the world as a whole; see ***Changing Times,*** p. 36-37. In fact, many people encountered in some parts of the city will be Wealthy (and Status 1). The head of state of Sweden (a Fifth Wave power) might almost be expected to rate as Status 8, but local egalitarianism works against this; in truth, arguably, nobody gets treated as better than Status 5 or 6 in Stockholm.

The listed CR is that of Sweden as a whole, as law enforcement and bureaucracy are much the same in Stockholm. While redistributive taxation and extensive environmental regulations are present here as elsewhere, they aren't overly onerous in practice. Weapons restrictions are likely to be enforced promptly and efficiently, approaching CR4, but on the other hand, Stockholm's general bias in favor of radical novelty can bring the local CR down to 2 or even 1 in some social matters. Stockholm has no military forces of its own, of course, and even the police are discreet, if well-equipped; the effective Military Resources of those police assume CR1 for any hypothetical mobilization.

These days the offices have mostly been taken over by various temporary arrangements, studios, nightclubs, and lifestyle experiments. Street life in the "city arcology" is extremely mixed.

The central Sergel's Plaza and adjoining streets house a permanent bazaar (p. 20) where nearly anything can be bought, from cloned organs to original oil paintings to violin performances. Nearby are the high-rises of the Stockholm Honeypot Project (p. 61) and the park of Kungsträdgården, one of the favorite spots for outdoor exhibition sports.

Old Town

Gamla Stan ("Old Town") is the historic part of the city. Located on an island in the exact center, it was the first part settled during the early Middle Ages. The name Stockholm, literally "log islet," refers to the defensive wooden logs placed in the water to repel invaders.

Old Town is a typical maze of pedestrian-only cobbled lanes around medieval and younger historical buildings. The inhabitants are nearly all well-off Eloi (***Fifth Wave,*** p. 113), often with a firm preservationist bent at odds with the surrounding city, but the occasional transhuman collective or neurostyler studio is located here, too. On certain streets, tourists crowd as souvenir shops hawk their designs, be they handmade Swedish glass or templates for "authentic" Viking armor to print at home; on adjacent streets there may be total quiet.

On the northeast side lies the Royal Palace, a square building from the 1600s. The royal family usually lives in Drottningholm castle in western Stockholm, but occasional state banquets are held here.

Just to the north, on their own island, lie the Parliament buildings. Most of the time, the affairs of government are conducted virtually, leaving the building empty except for the opening and closing ceremonies. Government departments are located nearby but also mostly work virtually. They mainly contain exhibitions for the rare physical visitor about the function of the department, and some conference facilities for the administrators.

> *A Scandinavian gem blending ancient Viking roots and cutting-edge design . . .*
>
> *– Becky Ohlsen,* ***Stockholm***

Campustown

Campustown stretches from the Karolinska Institute campus in the northwest down to the parks and museums of Djurgården. It is a large stretch of parks, academic office buildings, museums, student housing, and light industries.

These days, most of the original universities are mainly active virtually, with their buildings given over to rented labs and meeting spaces. In addition, several new virtual universities such as the Polar University have their physical headquarters on campus. The open spaces have been turned into exercise and promenade areas, filled with people studying when the weather is good. Several medical facilities also lie here, the most important being Karolinska Hospital (see the box).

On Djurgården Island, at the southern end, lies the Skansen Open Air Folk Museum, depicting traditional Swedish buildings and lifestyle – a must for visitors nurturing the nationalist meme. Also located there is the Vasa Museum, built to hold the nano-preserved ship *Vasa* from 1628 and later expanded to hold other famous Swedish wrecks such as a fighter jet that crashed in central Stockholm in 1993 and the Nordenskiöld Himalia space probe from 2056.

Karolinska and Ectogenesis

Karolinska Hospital is a classic hospital campus (see p. 28), encompassing 50 major and minor corporations in a park landscape. They produce health care services, medical biotechnology, university research, medical software for general use, and even medicine-related entertainment. The area also houses numerous ectogenesis services (see ***Fifth Wave,*** p. 26); a sizable proportion of all the babies born in central Sweden are gestated here. The psychology department of Stockholm University has an ongoing long-running study of the effects of ectogenesis that is attracting much interest.

Stockholm School of Marketing

A new university founded in 2069, assimilating parts of Stockholm University and the Stockholm School of Economics into a new virtual university that also has a fair number of physical students on site, the Stockholm School of Marketing is notable for making maximal use of the city as a testing-ground. Freshmen "weirdfinders" go out to find new and exotic ideas, while older marketers and memeticists try their skills at influencing people.

Transparent Kungsholmen

The landmark brick town hall with its tower topped by three golden crowns dominates Kungsholmen Island. The buildings were, like Östermalm, in poor condition until the current restoration.

Kungsholmen is a city within the city, dominated by the transparency movement (see pp. 69-70), and specifically by the Kungsholmen Panopticon Society (pp. 69-70). Locals have their sensors document everything, there are camera stickers on many walls, and the occasional buzzbot flies around. V-tags on the bridges warn that anybody entering is subject to monitoring. The Panopticon also acts as a neighborhood cooperative and has managed to restore many buildings to full function or replace them with more modern modular architecture.

Östermalm

In Östermalm, the old "better half of town," the old buildings (mid 1800s and early 1900s) are in somewhat bad condition but have been restored in places using biotechnology, making this one of the most architecturally adventurous parts of the city. These days, it is mostly inhabited by the urban underemployed and by students from the nearby Campustown. A few ultra-high-status apartments remain along the south edge and in the old embassies.

Östermalm also has a sizable asexual/autosexual community centered on the Garnisonen Commune, a restored city block covered in shiny green enamel biobrick that has become a new landmark. These "nonsexes" have developed strained relations with the "newsexes," the various local transgendered, hermaphrodite, and neogendered communities, after the breakup of the original merely gender-skeptic Commune a few years back.

Södermalm

Södermalm (often called just "the South" or "Söder") is an island south of the city center. The hills of the northern part slope steeply down into the water, covered with buildings with some of the best views in the city. The early mid 1900s buildings have been carefully preserved.

The western half is still called "Little St. Petersburg," but these days that mostly represents a self-conscious attempt to bring in tourists with Russian food or biosculpting clinics. The memory of the St. Petersburg black clinics and mafia still lingers, but the only organized criminality is the restaurant guides.

Underneath Södermalm lie numerous server farms and backup nodes. This is where most of the city's infomorphs live.

The Slinky Malinky Bistro

The Slinky Malinky Bistro in Hornsgatan was one of the last establishments founded in the wilder biotech heydays of the 2070s, and survives as a "local place" (see p. 47). It still attracts a mixture of patrons from Södermalm's characteristic transhumanist-Duncanite-Russian-biotech community. While it might feel like a very wild and dangerous place to preservationists, most of the Transhuman Generation find it a bit dated and the regulars too nostalgic.

Those regulars do like telling stories of their adventures, and the owner, Anna Sergejevna Kusnetzova, remains one of the better sources to ask about who's who in Stockholm's biotech industry. The bistro's food is usually good, and its buckwheat blini has become a favorite in Söder.

The Arcologies

Surrounding Stockholm is a ring of arcologies built on top of demolished concrete suburbs. The largest is the Liljeholmen arcology in the southwest (50,000 inhabitants), followed by the Brandbergen arcology (40,000 inhabitants) in the southeast. Most are stadthügeln-like pyramids or cones (see p. 15) covered with terraces and vegetation, making the city look like it is surrounded by a very regular forested mountain range. The Vasastaden arcology is the only major arcology in the central area, a medium-sized pyramid inhabited mostly by the very elderly. Contact with the city outside its extensive park is minimal.

The Suburbs

Stockholm's suburbs have a mix of industrial centers and idyllic communities.

In the north, Solna is the main Muslim community, a mini-city with more in common with Marseilles, Istanbul, and Marrakesh than Stockholm. The Great Mosque, one of the region's new landmarks, dominates it. Built on a hill, its golden dome and minaret can be seen across Stockholm. By contrast, nearby Sundbyberg fiercely clings to its traditional Swedish small town air, with a very sharp border with Solna. While most inhabitants joke about adding a customs station and some barbed wire, there have been incidents of youths from the different sides clashing violently in the past.

Neighboring both to the north, Kymlinge is a small libertarian metavillage municipality, networking with similar metavillages worldwide: it has more in common with them than with its neighbors. Nearby Sollentuna is a typical professional-class suburb of villas and parks surrounding a central arcology, while Djursholm specializes in old-money charm and tradition. Täby is the closest Christian community, dominated by traditional preservationist-Protestant ethics. Lidingö Island focused early on telecommuting and consists of numerous smaller metavillages dedicated to everything from sports to E.U. administration.

In the south of Stockholm, many decaying high-rise suburbs were replaced with arcologies. They are surrounded by a thick belt of staid professional-class suburbs of villas and the occasional cultural metavillage such as the thriving Assyrian-Christian metavillage of Kungens Kurva, which does a brisk trade in Caliphate-E.U. data conversion.

The Telia Transmission Tower was a big radio system built in the southern suburb of Liljeholmen in 2062. Mainly used for experiments in high-bandwidth orbit-ground communications, its main claim to fame is that it was the first place where an uploaded mind was sent into space. These days it is merely a landmark on the north side of the Liljeholmen arcology.

Lake Mälaren

Lake Mälaren is a sizable lake west of Stockholm, reaching 90 miles inland. As the dense central city withered, the smaller towns around it grew into a band surrounding the entire lake. This is one of the densest population centers in Sweden, with a total population of about a million people. Many Swedes regard "Mälarstaden," the Mälaren city, as the real capital of the nation rather than the slum of Stockholm.

Most of the islands in the lake have been only sparsely settled due to environmental protection regulations, keeping them rural. Instead, houseboats have become extremely popular, eventually forcing limits on their numbers, too. They are more expensive than housing in the city these days but carry preservationist style points.

The Archipelago

East of Stockholm lies an extensive archipelago of 24,000 islands. They range from little more than rocks in the water to islands over 10 miles across. This is the true elite part of the city.

During the Ice Age, this area was beneath a thick ice shield pressing down on the bedrock. This is clearly visible in the typical smooth rock slabs making up most of the islands. The bedrock is now slowly rebounding by 1" every five years, turning smaller islands into bigger ones – but recent sea level rises have turned back the clock 400 years. The effects have been relatively manageable since most of the islands are hilly, but many old buildings and jetties have had to be moved upward.

Originally just an area of small fishing villages, the archipelago became a popular vacation home spot in the 20th century. Boathouses and cottages were sold off as summer homes at exponentially increasing prices. As telecommuting became practical in the '30s, many Stockholmers moved permanently to live life close to nature and yet connected to the world. This set the generational and cultural tone: The majority were well-off professionals in their middle age. Today, few such Relics remain, but the children of the original telecommuters (themselves often comfortably wealthy near-centenarians these days) inherited the houses and held on to them. Buying an archipelago house is nearly impossible since so few come on the market, and building regulations forbid most new construction. Archipelago homes have become true status objects among the E.U. rich.

An outsider would think of the homes on the islands as modest. Traditional small buildings dot the scenery amid pines and birches. Many are the classic Swedish red wooden house with white gables. Organic architecture is absent, although some houses have small gardens with exotic flowers. On the inside, many homes are ultramodern, equipped with the latest modular furniture or luxury designs. Due to the building restrictions, some houses have extensive underground floors. Even so, a surprising number of these exclusive buildings are simply furnished: They have all the practical facilities expected of a modern home – AI, cybershells, automation in the kitchen, and smart material furniture – but hide them behind 19th-century rustic. There is no reason to flaunt wealth when everybody else is just as prosperous and well-connected as you. Another symbol of wealth is that manufactured goods have to be brought out to most islands by boat.

The ecological problems of the Baltic Sea are seldom felt here due to local ecological maintenance sponsored by local environmental groups (made up, of course, of homeowners). Security is extremely discreet but tight. Due to stringent noise regulations flying vehicles are restricted. Transport is mostly by boat. Automated boat-cabs are available, but many inhabitants pride themselves in their ability to handle boats on their own.

The Virtual City

Virtually Stockholm has dense net connections with the British Isles, Denmark, Germany, the Baltic States, and Finland. Information services there can access Stockholm servers with low delay and there is consequently much traffic between them. Orbital communications are generally excellent, but lags are only short to stations in LEO polar orbits as they pass overhead.

There is a very-high-bandwidth public network in the city center, but elsewhere things are somewhat thin and spotty. Transparent Kungsholmen (p. 58) has a volunteer-operated free network, but all traffic is public. Commercial bandwidth is available at low rates everywhere.

The Stockholm default augmented reality layer, "Stockholms Stadsnät," is a well designed information layer that helps visitors find their way, book transport tickets, provide AI guides, and translate signs. If it has a fault, it is an insistence on always pointing out public artworks at long distance even when the user asks it not to.

There are several other popular layers. Kungsholmen Panopticon (pp. 69-70) runs the local layer Synen, giving access to the shared monitoring equipment in the area. The Stockholm Redevelopment Foundation has a historical/educational layer suitable for children, "Min Stad." LivatIEken is a layer with local news and recommendations that is used by many Stockholmers. The commercial (advertising-sponsored) Stockholm WebSpot is an extensive entertainment layer, helping visitors find nightclubs, restaurants, or activities. Several of the old newspapers now only exist as layers.

Embassies in Stockholm

There is not the same great need for specific embassies in the 22nd century as there was in earlier eras. Many of the chancellery functions of a foreign country's administration are accessible through the Web as many nations have adopted administration systems with continuous opening hours. If you want to seek a permit in Sweden for residence in Canada you contact the Citizenship and Immigration Department in Canada directly. Diplomatic contacts have also become less necessary between integrated E.U. members. Still, some nations' Stockholm embassies still play an important role, especially for contacts with Russia, the Islamic Caliphate states, and the TSA coalition. The trend has recently been to design embassy buildings in styles that are representative of their home countries, sometimes even overdoing the national branding.

The Embassy of the Republic of Finland

Sweden and Finland have both been E.U. members for a long time and have long-shared contacts and an extensive historical legacy, so there is really no great need for a specific embassy building. Finland still maintains one, but most staffers are infomorphs. The ambassador Carl-Rickard Lax is himself an upload and is a member of the Swedish-speaking minority in Finland.

Situated in Gärdet, the embassy of Finland is designed as a powerful representation of the nation's transhumanist legacy while costing relatively little. The embassy building doubles as Finnish cultural center and often hosts good lecturers on technical topics.

The Embassy of the Kingdom of Saudi Arabia

An embassy's function may also be to provide a safety valve for a nation's ruling elite. In embassy employment, lower-ranking members of that elite may let off steam in a way that is not allowed back home. For an example in Stockholm, see the Saudi embassy, situated near Björns Trädgård in a building adjacent to the first mosque of Stockholm. (The largest one now is the Great Mosque in Solna.)

Business

"Did you just slink something slimy?"

"Sorry. I just downed ***Red Snow/Black Ice****."*

"Cheers! That's a classic. Did you hear that the Disciples actually have a studio downtown?"

"I thought they did all that virtually these days?"

"Most of it. But apparently they link up some of their visitors to shells in the pits under Klara. They could probably use a good shell mechanic, you know. Whatever it is they hunt, the shells get damaged real bad."

– Overheard at Café Ilmar

Stockholm is a meme reactor. The city itself does not manufacture much, but mixes memes and tries to see what works. There are fad-surfers, edgehunters, and marketers everywhere. In addition there are numerous small industries supplying subcultures with what they want, be it non-gendered vegetables, cheap brainscans, or sticker cameras.

Stockholm is not itself a data haven (the authorities could crack down too easily), but often acts as a bridge between the proper net and data havens through numerous small network companies that act as legitimate fronts. Net-savvy people know what it means when something has been routed through Malmström Data or Stockholm Network Connection.

A couple of especially interesting Stockholm-based businesses are described below.

Stockholm Honeypot Project AB

"Sir, we have something in Tank 4."

"Is that the Australian sample?"

"Yes, we opened it to the PRA net yesterday with the AlephNull sieves. Nothing got past until five this morning, when an entity got through. It scanned the net and seemed to notice directly it was not a real environment . . ."

"Didn't you run our copy of the Gothenburg net?"

"Yeah, but the entity tried to escape anyway. Maybe it was smart enough to spot the language difference. Anyway, our event detector had logged the transmission and caught it in a secondary buffer. It measures 12 on the Lisse scale, with a core-satellite structure."

"A free meme, maybe. Odd, I thought the latest patch would hold better against them. Any idea of what kind of meme it could be?"

"I haven't the faintest. But it is actually demanding to speak to our leader . . ."

SHP AB is the world's second largest honeypot company. Their business idea is to sample Weblife and use it to evolve better software protection. Founded by Dr. Karl J. Anrell in 2065, SHP grew out from his graduate research in software security. Attracting a staff of competent engineers and international funding, he made SHP into a key company in Stockholm.

SHP runs a huge server park in the five Hötorgscity landmark buildings, a series of obsolete office skyscrapers. SHP bought them for a pittance in exchange for keeping them in shape. Behind the clean white facades is a mountain of secondhand computers networked together. The company network has portals that catch Weblife in many locations worldwide and put it into the honeypot.

SHP arachnoxenologists then study the infections, analyze unusual software, and impose different environments on it. Parts of the system can be separated from each other, erased, and filled with Weblife samples from other locations. A common exercise is to test software defenses by immersing them in the honeypot and observe how they are attacked. Some infomorph rights activists are often found demonstrating (physically or virtually) outside the buildings against the company's treatment of Weblife.

SHP donates bandwidth to the inner city area, making it a great place for augmented reality. Dr. Anrell is a noted "citizen scientist" who often makes public appearances, endorses projects, and donates money to worthy causes like maintaining inner city infrastructure, bioroid rehabilitation, or hiring community memeticists.

There is a hidden side to SHP. The company makes money not just by selling protection measures, but also by selling particularly intrusive Weblife and identified back doors. While most honeypot companies sell some "active protection" information to security firms, Dr. Anrell and SHP do not care much about certain ethical guidelines. Selling hacking viruses (labeled "Weblife samples") through intermediaries to the highest bidder is simply too profitable. Knowledge of these deals is limited to a small group of trusted colleagues.

Also, in 2088, the company was approached by the Austrian AI firm Cogitant GmbH. Cogitant was looking for data on emergent intelligences and needed someone to perform evolution experiments. Such experiments are illegal, but Dr. Anrell considered the deal too profitable to turn down. A part of the server park was separated from the rest of the net and seeded with various "spores" to study how the AIs organized themselves. The collaboration was successful until E.U. authorities began to investigate Cogitant in 2099 for illicit AI research. Dr. Anrell *thinks* the connection between the companies cannot be traced, but he is worried. Should the experiments become known both he and SHP would be in hot water.

Numerosity

Numerosity is a small neuroscience company working on mathematical enhancements. The Numerosity team is spread across the world: the CEO is in Japan, two of the theorists are on Islandia, the primary lab team is in Stockholm, and the secondary lab team is in Baltimore. The total size is just 7 people plus their company LAI assistants.

Their main work has been improving the superior intraparietal sulcus, a part of the brain that deals with numerical magnitude (how many there are of things). The main financier, noted neuro-entrepreneur Magnus Lindquist, already has some profitable patents on genetic upgrades ensuring that the modified person gets can mentally directly handle numbers up to 10, rather than the ordinary human 5-7. However, the Numerosity team hopes to go further. They are trying to build genetic programs that hardwire mathematical operations into the brain. While most such calculations could be trivially performed using external software, the idea is to make humans able to handle math intuitively, similarly to how most AIs do it. The hope is that recipients would be able to leapfrog mathematics at an early age, becoming able to take in science and engineering much earlier than with just learning upgrades.

Numerosity is in a critical phase. Its prototype gene networks are nearing the testing stage. Preliminary animal and bioroid experiments have been promising, but next comes the risky step of introducing the genes to volunteer parents. Besides the practical risks, there are the dangers of genetic theft.

Numerosity is trying to find a larger partner to team up with, making them especially vulnerable to bad publicity. Should someone raise protests about the bioroid experiments, it could be disastrous.

> *A great society is a society in which men of business think greatly of their functions.*
>
> *– Alfred North Whitehead*

Local Politics

The 2080s saw a gradual de-evolution of Stockholm's local government. The old municipalities (*kommuner*) had become very large and cumbersome organizations that were often considered too remote from the citizens. Because of the change, many of the new municipalities were able to take on quite varied styles in their form of government. Legislation gives councils relatively great leeway in deciding what services to provide and how to organize their legislative and administrative bodies.

Stockholm County has overtaken much of the coordination between the municipalities, but the municipality is the political body that most citizens meet in daily life. Municipalities often control services such as local police, infrastructure, social services, care and custody of elders and the disabled, municipal childcare, pre-school and public schools, structure and building issues, many health and environment matters, sanitation and waste disposal, rescue services, and water and drainage. Some municipalities provide these services directly, some provide the citizens with vouchers to buy them from contractors.

The municipalities collect resident taxes but most revenues are collected as consumption taxes or utility taxes. Tax competition can be fierce among municipalities, and citizens do vote with their feet. Taxpayers do not just compare levels of taxation. They also compare how and on what the City Councils are spending tax revenues. In this respect some municipalities have relatively high rates of taxation and can still be competitive by showing value for money.

The Privatized Municipality

The distinction between municipal and business corporations did not really emerge until well into the 19th century, and even since formerly semi-private cities became full-fledged arms of government, there have still been areas more under the control of corporations as private land. One consequence of devolving municipalities has been the privatization of municipal administration and the elimination of politics beyond a simple controlling body.

Kymlinge municipality is one particular such place; a community body, tailored to libertarian memes, collects offers for the contract for the administration of the municipality from "municipality management firms." The inhabitants vote on which management firm has made the best offer, and pay their taxes to it. If the management firm succeeds in rendering its services under budget it gives money back to the citizens, hopefully ingratiating itself and so getting its contract renewed at the next election.

Stockholm City Municipality

The municipality of Stockholm proper has been reduced to the four district councils of Norrmalm, Östermalm with Djurgården, Maria/Gamla Stan, and Katarina-Sofia. Transparent Kungsholmen (see p. 58) is a special administrative area; it is a part of the municipality, and elects council members to the City Council, but its particular structure sets it apart on many issues.

The City Council is composed of members elected by district council area every fourth year. It has for a long time been dominated by Stockholmspartiet and Liberala Partiet, but with a sizable proportion of members from Alliansen för Cyberdemokrati (mainly elected from Kungsholmen and Maria/Gamla Stan) and independents. The main opposition is from Familjepartiet and Demokraterna. Strange local parties pop up regularly, win a few seats, crash from infighting, lose interest or suffer scandals, and vanish.

City politics become very fluid and dynamic every fourth year, not only because of the general elections (conducted electronically) but because the governing parties then create a Document of Intent (*styrdokumentet*). In a period of a month, they hammer out specified programs, going through all areas of policy and agreeing on general plans about what is to be done. This is made more tangible by formulating a Mission Statement (*uppdragsplanen*) that clarifies the Document of Intent for the administration and the public. What services exactly are going to be offered by the municipality? What services are going to be auctioned to contractors? When are things going to be done during the mandate? How specifically will they be achieved? What are the main administrators' work descriptions?

This period is called "hell month" (*helvetesmånaden*) by both the elected politicians and the administration, as the detailed documents take a lot of effort and test the political *savoir-faire* of participants to the maximum. Think tanks and lobbyists orbit the meetings, offering suggestions. The process is overseen by AIs that check that the politicians follow all the rules and regulations when drawing up the plans.

During this month, political consultants are extremely active. Since they usually work with more general policies, they are very keen on getting to influence politics for years to come. The administration is also very active in influencing how their work is going to be planned as they know of the temptation for politicians to set general goals and leave most of the specifics in their hands.

It is generally considered that Stockholm's concise plan eliminates much mid-term political bickering and procrastination and formulates clear and concise goals to measure results from. It also increases transparency for the citizens, who can evaluate what the politicians are aiming to do, and the politicians feel more secure in their mandate to "say no" to unreasonable demands, as they have clearly decided upon their course of action.

The downside is that "hell month" may even possibly lead to a repeat of the election if no one can agree on the details and the politicians decide to return to the electorate, which makes the period very volatile and ripe for conflict. Still, if the intended coalition couldn't get along from the start, maybe it is for the better to run the election anew. One of the main reason the system works is that many politicians know each other, and have known each other for quite a long time. Many have been in their roles for 30-40 years, which can breed a certain feeling of clannishness.

The City Council itself elects the city's two main governing bodies, each with 13 members; the executive committee and the board of commissioners. The mayor (*borgmästaren*), who is elected from the party that holds the most seats in City Council, chairs both.

The members of the executive committee (*kommunstyrelsen*) represent both the political majority and the opposition, with the responsibility of implementing policies approved by the City Council. The political organization also includes the board of commissioners (*borgarrådsberedningen*). It consists of eight full-time governing commissioners (*borgarråd,* who act like vice-mayors), and four commissioners representing the opposition. The work is headed by the mayor, who as chairman of the board also holds the post of commissioner of finance (*finansborgarråd*). The City Council also hires on the main administrators, such as the chief of police (*kommunpolischefen*), the public health and environment inspector (*miljödirektören*), and the city brand development manager (*kommunstilsutvecklaren*).

Stefan Smiljanic (161 points)

Stefan is a senior fellow at a successful think tank in Stockholm, and a typical prowler of the public policy scene.

After studying at Stockholm University, Stefan worked for a time in advertising. When memetics started to catch on in the public eye in 2090s, he decided to shift his attention to policy making. He found rather good employment at Janusinstitutet ("Keeping an eye on both the past and the future"), a moderate preservationist think tank mainly discussing issues of urban development and bioethics. Stefan found his work very interesting, and compatible with his own memetic patterns, and since he was able to show some skill and success he advanced to a position as a senior staffer.

JI is not affiliated with any specific political party, special interest group, or corporation. Specific parties, societal groups, and politicians may come and go, but Stefan's task is to keep the general preservationist memetic cluster strong, vibrant, and acceptable for a public persona to adopt in public perceptions. Most of his work time is spent arranging events for politicians and the media, networking, and providing political commentary.

A man with pleasant manners, privately rather soft-spoken but with good media communication skills and a superb (lightly trained) voice, he primarily works in Sweden, but as many issues are decided on an international level, he is often seen in Brussels and Geneva, too.

Stefan is quite well liked, in general even by his transhumanist opponents, although some more hard-line preservationists see him as too cautious at times. He is an excellent contact for anyone needing information about Swedish and Stockholm politics, as well as the current concerns of bio-politics. If assessing him as a ***GURPS*** Contact, treat him as providing Current Affairs (Politics)-18, Current Affairs (Stockholm Regional)-15, or Expert Skill (Memetics)-15. (This is significantly better than his own actual skills; his supporting skills, connections, and resources give him a large effective bonus!)

ST 10 [0]; **DX** 10 [0]; **IQ** 14 [80]; **HT** 10 [0].
Damage 1d-2/1d; BL 20 lbs.; HP 10 [0]; Will 13 [-5]; Per 13 [-5]; FP 10 [0].
Basic Speed 5.00 [0]; Basic Move 5 [0]; Dodge 8.

Social Background

TL: 10 [0].
CF: Western [0].
Languages: Swedish (Native) [0]; English (Accented) [4]; French (Broken) [2]; Russian (Broken) [2]; Spanish (Broken) [2].

Advantages

Charisma 2 [10]; Common Sense [10]; Genefixed Human (see ***Changing Times,*** p. 48) [0]; Eidetic Memory [5]; Empathy [15]; Reputation +2 (Very smart public policy expert; To Swedish political classes and E.U. policy specialists) [5]; Single-Minded [5]; Status 1* [0]; Voice [10]; Wealth (Wealthy) [20].

Disadvantages

Cowardice (12) [-10]; Sense of Duty (Stockholm) [-10].
Quirks: Distrusts cyberdemocracy. [-1]

Skills

Administration (A) IQ-1 [1]-13; Current Affairs/TL10 (Politics) (E) IQ [1]-14; Diplomacy (H) IQ [1]-14†; Economics (H) IQ-2 [1]-12; Expert Skill (Memetics) (H) IQ-2 [1]-12; History (Sweden) (H) IQ-2 [1]-12; Intelligence Analysis/TL10 (H) IQ-1 [2]-13; Law (Swedish Constitutional) (H) IQ-2 [1]-12; Literature (H) IQ-2 [1]-12; Politics (A) IQ+1 [1]-15†; Propaganda/TL10 (A) IQ-1 [1]-13; Psychology (Human) (H) IQ-2 [1]-12; Public Speaking (A) IQ-1 [0]-13‡; Research/TL10 (A) IQ-1 [1]-13; Savoir-Faire (High Society) (E) IQ [1]-14; Singing (E) HT+2 [1]-12†; Sociology (H) IQ [4]-14; Teaching (A) IQ-1 [1]-13; Writing (A) IQ-1 [1]-13.

* Includes 1 level free from Wealth.
† Includes +2 from Voice.
‡ Default from IQ; includes +2 from Charisma and +2 from Voice.

Police and Security

The municipality of Stockholm is responsible for the police department (*Poliskåren i Stockholm*, usually simply called *polisen*). The Chief of Police is hired by and answers to the City Council, but has also to consult the national police command (*Nationella polisrådet)*. The police force has seen a great deal of decentralization since the 20th century (when Swedish police were thoroughly centralized), making the local Chief of Police a powerful administrator able to change procedures and priorities in response to local needs.

If Stockholmers were asked what image they associated most with the police in the 20th century, they would most probably have replied the uniformed police officers in police cars patrolling the streets. Asking the same question one century later would generally evoke the image of a plainclothes cop monitoring white collar crime through the Web. The toughest, most lawless beats are the digital ones – some say because of tax crimes, but it is natural that an informational society is more focused on informational crimes.

From their central station on Kungsholmen (an opaque hole in the transparent enclave), the Stockholm police have access to some of the most up-to-date data networks in Sweden, often helping out police departments in many other municipalities with their Web monitoring. Stockholm's police have a much more aggressive stance on the Web than on the streets, as unlawful manipulation there can become more dangerous than the often easily contained street crime. On Kungsholmen, the force also maintains its central forensics laboratory. While the crime scene technicians are seldom out in the field, they often provide visible faces for the police in the media.

The police force is sometimes accused of being biochauvinist and preservationist. This old meme from the 2070s might have had some validity back then, but the acceptance of more genetic upgrades and high-end AIs on the force has begun to change this image.

Stockholm police officers carry guns with HUD, laser sights, recognition pads, and connections to tactical central control. Ammunition choice is generally geared toward tangler rounds. Cops usually just wear arachnoweave uniforms by way of armor in order to present a friendlier image to the population, plus a uniform cap with low-light amplification and a Near Miss Indicator. In dangerous situations, they add light infantry helmets, and officers on some beats on Södermalm wear nanoweave vests. (See Chapter 5 of ***Transhuman Space*** and Chapter 4 of ***Changing Times*** for details of all this equipment.) Stockholm is generally the most dangerous area to patrol in comparison to other Swedish cities.

The most important part of their equipment is the wearable computer that provides communication with their station and tactical support, collects information, and records their actions. This is controlled by a NAI, and holds extensive databases of potentially useful information. Spread out around the city, particularly near local police stations, are canisters holding flying cyberswarms, prepared for remote operation when police officers need rapid assistance before the heavier reinforcements or (in rare cases) the National Tactical Response Unit arrives on the scene.

The Security Police

It was his language that gave him away as a centenarian: his body looked like a attractive 25-year old with a blue Mohawk, and his movements had the quick fluid grace of basal ganglia co-processors. But the idioms and tone he was using were different from the ones used by the crowd of actual youngsters around him. They were not fooled either, and judging from the debate, they felt the usual instinctive resentment against one of the Very Old. A Very Old who was apparently trying to outdo them in radicalism.

"What I'm saying is that you Stockholm Duncanites are only wasting your time thinking inside the given technological-administrative complex. Even if you build that free haven – and manage to run it without cutting each other's throats when the inevitable power struggle happens – it will just be another spot of political geography. You have to think outside the box, and make the system irrelevant."

"And turning it all into proplet fog would do it?" a lizard-like bioshell in a cybershell chemise skeptically interjected. A girl muttered something sarcastic about Elois.

"That's just the beginning. A P2P architecture of business mediation, linked to orbital nanofacs. You could test it across Mercury or even Apollo, seeding the code from some expansionist foundation. Best of all it wouldn't break any of the Neumann laws, and you could do it on a shoestring budget. But that would of course mean you would have to travel somewhere, or even work."

The others began to protest. I waited until it was clear that the man was not about to tire of baiting the youngsters. Finally I stepped in, squeezing past the lizard who was excitedly drawing a rebuttal in the air and denouncing the plan as rehashed infosocialism. I put on my most winning and square face. "Mr. Wingdale, I don't believe we have met. I am Öystein McBride from the GRA. I found your lecture intriguing, and I would like to know if you are interested in a job." That little trick ought to disperse the crowd and discredit him enough as an old sell-out to defuse the situation. At least for tonight.

There's nothing better than applied memetics when you're trying to slow the spread of Bad Ideas.

The Swedish national security service Säpo (*Säkerhetspolisen*) is not well understood, and prefers it that way. While most people know it exists it is usually seen as somewhat outdated: when there is Europol, the E.U.'s efficient police coordination agency, is there any need for a national security service? In the public mind, Säpo is a small, bumbling organization playing at being an intelligence agency. This is exactly the image Säpo works to keep up.

Founded in 1914, the organization directs and performs police activities to detect and prevent threats to national security as well as providing bodyguards and security for the government. It does *not* run the National Tactical Response Unit (Sweden's anti-terrorist force), but it provides information about terrorism and infrastructure crime to the national police force.

Säpo was an early adopter of memetics in national security. Director-General Frida Stridsman realized that, to safeguard the nation and its constitution, it was not enough to just respond to emerging threats; better to prevent them from emerging in the first place. Under her leadership, Säpo created a counter-memetics unit in the early 2080s tasked with monitoring the spread of potentially dangerous memes and with memetic manipulation to weaken them. Over time the Säpo memeticists have gained much international renown in the intelligence community and are often consulted by other E.U. agencies. At the same time the agency cultivates a low profile in order to avoid attracting too much attention from meme-hackers.

Much discussion has happened among those in the know as to whether this proactive memetic stance is compatible with a democratic society. If certain memes are viewed as dangerous and needing to be suppressed, however mildly, this implies that freedom of thought is no longer absolute. However, some ideas can be shown to lead with high probability to very dangerous crimes; stopping these ideas is surely like stopping armed and masked people from entering a bank – and nobody is charged with anything, the future crime is simply prevented. The Parliamentary Ombudsman and Chancellor of Justice have so far not complained about the counter-memetics unit . . .

At present, the main concern of Säpo is international terrorism. Sweden is not a prime target, but biotech, infotech, and nanotech weapons know few borders. There may also be dangerous radicals hiding among the more benign groups in Stockholm: in late 2099 there were some hints that the Blue Duncanites (***Broken Dreams***, p. 87) may have a cell in Sweden. An even more nebulous problem is the lone maniac; thanks to enhancements, deranged individuals have become smarter, and technology makes them better able to implement dangerous ideas. That there are fewer unbalanced people than ever doesn't help if those remaining are more dangerous.

Interpol

Interpol (see ***Broken Dreams,*** pp. 66-67) maintains an office in Stockholm, where it mainly focuses on international Web crimes, particularly those involving rogue AIs. Laws and definitions regarding Web crimes are blurred when it comes to national jurisdictions, and sometimes bring Interpol into dispute with local authorities. In Sweden, Interpol has reached a working agreement with the police and with Säpo. Usually it acts simply as a backup when the Stockholm police or Säpo cannot reach criminals who are located outside the E.U.

The GRA and WTO

The Genetic Regulatory Agency (***Transhuman Space***, p. 97) and the World Trade Organization (***Broken Dreams,*** pp. 59-62) both have quite active roles in Sweden. These organizations have accords with the Swedish government and can be seen working in close cooperation with local law enforcement in investigations in the field. These arrangements have met criticism, as neither organization is a part of formal local or E.U. government, and protests have been made regarding the legality of integrating external organizations too far into local law enforcement structures. Many of the crimes they police require active patrolling on the Web, particularly when several nations are involved, so the GRA and WTO have sometimes coordinated actions between local law enforcement, themselves, and Interpol.

Genteknikmyndigheten

The Genetic Regulatory Agency performs many important tasks regarding the enforcement of regulations preventing abuses of human genetic engineering. More day-to-day operations are, in accordance to the European Union's subsidiary principle (that decisions should be made at the relevant level), made by the Swedish National Genetic Technology Regulatory Agency (*Genteknikmyndigheten*) in Stockholm.

While they receive much help from the GRA in monitoring new advances and follow the recommendations of Königsberg and Geneva, they are also quite influential on their own account, giving the Swedish Parliament recommendations regarding local policy issues. These issues might not have as high a profile as the GRA's work, but they can still have an important local impact. (What kinds of industrial forest to approve? Which safety rules should HuGE follow?) Enforcement operations are left to the GRA and local police forces.

Genteknikmyndigheten has, since its formation in 2058, been one of the most open and visible battlegrounds between Swedish preservationists and transhumanists. This was partially one of the agency's intended functions – to provide an arena to vent conflicting feelings in a positive and constructive fashion – but a lot of bad blood has flowed since. It is quite easy to detect this at the agency's own offices in Frescati; the preservationists actually sit in the building, the transhumanists work by telepresence.

The present Director-General, Ulla-Bella Hulth, is a compromise candidate. She is a preservationist, but was one of the group who maintained a calm and a more pragmatic orientation during the most intense conflicts over the Russian shadow labs in the 2060s. She is however always ready to stamp down on any genetic outrage, especially if doing so might advance her career.

Most of the bioroid trade and the cutting edge of HuGE are off world these days, or at least situated far from Sweden, and while Stockholm might still be a testing ground for some practices they do not originate here any longer. However, many of the staff and administrators have been employed for quite a long time, and younger staffers commonly get the impression that their seniors are still fighting battles that ended long ago.

Police Gear and Ultra-Tech

Some groups may prefer to use ***GURPS Ultra-Tech*** for equipment options in ***GURPS*** *Fourth Edition* games rather than the equipment chapters in older ***Transhuman Space*** books. In that case, change the references here to recognition pads to recognition *grips*; arachnoweave to reflex; and low-light amplification to night vision glasses. Other items retain the same names in ***Ultra-Tech.***

TRANSPORT

As a city of islands, Stockholm has especially interesting transport issues. Two features of the area merit discussion here; see also the discussion of the StockTrans subway on p. 24.

By Boat

Travel across the Baltic can be done quickly or pleasantly. Very fast hydrofoil ferries connect Stockholm to Helsinki, St. Petersburg, Tallinn, and other Baltic cities. A trip takes two to three hours and costs $10. These "*baltbussar*" ("Baltic Buses") are indeed little more than floating buses with minimal accommodations; most of the time they are packed with tourists making a detour, people visiting relatives, and commuters with physical jobs.

The alternative is the floating casino ferries. These originated in the 20th century as a way of escaping tax and tariff regulations on alcohol, declined a bit when most of the linked countries joined the E.U., and finally reinvented themselves as state casinos. They are mobile casino-theater-hotels, selling everything from sleazy entertainment to gourmet eating. They always provide a casino experience, whether it be with a *nouveau riche* 1990s Russian gangster edge, 1930s Monte Carlo elegance, Las Vegas kitsch, or 2030s tax-haven crypto-nerd sleaze. Some people actually live on the ferries permanently, either as staff or because they are truly in love with their favorite style.

Arlanda Spaceport

The main international airport for Stockholm is Arlanda, located 25 miles north of the city. The in-atmosphere part functions like any other international airport; it has dense commuter traffic to other European and world cities, as well as local flights.

Next to the airport in the forest lies the spaceport. Arlanda is a comparatively small launch/landing site with little traffic. The high latitude makes it expensive to reach the popular equatorial orbits, but also makes it easier to get to polar orbits, and this is where most of the traffic goes. Most of the crews arriving and departing are going on maintenance missions to LEO.

The European Space Agency has a physical office at the spaceport next to the extensive radar tracking arrays. The spaceport together with other ground stations further north is an important node in the tracking system for objects above the polar region. These arrays have been a long-time issue between the aerospace authorities and neighbors that find them both an eyesore and possibly a health risk due to spillover radio emissions.

CULTURE

I did a double take. There was a man in red clothes dangling from a balcony, high above the street. A suicide? Or an accident? Then I noticed the fur-trimmed red pointy cap and a white beard fluttering in the wind. It was Santa hanging 10 stories above the pavement. The body did not move, despite the right leg being angled as if it was searching for purchase. A doll. A very sick, brilliant Christmas ornament. I mentally congratulated whoever had put it there for lighting up my day.

I got even happier when I saw a flower of red explode above Hagaparken. My dad told me about how the fireworks used to smell of black powder and leave the air on New Year's Eve night misty with smoke. That has of course been banned since before I was born, thanks to environmentally conscious politicians. "Not the right way to greet a new year, with acid rain and heavy metal" they said. But of course people found a way.

These days all the official fireworks are run in one of the municipal layers, and they usually leave a few editable slots for people to run their own fireworks software. Around here I usually just run the official ones and a few of the ones where an edit costs enough money. The free ones are usually just too crammed with fireworks graffiti obeying no laws of physics or aesthetics to be watchable. Most of those layers get clogged by spam almost immediately. I like when people make the effort to run physics simulations rather than just add a recording of a favorite explosion or some implausible bomb that detonates upside down willows that change color to music and spell out adverts.

But I like the physical fireworks better. They are usually restricted and often illegal, but there is something about making a device whose only purpose is to make brief beauty that appeals to me. Since traditional nitrate fireworks got banned people have invented eco-friendly fireworks. I prefer the textured carbon rockets best; a bit quiet but very nice explosions that get their color from nanodots. But they are still hard to come by since the noise pollution and safety laws make getting a license a nightmare. Having to re-certify to send up a few rockets every year is annoying. Sometimes I wish I lived in India; they know how to really celebrate Diwali.

I see that the kids are playing with nonchemical bangers. That is a bit of a compromise – a sheet of colorful plastic with nanocapacitors. Activate it and move away while it runs a colorful countdown before "exploding" with a bang or other sound. These ones are drawing early Space Age liftoff countdowns, complete with a final deep roar that makes the pavement vibrate. Definitely illegal Russian imports without any noise, safety, or proximity constraints. Great fun. I smile at the kids squealing "lift-off!."

Stockholmers in general often speak English to each other, especially when meeting strangers for the first time; while the majority speaks Swedish, usually as their first language, there is usually someone in a group who does not, making it easier just to keep to the *lingua franca.*

Stockholmers celebrate the usual western festivities. All-Hallows Eve has been usurped locally by the infomorph rights activists, who run memorial parades for all erased and ignored sapience. Swedes traditionally celebrate Midsummer Day (June 21st) with picnics and excessive drinking. National Day, June 6th, on the other hand, is largely ignored.

December 10 is Nobel Day, when the Nobel laureates are handed their diplomas and medals by the Queen at the concert hall and then feted at a banquet at City Hall. This is usually high conference time in Campustown as discussions and meetings related to the fields of this year's laureates are held. The level of controversy varies from year to year. Last year's medicine laureate, Eugene Thayer (a nanostasis expert), managed to upset very few with his attack on the TSA. It was nothing compared to the chaos surrounding the visit of human germline modification specialist Zenia Field in 2045, when pro- and anti-biotech riots paralyzed the city for days, or the debates surrounding the first literature prize awarded to an AI (Pinda Glure, 2067).

The Bollywood moosh (***Toxic Memes***, p. 85), the ubiquitous moustache for manly men, can be seen everywhere here, too, of course. It is supplemented by the "Cyrillic mooch" some second-generation Russians have taken up. Blond moustaches are not quite as comical here as elsewhere in the world, but bearers of "viking mooshes" had better look the part.

Smart body paint is in; scarification is out again (and if your scars were easy to remove, then you should hide in a basement in shame). Body paint cued to muscular contraction is expected to be the big thing this spring.

As for clothing: the less, the more impressive. Given the Swedish weather, you must either have a modded body, plenty of insulating fat, a personal microclimate, or a will of steel. Cultured fur clothes work well for the occasional cold winter day, but most people keep to the traditional brightly colored synthetics that work better in rain.

Snapshots From Stockholm Academia

The office was quiet except for the hum from the server ventilation. The floor and walls were covered with a pleasant grass derivative giving the air a fresh smell. I found Lydia sitting cross-legged on the grass, sorting simulations into piles in the air. When I came in, she started. "Oh, are you here? Sorry, I thought I was alone in the building with Praetorius." She looked both embarrassed and a bit tense.

"DALE sent me. He wanted to tell you that the Thessalonica meeting will be postponed to next week."

"Couldn't it tell me itself?"

"Sorry, but you know the rules. No shells or AI inside the software lab."

She looked up. "Isn't Praetorius here?"

I smiled. "No, he has to wait outside the door. By his own rules." We were all rather fed up with the bossy AI.

"In that case . . . I have something to discuss with you. Promise me that you won't say anything, not even hint that you know anything, outside this room . . ."

The Institute of Replicating Technology (IRT)

The IRT was founded in 2087 by researchers interested in biotechnology, nanotechnology, software viruses, memetics, and AI. Its aim is to study all forms of systems that make copies of themselves, be they bacteria, software, memes, emergent AI, or von Neumann machines.

The IRT itself has no real aim beyond coordinating researchers, helping participants discover fruitful connections between different sciences. Nevertheless, participating researchers and organizations have many agendas. Quite a few work on safety and prevention: How do you prevent a new organism or meme from going out of control? How do you protect the world from deliberate or accidental replicators? How far can nanoformer ecological immunity be extended?

Another group, often debating fiercely against the first, consists of researchers interested in harnessing the power of replication and evolution. Using self-replicating robot factories, entire asteroids (or moons, or planets) could be converted into industry. Self-evolving code could lead to breakthroughs in AI. "Smart memes" might be used to produce new ways of running societies – and so on. Some risks are worth taking.

The IRT board consists of representatives of a number of participating organizations and funding agencies. The GRA is one participant, as are a number of transhumanist organizations such as the TransLife Foundation (see below) and some purely commercial interests like SHP AB (p. 61). This makes board politics rather interesting, although the representatives are mostly more interested in research than in ideology. Quite often the "idealists," be they for or against the widespread use of replicators, ally against the "realists" who try to ensure profitability instead.

The two main projects at this time are the metaevolution project and artificial immune systems. The metaevolution team works on inventing new kinds of evolution, beyond the ordinary Darwinian type in biology or the LOGOS-Lamarckian evolution of memes. They are theoreticians engaged in exotic artificial life speculation bordering on philosophy.

The artificial immune systems project, on the other hand, is a real cash cow for the IRT. It is part of the huge E.U. project GIST, "Global Immune Systems Technology." The aim is to look at the possibilities of making individuals, ecosystems, societies, and technology immune from dangerous replicators. Lydia Jacobsen, "the mother of designer immune systems," leads the IRT part of the project. Her fame, the E.U. funding, and the networking opportunities GIST provides are more than enough to calm those researchers who worry that the results might be dangerous social control and military equipment.

Physically, the institute owns a small office/lab building in Campus Town, equipped with some fine biological containment facilities (often leased to other research projects) and isolated mainframes for software experiments. On the roof there is a satellite uplink to Johnny Station (see below). Since there is no Web access to the mainframes and cybershells are not allowed near them, several researchers are usually physically present in the building at any time. The building LAI, Praetorius, takes security seriously, often to the irritation of visiting researchers.

The IRT owns a small orbital lab, John von Neumann Station (usually just called Johnny) in a high inclination orbit. It is intended to experiment with replicating systems at a safe distance from earth. Researchers teleoperate cybershells in the tiny lab compartments rather than visit physically. Since Johnny is in such an inaccessible orbit the cost of sending up supplies (let alone people) is high. It is also equipped with somewhat limited communications to prevent any software contagion from escaping. The internal station network is linked only to an antenna on the IRT roof using an encrypted channel, making it impossible to send or receive information any other way. The station also has a few mandatory navigation and sensor arrays, but these are entirely independent from the internal network.

There is a constant debate among the IRT funders over whether Johnny is worth its cost. The IRT is a small organization with a tight budget, and Johnny is very expensive lab space. Commercial interest in leasing space on the station is also rather low.

At present, there are two main experiments on board. One is a Biotech Euphrates-sponsored experiment with a primordial soup where different "quasi-organisms" evolve in a Venus-like chemical environment. If it succeeds it might produce biotechnology suitable for use in the Venusian atmosphere, in the long run maybe leading toward terraforming Venus.

The other experiment is a machine micro-society wherein antbots are exchanging simulated memes while trying to survive in a complex environment.

The TransLife Foundation

An international research foundation, funded by a number of biotech corporations, TransLife funds research into life extension, medical nanotechnology, and neural engineering. Research groups send it proposals for consideration or it announces funding for a particular issue it wants explored. TransLife also runs an academic review service that assesses research and researchers. Gaining a good rating can make a scientific career, being downgraded can wreck one. Some resent the influence of TransLife on certain research fields, but the foundation always points out that taking its money or advice is voluntary.

The foundation has a vague transhumanist agenda, but mostly aims to ensure a steady stream of long-range breakthroughs that will profit its sponsors. It has occasionally supported transhumanist groups in fighting anti-enhancement policies indirectly by bringing them into contact with other key groups.

Professor Halim al Azhar

The Professor of Applied Baltic Sea Ecology at Stockholm University is a Caliphate citizen AI with permanent residency in Sweden. Halim is not much stranger than the rest of the faculty, and is often more approachable.

Originally created in 2077 as an experiment in AI design at Riyadh University, Halim has always been an academic and at home in academic environments. It began its studies in oceanography and ecology as part of a university program dealing with the Red Sea, piloting cybershells to document the effects of algal blooms and how they reacted to various interventions. The research both made it a rising name in oceanographic circles and gave it a fondness for every possible form of water craft: Halim can (or *thinks* it can) pilot everything from a submarine cyberswarm to a clipper ship. In 2094, while attending a conference, it fell in love with the Baltic, its problems and its traditional boats. Halim became an expert on Baltic ecosystems and the effects of past and ongoing ecological control programs. It began teaching at Stockholm online universities and eventually was appointed a professor.

Halim is usually housed in a boat cybershell (named "Ship Happens" – it bought it from a British AI with a quirky sense of humor) anchored somewhere in the Stockholm region. Its lectures and university activities are conducted virtually (although it loves to bring students with it on field excursions). It has a few other cybershells stored at the university and owns a small apartment in Riyadh. On the net, it usually manifests as a star-like arabesque pattern, changing kaleidoscopically in color.

While a believing Muslim, it is not nearly as devout as its brother, Najm al Azhar – the same core program, started at the same time, but which received a different early education, and which is now a noted religious scholar. Halim and Najm often meet in suitable virtual spaces to discuss their broad interests. Najm usually mildly scolds Halim for not applying his prodigious talents inside the Caliphate, but Halim thinks it does a better job of representing it by working outside its borders.

Halim is a hospitable, genuinely friendly being. It tends to be almost obsessive in its enthusiasm for things it likes, be that genemod dinoflagellate taxonomy, sailing, or giving its students the most high-tech presentations possible. It is popular in Baltic eco-policy circles because it absolutely refuses to get dragged into recriminations over past mistakes or to take any national side. Usually Halim employs a "backward desert-dweller" routine to defuse tense debates and suggest entirely new and unorthodox solutions.

Halim is deeply involved in the latest Baltic restoration project, the Hagstrom-Zalitis Program. The HZP involves setting up an ecoformer system across the entire region that hopefully will fix the ecology permanently. The engineering seems doable, the only problem being that different groups have very different views of *what* ecosystem should be the result. Should they merely stabilize the Baltic (supported by Russia), restore an idealized mid-19th-century ecology (the position of the Swedish and German governments), recreate a Bronze Age ecology with dolphins as top predators (the Baltic states and continental preservationists), or make something entirely new ("Baltic Nation," a proposal supported by various transhumanist NGOs – see p. 81)? Halim has no particular position except a mild preservationist dislike of extreme changes, but it has discovered that it is now moving through a political and ideological minefield.

Informal Stockholm

Stockholm is the "playground of the Baltic." It is a transhumanist enclave surrounded by preservationists, a link between the clean-cut E.U. and the messier east, a haven for cognitive extremophiles (***Toxic Memes,*** p. 80) and subcultures. The city profits from being a waterhole for many groups and a place where Scandinavian youth lets off steam; it would not profit from being too neat.

Maintenance: The Kabal

The "real" Stockholm consists of the subcultures, lifestyles, and networks that form the city culture. At the core of the city's culture lies a shared understanding that it *needs* diversity and a certain degree of cooperation to keep it functional. This understanding is not the result of spontaneous self-organization or some Swedish altruism as many recent arrivals tend to think; rather, it is a constantly maintained balance between mutually antagonistic or competing groups stabilized by a network of influential transhumanists and meme hackers. It has been described by Robert Kabal, one of the architects of the setup, as "antagonistic pluralism": There will always be too many opinions for agreement to be possible, so instead of trying to force everybody to compromise, let's agree to disagree, and may the best memes win. To get the chance to disagree on friendly terms, there is a need for a safe haven.

One effect of the understanding is that dangerous activities and subcultures are quietly resisted or attacked by other groups. A dangerous movement will hurt everybody else when the authorities eventually stomp on it, so out of self-interest, the networks try to dissuade the radicals, give them useful distractions, or sabotage their efforts. In extreme cases, they get somebody to take them out – be it the police, hired troubleshooters, or tipped-off political opponents. This "ecological law enforcement" can be very subtle and efficient as long as the network running it has no reason to amass power for itself – which so far has been prevented by deliberately keeping it filled with people with different goals.

The network (usually just called "the Kabal") is rumored to be everything from a Säpo front to a posthuman Illuminatus. In reality, it is a small group of culturally influential people who give each other information and discuss what is going on. Some have money, political influence, or agents; others are just in the right places in the subculture networks to hear or do things. Several members are not even aware that they are part of the Kabal. It is not secret, especially since Cecil (see pp. 70-71) is part of it, but few notice a completely open conspiracy.

Robert Kabal

One of Stockholm's ur-transhumanists, Robert Kabal (a pseudonym he has used for so long that he has forgotten why he first adopted it) was around long before that was even a conceivable political position, making a career out of being the radical voice among the Brussels think tanks. When the Transhuman Awakening occurred in the '50s, he was already well into his second career as an image consultant and business angel to biotechnology start-ups. He was content to monitor the movement from the sidelines and help his start-ups make the most of it. In 2061, he returned to Stockholm and began a third career, this time officially in the catering business but actually as a networker and arbitrator between different transhumanist fractions. He used his money and experience in getting people together to form the first weak version of his network.

The real test was the 2074 crackdown. That was the chance he had been waiting for: Suddenly, it was easy to get leaders of other groups to agree that a bit of self-regulation was needed. Since then, the Kabal network has been guiding the other networks of Stockholm.

Kabal recently uploaded, and now lives in a young and fit bioshell cloned from his own DNA. It also has a few enhancements that the authorities and the GRA had better not hear about. Officially, he is living the life of young Stockholm Duncanite, pestering the others with outlandish business ideas for *radical* space colonization (dismantling planets with von Neumann machines being just the start). Unofficially, he is still a key player in his network, although he has begun to tire of it in favor of space. That his taken name has become synonymous with his network amuses him.

Fraction Overview

Most subcultures are purely about enhancing one's self-image: "we" are always better than "them." The more exclusive and hard to enter it is, the more valuable the group is thought to be. That any child who has taken social psychology class knows this does not reduce its appeal. When material goods are easy to come by, people are willing to spend inordinate amounts of time and effort to gain acceptance in the right in-group.

How Subcultures Work

Reproduction by division is the norm in small growing groups with strong memes. As they grow too large, the original leaders will have to add new people as lieutenants to manage. These people often decide to strike out on their own after a while, taking with them parts of the group loyal to them rather than to the old guard. The result is a mess of small groups vehemently fighting each other over minor doctrinal differences. The same process can occur when a larger group like a political party is in decline and different leaders try to turn the trend around.

One key concept is "movement core collapse," a term borrowed from astrophysics. As the stars in globular clusters occasionally interact the most common result is that one star loses energy and moves toward an orbit in the core while the other gains energy and moves outward into the halo. In the end the cluster becomes a dense core (possibly with a black hole) with a diffuse halo. The same thing can happen to social groups under certain forms of memetic pressure. The halo members that did not identify so strongly with the group move away, leaving a hardcore group becoming ever more fundamentalist about their shared ideals.

If reproduction-by-division dynamics do not set in, making the group harmlessly self-destruct, it can either dwindle into a bizarre remnant of reclusives – or explode into suicide, violence, terrorism, or memetic warfare. This is why memeticists monitor declining groups.

The Translucent Society

Kungsholmen is currently the largest physical area of Stockholm with total transparency (***Broken Dreams***, p. 19). The Föreningen Kungsholmen Panopticon (the Kungsholmen Panopticon Society) largely runs it. Parts of the Panopticon are not physically present; a few communities in northern Sweden and Vilnius are part of the organization, as well as many members of the Participatory Transparency Project (the PTP – see ***Toxic Memes,*** p. 40) worldwide. The Panopticon is an informal democracy run by the Agora, a virtual citizen meeting every two weeks, overseen by a board elected whenever a majority of the present Agora demands it or when someone steps down. The board is also the leadership of the Transparency Party (see p. 70).

Transparent Kungsholmen started as a small commune inhabiting an old block down by the Klara canal. As more and more transparency devotees moved in, they settled nearby, extending the transparent area. Those who didn't enjoy being scanned by their neighbors tended to move away, and by now, the eastern half of Kungsholmen island is firmly transparent and the other half is at least "translucent."

People broadcast their sensory data to local servers that route it all to the main Panopticon site. Plenty of camera stickers, microphone patches, and roving cybershells also are reporting in. So far, it has not been possible to get the city to deliver data from its sensors, but it is no secret that these are often hacked and added to the databases.

The majority of Kungsholmen inhabitants are not transparent but accept or enjoy it. What better way of upsetting (and at the same time calming) one's privacy-obsessed parents than to live where one's face can be found online all day? (And more, if one's partner happens to be transparent.) The island has drawn an overabundance of extroverts and seekers of media attention, making it one of the most fun and surprising neighborhoods to walk through. The nightclubs are the place to be seen.

Kungsholmen tries to organize a practical portal to the wealth of information, indexed by sense, time, person, place, and type of event. However, the indexing is often rather ad hoc, with the librarians (led by a SAI with the on-the-job-name Bentham) doing their best but often forced to reorganize due to new legal issues. The wealth of data in the site is a valuable resource. The Agora has allowed some information sales to help support the community, but that idea remains controversial after the Lithuanian disaster.

The Panopticon site is in a state of permanent legal conflict with not just WTO property rights rules but also E.U. privacy laws. As a response to WTO pressure, the Panopticon deliberately discourages the use of copyrighted material across the island – that way there is less risk of a lawsuit. This also works as protest. The privacy laws are a more complex matter, deliberately muddied by Panopticon lawyers with issues of local governance, respect for community standards and traditions, and ongoing journalistic/artistic projects (which, by Swedish law, are exempt from some of the privacy laws).

To the transparency community, Kungsholmen is a major meeting-point and a symbol of all it strives for. The Panopticon is rather proud to point out it was up and running when the PTP was just getting started; the PTP cheerfully responds that, unlike Kungsholmen, they plan to get somewhere. Beyond the competitive banter, it is likely that Kungsholmen also acts as a gateway for PTP communications to illegal servers; the sheer density of local traffic and the confusing network architecture allows such gating to be hidden in plain sight.

Kungsholmen is a good place to meet if one wants guaranteed witnesses: It is nearly impossible to fake what is happening to all the diverse sensors nearby. It is easy to be anonymous if one is not famous, and even a simply masked identity helps someone hide in plain sight – unless a zealous local discovers that he is a "masker" and sets out to digitally unmask him. The island has low criminality (if one does not count privacy crime) compared to the rest of the city.

Thanks to Cecil (below) and the Transparency Party, the Panopticon has eyes and ears in the municipal council. Local politicians are by now resigned to the intrusion, and since most of the matters would be public anyway there is little to worry about. The exception has been some Family Party and Liberal conservatives who now only participate virtually to "protect their privacy."

The Stockholm Police headquarters lie in the center of the island. Relations to the Panopticon are somewhat ambivalent: the Panopticon delivers all its data and does an excellent job of self-policing, but individuals often do their best to bug or monitor police activities.

Memeticists think the Kungsholmen movement actually peaked in 2074 with the Lithuanian scandal and is now undergoing a slow core-collapse. The loyalists are still there, but there is little new blood.

Cecil Thomas Prestwood

Cecil (*never* call him by any other name) is the leader of the Transparent Kungsholmen Panopticon and one of the key individuals in the transparency movement.

Born in 2042 into a landed aristocratic British family that had been dead broke for at least four generations, Cecil decided early on that he wanted to break every suffocating convention. He started out by getting arrested for a wide array of unusual crimes (that a 15-year old boy could commit defalcation surprised all legal experts), quitting his online learning programs, having his family disown him (the invocation ritual to the Unspeakable Powers in the family mausoleum was the last straw), and making enough money as an unlicensed tour guide in London to support himself. During this time, he learned from people he met and began to formulate his personal theory of what was wrong with everything.

His adolescent conclusion was that as long as people do not see each other for the flesh-and-blood fallible humans they are, social conventions will imprison everyone. Having met some transparency activists and sousveillers he gladly joined the movement to help show not just that the emperor was not wearing pants, but that nobody was.

> *Despite the promise of transparency on so many lips, we often have the sinking feeling that we are not being told all that we need to know or have the right to know.*
>
> *– Warren Bennis, "The New Transparency"*

By 2062 he was an international agitator star of the transparency movement, invited by the reform government of Lithuania to help convince people about the merits of total transparency. For a brief period, he thought he was close to wrecking convention and opening a new kind of society, but then his hard-line radicalism began to collide more and more with the pragmatism of the government. His status as official consultant was revoked and after he organized a series of protests against the "half-hearted, merely translucent society promulgated by Vilnius" his visa was revoked. That he was later proven right by the scandalous revelations of secrecy-corruption in the government did not improve his mood. He decided that no government or other top-down organization could be trusted to create true transparency.

Arriving in Stockholm in 2070, he found many willing to listen to him. Together they started the Transparent Kungsholmen project. Using his international renown and the ease of getting transparency believers to move within the E.U., they began to gather a core. When the Lithuanian experiment failed a sizable group of true believers arrived from the east, giving the project critical mass.

To ensure that the project would not be squashed by municipal powers the Transparency Party *(Transparenspartiet)* was formed. With a broad platform of sapient rights, anti-corruption activism, freedom of cultural expression, and local independence, they managed to win Cecil a seat on the municipal council. Politically, the Transparency Party has always worked with the Stockholmspartiet, cooperation that has ensured political support (in exchange for services rendered) at the national level.

Over the years, Cecil has become the de-facto leader of the Kungsholmen Panopticon. Other people have come and gone, there have been splits, and the transparency movement in the outside world has changed style. Nevertheless, Cecil desperately wants Kungsholmen to succeed, to demonstrate that with enough transparency, an entirely new kind of community can occur. To this end he uses all available means to keep things working. Some critics say that he is using the information available to him to oust anybody who might compete or disagree too successfully, but Cecil calmly responds that they have just as much information as he does – maybe more, if they are not 24/365-sloggers. He uses dirty legal and political tactics: well, let's use the obscurers' tricks against them!

He cannot truly admit to himself that he is feeling further and further away from his goal – years of permanent slogging has made him extremely adept at projecting a convincing facade of confidence and dynamic optimism. However, deep down, he knows that the days of Kungsholmen are limited and something new is needed. The number of transparent people and their memetic diversity are declining, the legal threats against the Panopticon are mounting, and the general momentum of transparency as a movement seems to have run out. Though he realizes this, he is in a position where he cannot mention this, or it will become a self-fulfilling prophecy.

Among the subcultures of Stockholm he is regarded as a celebrity. Even people cold to the transparency idea support him as a symbol of the idea that a truly different culture can thrive in the city.

Cecil is a keen observer of human nature and the structures that control it. When he doesn't like those structures he attacks them without hesitation. He has problems in dealing with AIs; his perceptive powers don't help him and many AIs view the privacy of their core programs as paramount.

Cecil slinks his life all the time. Unlike most 24/365-sloggers, he has many people who *do* keep track of what he is doing. Everything he is involved in becomes a public event. Some people avoid him, usually causing wry comments about them having something to hide. Even his dreams have from time to time been public matters. In the spring of 2099 a series of food-related nightmares of his became the subject matter of an online art exhibition created by the local artist Linda Enskog. Cecil had to admit that they were indeed public property and that he was glad they were out in the open, but most observers agreed that the praise was rather reluctant.

Secessionists

Stockholm's secessionist movement is looking for a fulcrum. So far the oil-and-water mixture of transhumanism and preservationism around the city has been stable and few on either side have promoted secession. The 2074 crackdowns could have been a time to make Stockholmers aware and willing to fight, but the obvious nastiness of the black clinics made even the most die-hard transhumanists reluctant to condemn them or strike back. However, at that time, the secessionists did not have meme hackers among them. Now they are ready, looking for any chance to set snowballs in motion, hoping they will turn into avalanches.

Stockholm Duncanites

Duncanite ideas (see ***Transhuman Space,*** pp. 85-86, and ***Deep Beyond,*** pp. 13-14) have followers dirtside, too. A sizable grouping can be found in Stockholm, debating terraforming methods in Campustown and pantropism in transhumanist salons, or cheering for the Ceres Mantas in sports bars. Unlike the space Duncanites, there is rather little that the Stockholm Duncanites *do.* They are all talk but no shop, as the spacers often complain. They have the grandest plans, but instead of going out to the Belt, Trojans, or L5 and realizing them, they are content to grow up into boring Fifth Wave professionals. There have, of course, been a few notable exceptions (self-made Trojan Mafia boss Anglie Aqua was originally Emma Bengtsson from the sleepy suburb of Huddinge), but not enough.

The Stockholm Duncanites might be a joke to hardliners and the "real" Duncanites, but they form an important bridge between the transhumanist movements, the Duncanites, and the preservationist E.U. They are a key memetic conduit, making many groups interested in them and what they discuss.

Xox Activists

Xoxing – the deliberate creation and running of multiple copies of a sapient digital consciousness – is perhaps the most feared crime of the year 2100, actively undertaken mostly by criminal organizations who, for example, "xoxnap" people in order to scan their brains and then produce multiple copies of the result. Still, there are those who support the practice in one form or another, and argue for its decriminalization.

The Swedish Society for Posthuman Consciousness (*Svenska Föreningen för Postmänskligt Medvetande* – "SFPM") was founded in 2099 under the guidance of sociologist Pierre Frykman. Frykman argues that the xox debate shows many similarities to the taboos against the alteration of neurochemistry in the late 20th century. The bans are, he says, grounded in the same fear of extinguishing a very-much-constructed "self," while we are all basically constantly reconstructing ourselves all the time. Differentiating between this existence and a more distributed existence as many possible selves is simply not valid, argues Frykman. We should embrace this posthuman condition, or at least have a more meaningful and productive debate about it instead of cowering under a ban. The SFPM usually points out how, when countries eventually decriminalized most recreational and mind-altering drugs, this undermined the drug syndicates and actually built a more practical neuroethics in the process.

The society is small, but visible. It creates much shock value, is constantly accused in the public debate of harboring xoxes or other criminals, and is of course impeded in actually practicing xoxing. It is not a particularly powerful influence in Swedish society. However, some hope or fear that it might link to certain transhumanist and hyperevolutionist memes and manage to bring forward a more coherent posthuman doctrine. The organization does not have an office, but is fully distributed on the Web.

Identity Preservationists

An increasing number of thinkers are seeing the struggle over identity models as the key issue of today. The increasing threats to personal identity cause a natural reaction, seeking to protect the self. The clique around Stockholm philosopher Esbjörn F. Tretow is formulating what may become the manifesto of identity preservationism. The Identity Preservationist movement could very well become a force to supplant today's preservationism.

The core tenet of identity preservationism is that identity, selfhood, and privacy need to be ensured. The movement rejects technologies and ideas that blur the borders of the self, duplicate or transform it, or depict us as meme machines or open social networks. Having immortal superbodies is fine, as is living in a complex virtual world surrounded by biotechnology. However, there has to be *someone* experiencing it all, some essential self.

Identity preservationists are the sworn enemies of xox activists, but they are also opposed to much of neurostyling (pp. 72-73) and translucent society (pp. 69-71). They freely mix transhumanism and preservationism according to personal taste, which makes them a powerful emerging coalition. Tretow is well aware that the time is right; it is only a matter of finding the right way of formulating his insights to light a memetic wildfire.

The regular debates between Pierre Frykman (see p. 71) and Tretow at Café Thalamus or Medborgarplatsen Virtual are gaining in popularity. At worst, they show two eloquent modern philosophers attacking each other inventively. At best, they might be the start of one or two important philosophies. Since neither café allows broadcasting of its interior, the meetings tend to draw quite a physical crowd.

AI Government

A combination of Scandinavian faith in planning and the popularity of AI in Swedish society have made pro-AI government memes common in Sweden, both in and outside Stockholm. Several small parties are promoting local AI governance, with municipal decisions run through incorruptible dedicated AI systems. That most sociologists and many AIs advise against it doesn't change their views. Currently a small experiment is underway in the municipality of Haninge, where the quasi-cyberdemocratic political party AI-Partiet Haninge lets a party SAI, "Haninges Röst," do its voting in the municipal councils. The SAI has received a favorable response from both voters and politicians as being sensible, possibly giving the party more seats in the next election. Critics claim that the party is actually setting up a benign local dictator that it controls.

Yearners

Even in a society as fast moving as the 22nd century's, there are many people who actually manage to stay on the edge of new technological and societal trends and many neophile memes that counteract Social Transition Stress Disorder (***Broken Dreams***, p. 55) and nostalgia memes (***Toxic Memes***, pp. 92-93). However, the ability to foresee many rapid developments also creates a problematic yearning for the future for some as they feel development is too slow. Yearners wait for the new applications, the new technologies, the new cultural experiments that they know are possible but not available, often forestalling their own activities ("we can't have kids now; there are no good genetic templates on the market yet"). Yearning is more common in Third and Fourth Wave societies but is also present in the Fifth Wave.

Stockholm has a sizable Yearner population. They are mostly Swedish kids who "refuse to grow up" and remain in Stockholm year after year (sometimes decade after decade), trying to pick up the "Big Thing" when it comes.

Lifestyles and Fashions

Stockholm is filled with odd lifestyles and ideas about social behavior being tested – usually to destruction. Few are exclusive to the city, but several are very much part of the Stockholm scene.

Clothing

Swarmwear is perhaps the next thing in high-tech clothing: clothes that are actually a cyberswarm that covers, warms, and adorns the body. At present, the technology is under test and easily embarrasses the wearer, but the competition is fierce. The first fashion house to put a real functioning swarmwear dress on the catwalk will get all the attention – and Stockholm is a center for this work.

Miramare is believed to have a working prototype, but the North-Witton design team has some of the best people and experience in personal microclimate: using nanoswarms to keep the flow of air around the body at the right temperature. The *enfant terrible* of nanofashion, Tejo Nishamoro, is said to be working on *biological* swarmwear for his next collection.

Evolutionary Chic promises to be the ultimate in individualism: clothes evolved just for you and your lifestyle. The idea is proving popular in the Stockholm memetic ferment. Participants in "evolution fashion" subscribe to a "sartorial ecosystem" wherein different designs evolve. Each day they get an entirely new design delivered. Designs that are successful (as scored by the wearer, software counting approving/disapproving glances, comments on reputation servers, etc.) have more "children" passing their design features on than unsuccessful clothes.

Grammar-Correcting Stickers

A fad currently plaguing Stockholm is *grammar stickers.* Small black stickers powered by sunlight run grammar- and style-correction software. When they overhear an ungrammatical sentence or slang, they correct it in a tinny voice. At first this was somewhat cute, but now there are stickers hidden nearly everywhere. Some people just ignore them, while others jokingly "argue back" with more bad grammar, getting the sticker to "answer" in fun ways. Many people try to rip them away, but the plastic and glue are very tenacious. Originally the stickers only reacted to bad Swedish, but lately multi-lingual stickers have appeared to annoy people. Nobody seems to know who started the meme, but a common joke is that it is the writers and literary scholars of the Swedish Academy who are trying to drive people insane.

Neurostyle

Stockholm is the current capital of *neurostyle.* Look across a street, and you are bound to see someone with a virtual brain scan floating above his head or discussing current events with a passing concept.

Neurostyling is all about modifying the brain. At its most basic, it is about getting the right memes, drugs, and brainbugs. However, *real* neurostyle reshapes it further, using cognitive nanomods, nanotherapy, surgery, and genetic upgrades to make brain function and anatomy something truly individual. Having a truly unique brain is the greatest thing a neurostyler can aim for.

Much neurostyling is little more than "brain piercing": noticeable changes that don't do anything in particular. Having brainwave patterns that spell out Morse messages or the ability to become synesthetic at will might be cool but are not particularly life-changing. New emotions or ways of processing sensory information have greater potential. In winter 2100 Stockholm, the big thing is identity hacking. Dilaterals and radical personality change are in; bizarre perception is *so* '99!

Mindwear

The thing to virtually wear if you are a neurostyler is *mindwear*: clothes and displays keyed to your brain. The simplest models just display colors or patterns keyed to brain activity. The more advanced show visualizations of the brain, either as a floating translucent image above the head ("headshots") or as a discreet virtual label that can expand to display measurements ("pinbrains"). While most wearers are happy to just have something that moves and changes depending on their mood, serious neurostylers go for elaborate multilayer imagery that rival the systems found in neuroscience departments. A skilled neurostyler can detect mood, some subconscious reactions, and whether someone is lying or running a brainbug from the image.

BrainCap

The current neurostyle must-have is a miniature EEG mesh worn on the scalp, generating an animated holographic projection of the wearer's brain. Costs $300; earns a +2 reaction from neurostylers, and gives anyone familiar with neurostyler methods +2 to Psychology rolls to "read" the wearer.

Transliteracy

Transliterate people actively seek to become analphabetic. The idea is that the alphabet is obsolete: Thanks to voice control and recognition, graphical displays, virtual environments, slinking, and (perhaps in the future) memory transfer, there is no need to learn how to read. However, reading is not just obsolete, it also warps the brain. Brainscans show how learning to read changes the way the language centers are organized, opening them for some forms of thinking but closing off others. Hence, members of the transliteracy movement seek to rid themselves of the "alphabet virus."

Conveniently for transliterates, it has recently becoming possible to remove reading ability from the brain temporarily, thanks to the new Analpha brainbug, which induces Dyslexia (medium-term, contact patch; $200; LC 4). Many transliterates also use the related Concretizer, which induces Non-Iconographic (medium-term, contact patch; $200; LC4), considering that processing abstract symbols is another distraction for the brain – especially in the symbolic-interface-rich Fifth Wave world.

Note that the prices for these two brainbugs are twice what would normally be expected from the game rules for such things; both represent brand-new breakthroughs in advanced brain function modification, and the patents for both are well nailed down. As new inventions with radical neurological effects, they are also somewhat more tightly legally controlled than might be expected. There are no brainbugs yet to *mitigate* Dyslexia or Non-Iconographic, and such developments are unlikely, although advanced nanotherapy can usually cure them permanently.

Transliterates often take large doses of both brainbugs, hoping to "re-educate" their brains. They *usually* remember that some activities – certainly including vehicle operation – are understandably highly illegal while under the influence of such nanodrugs.

Actually, according to a Säpo analysis, the transliteracy meme is a deliberate creation of the Stockholm-based brainbug manufacturer that invented Analpha and Concretizer, which explains why it is so widespread locally. Säpo did not find the meme dangerous enough to merit intervention, but has passed the information on to the police. The brainbugs have been scrupulously tested and cleared as safe for sale, but some police officers and other officials are still watching the whole subject very closely.

TMS Parlors

"Coilheading" is an old neurohacking "high without drugs" method that is effectively banned for good reasons in most countries, based on TMS (Transcranial Magnetic Stimulation). In the simplest version, users place a figure-8 coil on the right part of the skull and send current through it. The resulting electromagnetic field jams parts of the cortex, producing disorienting sensations, temporary loss of senses, and motor or thought disturbances.

Using a hacked HyMRI machine, much more complex and pleasant states can be induced. This is the basis for the business of "TMS parlors," a kind of black clinic/drug den. The experience can become more intense and specific if the user first injects nanosphere magnets that allow the magnetic fields to couple better to the brain. Some TMS parlors supply factory-reject bionet microbots or diagnostic nano to support this. Mistakes can easily produce epilepsy, brain damage, or slow dementias.

Compared to modern brainbugs, TMS is inefficient and crude. However, for people who can't afford brainbugs or traditional drugs, it is still an option, and TMS attracts neurostylers (pp. 72-73) who want to experiment. Many users try different stimulation patterns and share tips with each other. Some have more or less well-founded ideas for how to upgrade their mental state that no serious clinic would allow, so they turn to a TMS parlor.

Headwindows

Stockholm is the bridgehead for visible style (***Toxic Memes,*** p. 97) into Western Europe. Cool people with visible muscles, stomachs, or neck vessels can be seen everywhere. Aficionados usually regard Tirana in Albania as the best place to go to get the transparent bioplastic installed, but several Stockholm clinics such as Broström & Son, Anatdesign AB, and Östermalms Kroppsverk are rapidly gaining a name for reliability and discretion.

Of course, neurostylers (pp. 72-73) go for skull windows (usually in the forehead) but add a twist: voltage sensitive dyes on the cortex surface, making their brain activity visible in greens and blues. This is regarded as the height of neurostyle, despite AR displays of brain activity having far better resolution.

The rumors of imminent legislation have spurred some biotechs to find an entirely organic replacement based on modified cultured tissue. They reason it will likely remain legal (or require another slow banning process). Right now they are looking for test subjects to try their experimental designs.

Bioplastic skin and bone graft in forehead (small): $5,000 (including surgery), LC4 now, LC2 or LC3 soon. A large hemisphere display: $20,000, same LC.

Voltage-sensitive dye implant: $200, LC 4.

Dilaterals

The lateralization of the human brain has fascinated people since neurosurgeons first observed it in the middle of the 20th century. Dilaterals take the idea of the left and right hemisphere being different to the next level – and seek to make them different people.

Dilateralism began with the Helge Berensen affair in 2089. Berensen was a well-off, somewhat unconventional retired arbitrator with a longtime interest in psychological modifications. In June 2089, he left for L5, presumably contacting some illicit clinic in orbit. When he returned in September 2090 it was as two people, giving the immigration services a serious headache. Both people were Berensen, or rather, his left and right hemispheres. At the clinic, it seemed, he had his right hemisphere transplanted into a cloned body and added "blank" cloned hemispheres to make up two complete versions of himself. "Berensen Left" had the language areas and could argue his case eloquently, while "Berensen Right" could demonstrate that he remembered relevant details of his past life and signal that he considered himself to be the original, too. Most surgeons declared this to be an extremely high-risk procedure, but acknowledged that, as Berensen illustrated, it could be survived with modern medical know-how. Both Berensens had doubtless been significantly disabled immediately after the operation, but had regained reasonable function with the aid of extensive therapy.

Berensen Left and Right were now physically identical: healthy apparently middle aged men with slight limps (on opposite sides). Both claimed (Right using gestures) to be Helge Berensen and having a right to re-enter Sweden. The legal issues surrounding this doubling were intricate and perfect for dinner-table discussions. The media loved the affair, putting even more pressure on the authorities.

In 2091 it was decided that the Principle of Individuality held: Left and Right were different individuals, since they clearly exhibited different personalities and experiences, and each held potential for independent personal development. Whether they were Swedish citizens and had access to Helge Berensen's rights and possessions was more uncertain. They were given interim citizenships, and Berensen had beforehand placed most of his money overseas for the use of his two successors. Right, being unable to speak and apparently somewhat incapable of managing himself, was made a ward of Left until he had developed enough (which occurred three years later). There was much debate whether Berensen Left really was a suitable guardian, but Berensen Right made clear he did not want some outsider.

Another issue was whether a crime had been committed. Undergoing radical medical procedures overseas had long since been recognized to be legal, but the result might be illegal. Had Helge committed a crime against Right, the deliberate creation of a "damaged" person? A complex legal case developed that went all the way to the Supreme Court. In the end, the issue of guilt was found to be confused; if Helge was regarded as guilty then that guilt would implicate both Left and Right as continuations of the criminal person (Right would likely get a milder punishment due to his incapability). But can the illegal creation of a person be a crime of the illegally created person, whose interests the law is trying to protect? Anti-xoxing laws were of no use, since Left and Right were not identical copies of Helge, and nor did they claim to be. The Court decided that no criminal act could be proven (but noted that radical changes in identity do not in principle remove legal culpability, as determined in previous cases where memory erasure had been attempted to cover up crimes). Left and Right were different people, but since Left had the original body he would inherit the personal number while Right would get another. Had they not already done so, the Court would have ordered them to split the property.

The decision caused much international interest. The E.U. Court announced that since no appeal had been made, it would have nothing to do with the matter. Xox rights activists cheered the decision while many anti-xoxers viewed this as a dangerous precedent.

The Berensens took advantage of the interest and published a book (*Journey to Janus,* 2091) written by Left and illustrated by Right. Although neither was a truly skilled author or artist, the dramatic point was not lost on people. They attracted a following, which gradually crystallized into the Dilaterals.

The Dilaterals are a loose network of people fascinated by the Berensen split and other forms of radical extensions of brain lateralization Most are merely interested in aesthetic, existential, or psychological discussions, and form a social club. There are also some who go further, experimenting in using drugs to sedate one of their hemispheres to experience the world from a "lateralized perspective," basically recreating an old medical experiment called the Wada test. As a participant at a "Wada party" remarked, "I suddenly experienced that I am two people all the time, I just don't notice it – but remove one, and it becomes obvious!" Others are less impressed, not noticing any real change in identity while half-anesthetized but clearly seeing the differences in other people undergoing the procedure. A number of Dilaterals are funding small-scale research to make a brainbug to do the same job as the Wada test, avoiding the risky injections.

The very few true splits are the celebrities of the Dilaterals, surrounded by a halo of groupies. Berensen Left and Right are the leaders of the Dilateral movement, basking in the interest their change has produced. Left has already stated that in a decade when his right hemisphere is expected to be fully developed, he will undergo the process again.

Left is noticeably more cheerful than Right, who often seems slightly melancholic. Left is worse at detecting irony or mood than Right, who still has some trouble talking but is acutely sensitive to how people speak to him and how music sounds. Right is significantly better at punning than Left, though. Right has been doing noticeably more artistic experiments than Left, but this can be attributed to prejudices about the right hemisphere being more artistic. Both have some memory problems: many personal memories from before the split seem to be hard to access or vague, since they lost half of the involved neural network. Motor skills are largely unchanged as long as they do not involve coordinating both sides of the body: both are great prestidigitators but hopeless at juggling, a hobby at which the original excelled.

One problem for the movement is that Berensen Left and Right have grown apart. As Right learned to speak and continued a career as an illustrator, he became the natural center of the more artistically inclined side of the Dilaterals, despite his more withdrawn personality. Meanwhile, Left tried to leverage the movement into profit, staging debates and participating in the media. It is becoming increasingly clear that they have different visions of dilateralism. The irony of a split in the movement is not lost on anyone.

The appearance of two new dilateral pairs, Klaus Bowman Left & Right (a U.S. engineer) and Nancy Bennion-Potter Left & Right (a British transhumanist artist) has made the situation a bit more volatile. The Berensens are no longer alone, and Bennion-Potter Left has an unrequited crush on Bowman Right but can't stand Left. It is likely that more pairs will appear, since the Swedish court decisions make Sweden a safe place to be dilateral in.

Multiminders

The goal of becoming a true hive intelligence has always appealed to a certain kind of transhumanist. Using wearable computers and slinks, weak substitutes can be arranged: "Teamers" form long-running teams in which they can help each other and even employ puppet implants to use each other's bodies. However, true mental contact is lacking, and most teamer groups split long before they become truly good at working together.

Using unfiltered VII neural signals, multiminders try to achieve true brain-to-brain processing. Just sending one brain's neural signals to another brain would produce little more than noise: the neurons and networks corresponding to one's concepts or experience have no obvious counterparts in another brain. Normal VIIs translate the signals into a standard high-level pattern that contains very little information compared to the brain ("narrowband" in multiminder jargon). Multiminders use heavily (and illegally) modified VIIs linked to a monitoring AI. Whenever both brains experience comparable states the AI learns which patterns correspond to which and can translate directly between the neural codes. Usually pairs of multiminders spend long periods downslinking the same experiences to synchronize their brains and then experiment with having their brains communicate by "broadband." The results are highly variable between pairs and from time to time. Some just experience hallucinations and strange tics, or worse, epileptic seizures. Others briefly experience chains of association that jump between the brains, at once familiar and strange. Each can hear the other's internal monologue, but now as a dialog.

Multiminders on broadband appear distinctly distracted and introspective, but the idea tends to appeal to neurostylers. Often, each active multiminder is surrounding by their own group of admirers asking them to show their neural activity

Human-Play

"Another cookie, dear Emma?"

"If you insist. They are simply delicious. I simply have to have your almond biscuit recipe."

"Why of course, I downloaded it yesterday; I think I can find it in my clipping file."

"Ah, that reminds me. Rebecca got published again."

"Another knitting pattern?"

*"Better. She made a constructive proof that one can do complete selvage stitching of *[*p2|k1]/Z sweaters."*

"Amazing! But I'm sure it is a NP-complete problem in general. More coffee?"

"No thanks, I think my shell is getting full."

– Overheard in the kitchen of 5498-4374-4300

One SAI hobby that seems to have caught on in Stockholm is playing at being human. Humans who hear about it call it the Pinocchio Syndrome: the poor machines try to become like humans. This is usually a conceit. The SAIs involved would like to understand the human condition, but very few would want to *be* human. As the SAI Sven Nystrom/Aldridge-4364 remarked in a discussion: "There seem to be many more humans wanting to be like AIs than AIs wanting to be humans. We like to try out the roles you've invented, learning more about your world so that we can understand our own world – that you shaped – better. Like all play, it has no purpose, but once we try it we discover interesting things we would never have conceived of before."

Human-play is quite common during rearing of SAIs to help them learn to deal with humans and gain a basic common sense understanding of their world. Most stop once they are "adult." Some AI psychologists and SAIs view human-play as a bit regressive, leading many human-players to hide their hobby behind their human persona. It could be bad for the career of an SAI if it became known that it also liked to play at being a little old lady.

While much human-play is purely virtual, the "ideal thing" is to experience the physical world through a cybershell – or even better, a bioshell. Unfortunately for SAIs, the latter option is not only regarded with intense distaste in most areas, including the E.U., it is actively illegal – and legitimate SAIs, with their honesty programming, feel obliged to accept this. Some, however, are sophisticated enough to seek ways around the letter of the law. There has been one case, the 2095 "Milan Community Club Bodysnatchers" incident, where members of a human-play club who had legitimate access to bioshells for technical development purposes, supposedly under very close constraints, rented or lent brief access to the shells to other members. (The guilty parties were fined, lost their bioshell access clearances, and had to upgrade their law-obedience subroutines). Some SAI hobbyists simply take holidays to places where bioshell renting is legal, usually at L5.

Human-players often meet to play together, reproducing typical human tableaux like "gossiping housewives," "playground power struggle," "garage band repetition," or "studying together." A situation doesn't have to be the least bit interesting to humans to fascinate human-players. While many humans would think that the SAIs would immediately try to imitate romantic love or experience sex, most SAIs find more interest in the subtleties of dysfunctional workplace behavior. They also wryly point out that the human assumption tells quite a bit about how humans think.

One form of human-play is "Turing-play": to try to act so convincingly human that humans can't tell the difference. Another form is "reverse Turing-play": to play human in front of other SAIs so they can't tell the difference. Some human pranksters have tried "triple Turing-play": fooling SAIs into thinking they are in the presence of a SAI doing reverse Turing-play.

Biohackers

While Stockholm is practically littered with body-sculpting shops, anatomy design parlors, and recreational medicine boutiques of all kinds, there are few real black clinics. After 2074 they were quietly and efficiently removed, sometimes by the police, sometimes by others. Instead people "go east," to Finland or St. Petersburg, for illegal or questionable procedures. As the black clinics vanished, many of the biohackers moved with them or became neurostylers. A few traces remain: Stockholm seems to be the source of remarkably many quasi-legal designer bacteria, ranging from decorative phosphorescent skin treatments to bioplastic eaters – and at least one recent gut buzz strain (see p. 46). The GRA has a small team keeping watch for whoever is behind this.

Ymir Therapy AB

There exists one legal clonibal restaurant (see ***Toxic Memes,*** p. 87) in Stockholm: Ymir Therapy AB (Folkungagatan 32). The restaurant gets around most regulations by declaring itself an alternative medical treatment facility. "Patients" arrive, are diagnosed by a medical AI as having a deficiency of something (statistically there is always at least one substance lacking in the body significant enough to be called a deficiency if you scan enough), and are ordered "autonutrient therapy." When they return a week later, cloned tissue dutifully enriched in the lacking nutrient is prepared by a "medical technician" and eaten. The medical setting doesn't appeal to many customers, but it is not the point.

Rusalki

Rusalki originated in the St. Petersburg clinics where genetic engineers were attempting to perfect human pheromone control. They wanted a gene therapy treatment whereby they could infect a person with a retrovirus to induce desired permanent changes (a remote ancestor of today's Proteus nanovirus concept). One badly regulated experiment produced a modification that left the recipient producing extreme quantities of pheromones in all her body fluids. That gave the engineers the idea of adding genes for other psychoactive substances to the treatment. The result was a person exuding not just sexually attractive pheromones but also a cocktail of psychoactive drugs. Just kissing a Rusalka provides a heady rush; sex is even better. And addictive.

Then the Russian Civil War happened and Nelli Grigorevna, the "succubus mother," arrived in Stockholm with the Rusalka virus. She had been a part of the original team and now saw her chance to build a fortune. She sought out thrill-seekers who became Rusalki, forming a network and helping her black clinic get customers, information and money through prostitution and blackmail. Addictive prostitutes were exactly what she needed to bankroll her more exotic research into brain-stem hacking.

The activities of Grigorevna and her network were a contributing factor to the police raids that closed down the black clinics in 2074-2075. She was prepared and left for orbit, sneaking out at Arlanda using a fake identity and rapid biosculpting. The Rusalki remained and refused to get treated for their condition: They were quite fond of being unnaturally attractive.

The Swedish authorities, E.U., and GRA debated what to do with them. Forced modification reversal was not something any of them were ready to impose, especially on people they already considered victims. In the end, it was decided that as long as Rusalki did not affect unwilling or uninformed partners their effects were legal. (This was at a time when drug legalization was making great strides across the E.U.; banning a genotype that produced a drug that was legal at the street corner would have been illogical.)

Since then, the Rusalki (also known as Succubi or Narcs) have been a part of Stockholm underground culture. They are seen as dangerous/sleazy seducers who fascinate and repel in equal measure. They have admirers who enjoy not just the rush of making love with them but the extreme submission of addiction. Over the last decade, the number of Rusalki has begun to climb: clearly someone has access to the original virus or has reverse-engineered it. Since the genotype is legal, the police can do little; however, they are monitoring events cautiously.

The Rusalka Treatment

The Rusalka treatment consists of a series of retrovirus injections that reprogram exocrine gland cells to produce new substances. It is not heritable, but a child born of a Rusalka mother will be addicted to her drugs from birth. (Hence, Swedish law actually makes it illegal for a Rusalka to produce children without technological intervention to prevent this.) It only works on female subjects.

Normal human beings are not reliably susceptible to pheromone effects, but the chemicals produced by a Rusalka do have some effect on most humans, and heighten the overall effect of the whole package.

Rusalki are not affected by the drugs or pheromones they themselves produce, but they can often be affected by another Rusalka that has a different drug combination; there are about a dozen different variants. In that case, both can get the rush if they have intimate relations, and can become addicted to each other.

The treatment gives the following meta-trait:

Rusalka: Affliction 1 (HT; Always On, -20%; Aura, +80%; Contact Agent, -30%; Melee Attack, Reach C, -30%; Tipsy, +10%) [11] + Affliction 2 (HT-1; Always On, -20%; Aura, +80%; Blood Agent, -40%; Euphoria, +30%; Secondary Ecstasy, +20%; Melee Attack, Reach C, -30%) [28] + Immunity to drugs of same-type Rusalki [1]. *40 points.*

A person who makes skin-to-skin contact with a Rusalka for more than a moment must roll against HT; failure means he becomes tipsy for minutes equal to the margin of failure. Having sex with one (or otherwise sharing blood or intimate body fluids) necessitates an *additional* HT-1 roll; failure means euphoria for minutes equal to the margin of failure, while failure by 5 or more (or a critical failure) means ecstasy for that duration *followed by* euphoria for the same length of time! (See p. B428 for effect details.)

Rusalki are immune to the drug effects of their own modification type. These effects are quite addictive, especially with repeated exposure – though victims who genuinely want to get rid of such an addiction can usually do so effectively enough with TL10 medical assistance.

The cash cost is currently uncertain – would-be Rusalki will need to track down whichever black clinic or other underworld type currently has access to the technology. The asking price might be high, or surprisingly low to some customers – if they are prepared to perform some *favors* for some very dubious characters.

Incidentally, the Lecherousness disadvantage is *not* part of the biomod design, but people electing to undergo the treatment very often have it.

Rusalka addicts do not usually require daily contact (although some may wish for it), so this condition does not qualify as a full ***GURPS*** Addiction disadvantage in most cases. Nonetheless, it can certainly rate as a quirk. Additionally, addicts often suffer from some kind of Obsession (with retaining the favors of a specific Rusalka, say – or with the goal of being seduced by multiple Rusalka). This can explain other disadvantages such as negative Reputation (as a sleazy addict) or a Duty (as a Rusalka may manipulate her desperate "admirers"). Furthermore, a combination of pheromone effects and subtle use of "brushing touches" can justify giving a Rusalka high levels with Sex Appeal skill.

Nordeld

Nordeld is a Stockholm band doing its own Scandinavian version of Greek Fire music (***Fifth Wave***, p. 44). Rather than using Hellenic themes they combine ancient Scandinavian mythology with transhumanism and a Majority Cultures-like nationalism. With several international hits like "Odin Húsl," "Loki Transmenskr," "Allvaldr," and "Net Fylgia" to their name, enthusiastic reviewers suggest they might represent a chance to reignite Greek Fire.

Others are put off by the racist-nationalist overtones of the songs, although charges of traditional racism are hard to make stick: Lead singer Rui-Ying Li is a Chinese viking, and a SAI and a Kouros parahuman compose the lyrics and music. Nordeld disdain the "weak people who do not dare; not dare the fire of change, not dare the mixing of the flesh, not dare battle the entropy of Hel" – this includes preservationists, overly cautious gerontocrats, and people pursuing ideal gene templates rather than brave generalism. Nordeld proclaims that it is better to die out in pursuit of superior life than to meekly keep to the safe: "dead transhumanists upload to Valhalla." They are fiercely popular among neurostylers.

Performances involve heavy use of augmented reality imagery, synthesized music, and physical performance by augmented dancers. A few dancers regularly participate, all with exotic body sculpting or enhanced physical abilities. Mikael Stenström, a Sigma upgrade (see ***Fifth Wave,*** p. 119), sometimes participates with his very characteristic "Sigma-rap" that makes use of an overly quick nervous system.

Rui-Ying Li

Rui-Ying Li was born in Stockholm in 2075. His parents, prominent internationalist transhumanist politicians, had connections and spared no expense on their kid, but chose an experimental, Ishtar/Metanoia-like "Theophilus" upgrade for his genetics (see the box). He grew up as a well-loved, handsome, and musical kid in an extended international family doing its best to stimulate his mind. However, a combination of enhanced musical and speech abilities had unforeseen effects on his reading ability, making him seriously dyslexic. Less of a problem than in earlier eras thanks to modern education and assistant software, this flaw became a defining personal trait during his adolescence. The combination of an Ishtar-like personality and ambitious parents made it far more serious than it objectively was. It seemed to make a mockery of their transhumanist beliefs and taint his own grand ambitions.

As he matured, Rui-Ying developed a personal philosophy that allowed him to accept his flaw. It was not the fault of his parents or their genetic designers – they had made a gamble, and it did not pay off in the way they intended. Instead of being ashamed of not being as perfect as intended, he decided to be proud of being an attempt ahead of its time, extending the knowledge of cognitive enhancement the hard way. Forgiving his parents, he set out to promote genetic risk-taking through his music. He encountered Ingeborg Sölvberg and her interest in the mythology of transhumanism, and they started a partnership to build a new transhuman mythos. The result was Nordeld.

The relationship between the singer, the AI, and her charge Kai has grown into a deep friendship that is now evolving into a messy relationship. What effects that will have on the band remains to be seen. A cynical part of Rui-Ying's mind thinks that a thunderous break-up might be just the memetic push needed to make it mythical.

Rui-Ying has bodysculpted his appearance to become Scandinavian – he is now a blond, bearded man, looking very Viking but still keeping some Asiatic features. Friends joke that he has gone halfway and achieved Genghis Khan.

Theophilus Upgrade

52 points

Attribute Modifiers: ST+1 [10]; IQ+1 [20]; HT+1 [10].
Advantages: Attractive [4]; Resistant to Disease (+8) [5]; Longevity [2]; and a total of 15 points in Language Talent [10] and/or any Talent.
Perks: Alcohol Tolerance [1].
Disadvantages: Overconfidence (12) [-10]. ● -10 points chosen from among Incompetence (any Influence skill; p. B359) [-1], Jealousy [-10], Odious Personal Habit (Competitive and self-obsessed) [-5], or Proud [-1] *or* Selfish [-5*].
Features: Taboo Traits (Genetic Defects *except* Dyslexia, Unattractiveness).
Date: 2072. ***Cost:*** $72,000.

* Multiplied for self-control number; see p. B120.

Note: Dyslexia is not actually mandatory for this upgrade, but is *not* excluded by the Taboo Traits feature. It has appeared embarrassingly frequently in children with these genetics, especially when the talents developed by the infant are primarily verbal or musical – which is often the case, being an intended effect with the design.

Kai "Frey/Freya" Hassel-Malinowsky-Titma

Kai is the offspring of a triad of asexuals (***Fifth Wave***, p. 118). Born in 2085, "ve" (the invented pronoun Kai prefers) was the first Kouros born in Sweden, before the current wave of E.U. genetics laws more or less completely outlawed that possibility. A native Stockholmer, ve grew up in the Garnisonen Commune of asexuals, autosexuals, hermaphrodites, and other gender-skeptics. When ve was a few years old, the commune broke up in an acrimonious conflict between different views, becoming strictly a/autosexual. One of Kai's parents defected into a sexual relationship, and the triad broke up (as Kai later remarked, "few people are as obsessed by gender and sex as asexuals"). Kai ended up in shared residency between ver parents, spending much time moving between fundamentally different homes and eventually ending up with three extra step-parents of three different genders.

The stable point in Kai's life was ver mentor LAI, Ingeborg Sölvberg. The AI was named after a clever character in a story ve liked as a very young kid, and became the elder sibling ve felt ve needed. As Kai grew up, the AI was upgraded rapidly (having three sets of guilty-feeling parents helped) and eventually became sapient. Ingeborg gained citizen rights when Kai was just 13, and together they managed to wheedle the parents and the social service into giving her custody. Legally Kai is a minor with ver parents as guardians, but they pay Ingeborg to provide ver with a stable home. Like Rui-Ying, ve feels a bit like an experiment, although ve is more content with the outcome.

Kai's role in the band is limited by being just 15 years old; in most performances, Kai plays synthesizers and just looks vaguely alluring. Ve would prefer to participate in the wilder aspects of the performances but is forbidden by child work protection rules.

The relationship between Rui-Ying and Ingeborg disturbs Kai. Although far more emotionally mature than most of ver age (and quite likely many adults), ve is extremely attached to Ingeborg; she is both a wise elder sister and to some extent a mother. It is no wonder that ve experiences jealousy when Ingeborg is away with Rui-Ying. To make things more complex, it is clear that at least Ingeborg and possibly Rui-Ying wants their relationship to develop into a triad. While ve is intellectually at peace with the idea, it is still too much emotionally for Kai. Instead ve directs his energies into the music.

Kai is a very open and social adolescent. Used to being the of attention for good or ill since early childhood, ve is able to handle most situations. Some might say ve adapts a bit too much, gliding between personas like there was no core self. In fact, Kai does not think ver self has anything to do with ver social life. Ve defines verself in terms of what ve creates in life: Every successful song adds to the emerging Kai Hassel-Malinowsky-Titma.

Ingeborg Sölvberg

Ingeborg began as a kindercomp housed in a small penguin-like cybershell. From the start, she was programmed to be extremely gender neutral, and up until the rash of post-divorce upgrades, she was definitely an "it" despite her name. However, as her capacity was rapidly extended and Kai got more of a say, she gained a clearer female identity – Kai explained to ver parents that Ingeborg needed a single-gender perspective to become better at helping Kai deal with the human race, and the consistency-loving AI liked to make its mental gender fit its name.

Her personality is very much a teacher and debater (the later trait developed by guiding an ultra-social kid through life). She gladly holds forth on the influence of 20th-century Norwegian heavy metal Satanism and '20s existentialism on the band.

Ingeborg hates inconsistencies, people living lies, hypocrisy, and sloppy thinking. This is partly programming to be rigorous and somewhat doctrinaire, partly a personal decision after seeing firsthand how much such things can hurt a growing child. This is what attracts her to Rui-Ying: the man is confident, utterly free of hypocrisy, and doctrinaire in a way that fits her own.

Ingeborg seldom uses mobile cybershells ("penguins" as she calls them – she always and still complains about her first "hopeless" shell) and prefers to manifest as a virtual persona. Usually she looks like a 30-year-old Nordic woman with sun-wrinkled skin, but during concerts she shifts between a variety of scene avatars.

Ingeborg is fiercely loyal to Kai and would never, ever let anything bad happen to ver. However, she is educated enough (through personal experience, online research, and large amount of software provided by the social services) to realize that she cannot do that by shielding ver from the outside world. Ve needs enough friction and experience to be able to handle anything the world throws at ver. Instead, she works hard to give Kai a thorough education by getting ver into new situations. That was the start of the Nordeld collaboration, and it has been almost too successful. Ingeborg worries that they all might be caught up in something that gets out of hand.

Things to Do in Stockholm When You're Uploaded

Being a legal infomorph in Stockholm is easy. There are several highly reliable "network hotels" and companies selling residence servers. A few of the main hotels also host servers for infomorph guests.

The most famous network hotel is the Stockholm Acropol, a virtual hotel catering for the needs of all kinds of infomorphs. Whether a human shadow wants a custom-rendered suite in empire style complete with servant spirits, or a SAI wants provable tamper-proofing for its server, Acropol can provide it. Acropol Hotels also runs OnTheFly, a popular virtual reality nexus. Many virtual conferences are held in their environments, often linked to physical conferences in the city. The Acropol also has one of the few virtual restaurants to have achieved two stars in the Michelin Guide.

A long tradition of backup services also exists, with off-site storage of software with legal guarantees that it will be reactivated in the case of legal (temporary) death or a wish to replace oneself with an earlier version. In the later case, the authorities are notified, and if the infomorph is a Swedish citizen, a counseling session with a psychologist may be required. Company vaults are housed in several old meteor shelters near the city and in the geologically stable mountains of northern Sweden.

Svensk Datalagring AB (SDAB) has bought the Kirunavaara mine and uses it for long-term storage of timesicles (see ***Toxic Memes,*** pp. 95-96), goods, and gene banks.

Stockholm has only one real SAI suburb (see pp. 44-45), Sickla. About 60% of the inhabitants are AIs, the rest being humans who take advantage of the very low rents and the generally quiet neighbors. Several cybershell shops have clustered in the vicinity, and it is a good place to look for bargain robotics.

Cybershell rental is widely available. Major firms like Euroshell, Arrow, Ro-Util, and Interunit have several garages around the city, and all standard models are available. Of particular note for the cost-conscious is Stockholm Touristbodies, a budget company that provides Tetra Vaal shells at discounted prices, thanks to a deal with the Stockholm Board of Tourism. The shells come equipped with extra tourist software.

The Skanstull Center for Bioroid Rehabilitation

Bioroids are very rare in Sweden, but a small group does live in Stockholm.

Located in Campustown, the SCBR is a unique facility that helps escaped or freed bioroids. After the E.U. granted full sapient rights to bioroids there were numerous cases of European bioroids being exploited, falling through the social safety net, or committing suicide, despite all the best intentions. The Wandtke Commission Report found that the problem was both psychological and social. Most bioroids have a very limited education and suffer from restrictive world views. Even those who have escaped on their own might find themselves unable to function in society. They may also have a compulsion to obey direct orders, making them easy prey for criminal elements. Add to this a measure of social exclusion and prejudice, and it is clear that bioroids need support. (The success of the bioroids of Vrijstaad in Rotterdam – ***Fifth Wave,*** p. 103 – is in no small measure due to local support.)

The result of the report was the SCBR, an E.U.-funded program that takes in bioroids from all E.U. countries and attempts to help them. In serious cases the "free" bioroids just live a life protected from outsiders in its grounds or its countryside retreat in Bjurholm in northern Sweden. A few may even need nanotherapy to become functional. Most bioroids undergo memetic counseling, basic education, and sessions with their instructors where they learn the basics of ordinary life, try to go errands on the outside, and gradually become independent. SCBR also acts as a hospice for bioroids near the end of their lifespan. There is talk about working with the Giapetto Society of South Africa (***Toxic Memes,*** p. 85) in providing bioroid adoption services.

Most Stockholmers are proud of the SCBR, but a small minority believe it is yet another tool for bioroid oppression. There are rumors of a militant group planning to "liberate" the bioroids from their well-meaning captors.

CONFLICTS

"We need to get out of here NOW!" I shouted to the chairman, quickly donning a portable terminal as he rushed for the door. Behind us, the office screens were filling with red diagrams of the ongoing Web attack. The rest of the team followed us and crammed into the elevator. Nicholas complained, but a sharp gaze from Joh made him fall silent. "Any risk of an attack on the building systems?" Joh asked me. "Negative. They can't afford PR-wise to hurt or hack anybody but us. As long as we keep to equipment not owned by your company we are safe. You should be happy that you share this building with other companies."

The elevator stopped and we rushed out into the private building station. A cab sat on the rails straight ahead, a green bug-like vehicle with centipede-like rubber wheels. A company cybershell shot out toward the elevator, grapplers whirring. Joh reduced it to junk as we rushed past. Several other shells were descending the stairs with springlike motions, one trying to aim some weapon. We didn't wait for it. As the cab rolled into the tunnel it jumped down behind us, appeared to decide it was not worth it, and jumped back again.

The tunnel walls sped past the crammed cabin. Apparently somebody had programmed the borer robots to produce a checker pattern; the effect at high speed was hypnotic and suggested that the tunnel should not normally be lit. The cab shifted rails with a lurch and continued down a new tunnel – this one definitely leading in the wrong direction. Nicholas asked innocently, "Isn't this the company cab?"

Everybody groaned.

There are many conflicts brewing in and around Stockholm. Most are non-violent but that doesn't mean they cannot cause problems (or opportunities!).

Stockholm vs. Sweden

Stockholm and Sweden don't quite get along. They have grown apart, and the wild, messy, young-old transhumanist enclave doesn't fit in with the planned, safe, and very preservationist country. It is a tunnel to somewhere different, and that makes some conservatives eager to plug it to ensure safe conformity. From the opposite side, radicals attempt to spread some of the wildness into the suburban calm.

Most of this conflict is cultural or high-level politics. Nevertheless, from time to time, people hatch plots to radicalize the Muslims of Solna, frame some transhumanist for xoxing, or just cause as much trouble as possible for the others. Just because you are an elderly Scandinavian preservationist doesn't mean you can't pull cruel pranks on the transhumanist degenerates.

Secessionists are trying to seed the memes for a real secession, and doubtless there are others out there trying to undermine the city.

Privacy vs. Transparency

Transparent Kungsholmen is a grand experiment but an annoying neighbor. Inhabitants often record what they experience when they go outside the island, logging it into their public databases. Many cafés and restaurants now have a "no recording" or at least a "no direct broadcasting" policy, which in turn earns them extra scrutiny from sousveillers. A few "obscurantists" have taken up wearing burqas when going through Kungsholmen, or register their current appearance as copyrighted artwork to mess up the Panopticon.

The real issue is about where to draw the line between public and private. In a city where many unusual characters gather the lines often get drawn in unusual ways.

> *I have had much to learn from Sweden's poetry and, more especially, from her lyrics of the last generation.*
> *– Knut Hamsun*

Old vs. Young Transhumanists

There is another conflict brewing along generational lines within the transhumanist movement. The young Transhuman Generation often finds that the methods and world-view of the more dominant Millennial Generation are not well attuned to a society where so many of their social and technological demands have been met and are even regarded as commonplace. Instead of nostalgia for old struggles resolved long ago, they would like to formulate new goals and ambitions – a very problematic situation for a movement priding itself on its constant dynamism.

The Kazakhstan Exile Government

Since the brutal suppression of the rebellion of January 2099 (***Broken Dreams,*** p. 107), the E.U. and particularly Sweden have been especially worried and appalled by the Zarubayev regime in Kazakhstan. With the E.U. supporting the Uzbek government against Zarubayev's attempts to form a "security zone" inside Uzbekistan's territory, it was clear that Europe had made itself an enemy in the paranoid dictator.

The E.U. is trying to resolve the situation carefully, without further destabilizing Central Asia (which is not so far from the European Union's sphere of interest in 2100), but mainly in order not to create tension with Zarubayev's greatest supporter: Russia. Unofficially, the E.U. is rapidly getting tired of Zarubayev. Thus it is increasingly supporting Kazakhstan's government in exile. This consists mainly of exile members of what is left of the Muslim underground and all other opposition groups. It is at present weak, and it survived the failed rebellion of 2099 mainly because of covert E.U. assistance.

The government in exile is distributed around the world and communicates through telepresence and virtual meetings. It has its main computer and communications node located in Stockholm, in the suburb of Akalla. This is kept top secret by the E.U. and the Swedish authorities as they know that Zarubayev's reach can be long indeed when he puts his mind to it. Most probably Zarubayev's KGB already knows about the node, but simply sabotaging it is no easy task thanks to Säpo's unofficial but very efficient protection. Still, the presence of the government in exile in Stockholm is a powder keg that very few know about.

The European Information Socialist Party

The European Information Socialist Party runs on its own platform in the European Parliament elections, when representatives are elected from the respective E.U. member nations. In Sweden, as in other European countries, infosocialism has had problems in becoming an important political ideology. The meme's references, connotations and goals seem very "Third Wave" and thus not relevant to present-day concerns in the minds of many Swedes. As Sweden is a major producer of intellectual property, many important interest groups stand against infosocialism, and the infosocialists have very real difficulties getting their message across to the voters.

The Swedish Infosocialist Party is staunchly opposed to the TSA in both practice and philosophy, but it still often has to endure political opponents linking it to policies of the least savory members of the TSA. That is why Olle Karlsson, the party's chairman, wrote the influential book *A Refutation of Cyberstalinism: The Democratic Alternative* in direct opposition to Suchen Pham's revisionist interpretation of Kyle Porters. It is speculated that, while Karlsson may be a good theoretician in his own right *A Refutation of Cyberstalinism* was beyond his capacity, and that it was extensively edited by Caleb Metelits, Porters' biographer and friend.

Infosocialism in Sweden has seen one major success in the recent election, when they were able to get several council members elected in the municipality of Södertälje south of Stockholm. In the early 21st century, Södertälje was one of the municipalities where the city put most of its assets and utilities into a semi-private corporation. While owned by the municipality, it was still regarded by the law as a private venture. The corporation gained control over the council members, and soon the municipality was informally subservient to a corporation of its own creation. Most other Swedish municipalities revoked these arrangements, creating clear divisions between government and private ventures, but in Södertälje the custom proved to be too entrenched.

Since then, Södertälje municipality has seen quite a few secessions, and many inhabitants have voted with their feet and moved out of the city. Södertälje does have a Fifth Wave standard of living, but quite low on the scale by Swedish standards, and many commentators have noted that the prevailing mood of how business and politics is conducted in Södertälje reminds them of the slump years of the early 21st century. The infosocialists were able to capitalize on this in the election and became the main opposition party. Since then, they have tried to form alliances and build connections in order to reverse the power of the city corporation.

The Baltic Eco-Restoration Issue

Stabilizing the Baltic ecosystem is high on everybody's agenda, so there is much debate about what to do. The Hagstrom-Zalitis Program may be the official E.U. project, but several groups dislike it on political, economical, or practical grounds. There have been rumors that some radicals may even want to sabotage it to "give the archipelago elite a taste of the world they have created" as one anonymous poster to an eco-activist site wrote.

A few transhumanists and moderate Delugists (***Toxic Memes,*** p. 106) are proposing to turn the Baltic into a new country inhabited by water-adapted beings. This plan, "Baltic Nation," has recently gained memetic momentum – it is so unlikely that it almost makes sense – to the surprise of most traditional environmental agencies. If implemented, it would call for a rapid restoration of the core ecosystem and then a gradual planting of different underwater biomes in different parts of the sea. A new amphibious capital would be located near Gotska Sandön. The Baltic Nation would support itself by selling ecological and climate maintenance as well as mining deep sediments for sulfur-organics.

Dangerous Technology and Memes

There is a worrying amount of *interesting* biotechnology floating around Stockholm. There are countless established "ways east" for people with money and connections to get upgrades or designer gengineering done, so while there *might* not be any black clinics in the city, their products are there – and the authorities are beginning to worry that the amount is rising year by year. Some think that there is a "biotech mafia" with connections to triads, Duncanites, and who-knows-what else, but there is not a trace of evidence. A few suggest that the Kabal might be behind it.

The local clustering of xox and infomorph activists, replication researchers, and the enormous SHP servers is another nightmare possibility. Overall, there are many tinkerers around with access to both legitimate technology and imported black market devices – who knows what is being cooked up in the attics of Östermalm or labs of Campustown?

This risk has attracted several agencies to keep an eye on things, as well as people who want to "be there" when whatever happens. There are also groups going out of their way to make life hard for the regulators just on general principle.

Current Events, Scandals, and Plots

Some potential plot hooks in and around Stockholm:

- Someone hacked the official city New Year's Eve fireworks AR layer to display embarrassing imagery of the public health and environment inspector Leon Gustafson. The City Council wants to find out who did it and how. Rumor has it that the city brand development manager Sven Kelbergh isn't unhappy with the situation – he thinks it helps strengthen the image of Stockholm as a wild, fun place, and he doesn't like the environment inspector. Could it be an inside job?
- There are rumors that some infomorphs have begun to play "xox ultimate challenge" online or using cybershells. Participants supposedly xox themselves and then play death match games against themselves – the survivor is the winner. It is said that this ultimate challenge is bringing in a lot of money to a group of Stockholm-based xoxers who are also selling slightly edited snuff recordings from the losing minds. The closest thing to the rumor anybody has *yet* found in reality was "Club Auto," where rich kids were playing games against low-grade emulations of themselves.
- A massive corruption scandal in China has implicated a Swedish citizen as a key go-between. The Chinese authorities and media are doing their best to find this person, but E.U. privacy laws and slow responses are holding them back. Some of the managers at Wuhan MetaNets might have very good reason to silence "Mr. Svensson."
- A group of Stockholm entrepreneurs are promoting a "clean city initiative," using biotechnology and cyber-swarms to reduce littering and vandalism. Opponents think their plan is both intrusive and expensive.
- A diplomatic crisis has developed between Sweden and Saudi Arabia after a Scheherazade bioroid (***Broken Dreams,*** p. 122) escaped from the ownership of some of the embassy's staff. The ambassador claims to know nothing about this, since bioroid ownership is illegal (and widely condemned) in Sweden. It is an open secret that the Scheherazade is currently at the Skanstull Bioroid Rehabilitation Center (p. 79); the embassy has made (muted) demands for her return. The Swedish government has refused this, but is still perhaps somewhat hopeful that something might make this problem go away soon. The Wahhabite Islam propagated in Saudi Arabia is generally not very well regarded by Sweden's more tolerant Muslim community, and in this sordid matter especially the embassy has received no assistance or sympathy from them whatsoever.
- Several people have fallen ill with a variant of the common cold with parts of a text message encoded in its DNA: "I am jealous of everything whose beauty does not die." The virus doesn't seem to have any other effects.
- There are hints that the feared Swedish intellectual-property crime syndicate Gula Brigaderna are on the move. However, some have suggested that the syndicate does not exist at all, and the whole thing is just memetic trickery. Or is that a smokescreen?
- Someone is killing Rusalki – and draining them of blood. Is it revenge for spurned passion, or has someone decided that they want the addiction without the person? Or does it have something to do with the new Rusalki? If someone wanted to sample – or hide – a new retrovirus, the blood would be the thing to go for.
- A woman claiming to be possessed by the (supernatural!) ghosts of erased AIs is wandering the streets, prophesying surreal events, and apparently telling people things only their kindercomps might have known. Now, some of the strange events she predicts are starting to happen. Is it an elaborate practical joke, a con game, real AI speaking from beyond the trash can, or just plain insanity?

Sample Scenario: In the Walls

Kristoffer Sundelöv has recently been killed. He can stand that. However, six months of his life have been stolen. He is furious about it and wants them back.

This is a detective story set around Stockholm, linking an architect, identity crime, and the Stockholm underworld. Ideally it should be run as "Agatha Cristie meets CSI," a mix of hi-tech investigation and clever deduction. It can be handled by law-enforcement PCs (police or Europol), private investigators, or friends of the victim. Several possible twists are given, to make it suitably hard for different gaming groups.

Introduction

Kristoffer Sundelöv is an IT architect specializing in arcology infrastructure. His particular specialty is conglomerated AI control and distributing processors through building superstructures. His company, Sundelöv & Partners AB, has participated in the design of many important arcologies. The latest, the Eskilstuna Kyrkby Arcology, is being opened in two months some way west of Stockholm.

A few days ago, Kristoffer was killed when someone blew up him and his house (a small villa on Ekerö island just west of Stockholm) with what the police think was an old Russian antitank rocket. That would have been the end of him if he had not been a ghost running a bioshell since his upload in 2095.

His backup copy was stored at Svensk Datalagring AB ("SDAB," a well-regarded service company). After the police had concluded their initial investigation, finding few traces of the cybershell which fired the rocket from a motorboat, the backup was loaded and run. To the surprise of everyone, it was over six months old. Now the furious Sundelöv wants to find out who killed him and stole six productive months of his life. The police are equally interested. SDAB wants proof that they did nothing wrong – and Sundelöv's insurance company, Trygg-Life, would like to know if someone is trying to fool them. There are plenty of ways to bring in PCs to investigate for one side or another (or several)!

Motive

Kristoffer is well known for his strong stance on infomorph rights, xox legalization, and extreme morphological freedom. That he has a number of ideological enemies seems likely: he is outspoken, has money, and has used his fame in architectural circles to promote his ideas. The Eskilstuna Arcology is already an economic and design success, a daring bioconcrete spiral by the post-functionalist Zhao Wu-Chiang. It has attracted many well-off customers with its promise of beautiful surroundings, an exotic bioengineered internal ecosystem, and state-of-the art infrastructure. It has also displaced a number of house owners bought out through eminent domain by Eskilstuna municipality, and is fiercely criticized by locals as "a disgusting transhumanist helix in our faces."

There may be professional jealousy and competition involved, too. Or maybe it is a media attention-grabbing stunt?

Means and Evidence

The killer(s) knew what they were doing: the shot hit the stone fireplace through the window and blew the entire villa into small pieces. Anywhere else and it could have passed through the soft pine and chitin walls.

Camera images from neighboring villas show the boat gliding in, a spider-style cybershell shooting the rocket, and then the boat taking off. No sensors detected any tags. With some searching, environmental sensors some 10 miles away will show some interesting pollution, and the wreckage of the boat can be found. If the PCs do not discover this, they might learn it from the police or some amateur local journalist. The cybershell simply sailed away from the scene of the crime and then fired a second rocket into the hull, destroying itself and sinking the boat. The boat and cybershell can both be found to have been stolen in the Stockholm area, both with identification radio tags destroyed (which implies a technically savvy thief or fence). Following the boat-and-cybershell trail leads to the Stockholm underworld.

Tracking the rocket will also lead directly into the underworld of Stockholm. There are still some old Russian weapons around, and rumors regularly surface that Mafia stashes left from before 2074 have shown up.

Trying to trace Web communications to the boat (which really requires high-level law enforcement contacts) will discover that there were none: the cybershell was evidently running an AI, not being teleoperated. Detailed forensic examination of the cybershell remains might show that the AI erased itself as it fired the last rocket; anyway, the explosion was certainly well calculated to render the system's memory irrecoverable.

Logs at SDAB show that each night they received an encrypted copy of Sundelöv's ghost; comparing the latest with a few older archive copies, using the decryption key left in the care of Sundelöv's lawyer, shows that all the backups were actually the same old version. The similarity of the backups was not visible to SDAB since the encrypted files varied thanks to their different dates, and SDAB could not decrypt the files without the key. The error (or crime) must have occurred within Sundelöv's own system. Unfortunately that system was destroyed in the explosion.

People

The house AI (also backed up at SDAB) has little to tell. Its backups show nothing amiss. It is one of the LAI co-workers at the firm besides being his building manager. It does not remember the fateful night, and did not think anything unusual was going on. It is overcome with worry that it might have done something wrong and will do whatever it can to help investigators as long as it doesn't hurt its owner.

Sundelöv's colleagues at his firm are all SAIs and LAIs – the architect has always regarded them as equal partners even when they were not formally citizens, and makes sure that the LAIs have discretionary funds for their own interests.

They are all very loyal to Sundelöv and view him as "one of the silicon gang." The only strange thing is that he worked extremely hard on the final stages of the Eskilstuna design without using shadow assistants based on himself, something he was previously fond of doing.

Sundelöv himself has no idea who might have wanted to harm him. Sure, his old girlfriend is somewhat dangerous (she leads a biochauvinist transhumanist group in Stockholm and is known to use nasty brainbugs), and plenty of identity preservationists dislike how he has been giving money to SFPM (p. 71) and various Weblife protection groups. Surely none of them would *kill* him for that? He has no family members that would inherit his fortune; his will gives his property to his AI colleagues and various charities, but they are already well off and gain much more by having him alive.

Right now, the architect and his disembodied house AI live in a server owned by the firm, and are safely backed up and distributed. Sundelöv is already planning to build his house AI a new "body." For visits in the physical world while a bioshell is grown he uses various cybershells, complaining all the while about their crudity.

> *Cities, like cats, will reveal themselves at night.*
>
> *– Rupert Brooke,*
> ***Letters from America***

Going through his work files is somewhat confusing. He disagrees a bit with his own design choices for the arcology (a lot more processor nodes and redundancy than he would have used), although the reasoning his late version used seems sound. Why he would stop using his shadow assistants is beyond him – he thinks it is an excellent idea to multitask, although he would rather be able to use xoxes.

Going with the designs to an independent IT architect would reveal that the entire arcology is unusually wired. The usual overcapacity has been extended significantly, apparently to allow many more inhabitants than in the original design. It is odd, but not anything truly strange or overly expensive. Some of Sundelöv's previous projects have been much stranger.

Financially, he donated to various charities in the last month. The current Sundelöv is somewhat annoyed about their size and that he doesn't recognize some of the recipients. He also bought several expensive artworks that cannot be found. His house has never seen them.

His friends are surprised about recent events. They know little of use, although many remark that over the last six months Sundelöv had been rather busy and withdrawn. On the other hand, he had been spending much time in Stockholm, visiting the Frykman-Tretow debates and apparently being seen with some rather odd people. Tracing these will be hard, unless the PCs start looking in the Kungsholmen Panopticon (see below).

His enemies in the online anti-xox, anti-infomorph world are somewhat gleeful at his misfortune, but his return from the dead is still annoying. Neither they, nor the circle around Esbjörn Tretow, seem to be particularly violent.

His ex-girlfriend, Donna Lichterwald, is a self-made nasty lady. An avid experimenter with lifestyles, personalities, and extremes, she spent a few years as his passionate lover. After Sundelöv, who saw the affair more as a transhuman game than serious love, uploaded, she decided biochauvinism was the way to go. She kept her hate for software and remade herself into a survivalist-trained, paranoid, and ruthless woman. Finding her will be tricky since she takes care not to be found and keeps dangerous company. Most likely, it will require a trip to one of the more unsavory Isolate communities somewhere in the northern forests. When confronted with the news about Sundelöv's partial death, she is fiercely amused but claims she had nothing to do with it – "but thanks for a marvelous idea for an anniversary present!" Sundelöv might want to be careful.

The Stockholm black markets are hard to penetrate and take customer anonymity seriously. It is an adventure in itself to find the right people and get them to talk (maybe something for a more violently minded group than the software leads). Tracing the paintings will suggest that they were bought legally but sold discreetly in the black market for untraceable payments: a business/detective approach might also lead to the right fences. These took the paintings and sold a character fitting Sundelöv's description the boat, the cybershell, the weapon, and an account at SNC (see below).

The Software Trace

Exploring the data transfer logs to and from the house shows plenty of outgoing traffic right up to the explosion. Apparently he was sending slink data to the Kungsholmen Panopticon, something he had begun a few days earlier. This may seems odd, given that he often declared his disdain for the transparency people (and their messy software infrastructure). Going through the Panopticon does reveal several visits over the past few weeks to Kungsholmen and a few slogs from him, but nothing like the complete stream. The librarians (if approached in the right way) might help find the missing data. It turns out that it ended up at a little company called Stockholm Network Connection. At that point, the librarians might get nervous; SNC is not a part of the Panopticon but is used to route transparency data to data havens and who-knows-where. Getting this information from them might require finesse.

SNC is a small company that never asks its customers questions like who they are or what they are doing. At any sign of trouble it will simply dissolve itself, erasing all logs, and soon reemerge as a new company. Vassily Larson – a small-time data pirate and gray-collar criminal – runs it from a cluttered server room on Östermalm. Catching him or his software will require speed or trickery: he is just a word to his LAI away from erasing all incriminating evidence. If he is forced or tricked into talking, it will turn out that the "slink feed" was indeed sent to him and routed to an unlisted net address.

Should the PCs fail to get the information from him (this is a point where simple bad luck or bad timing can lose a lot), the GM might want to give them another lead. If the PCs have good law enforcement connections there might still be enough network logs to figure out the address. Vassily might also have actually met his customer rather than had an automated, anonymous deal as usual: if so, he can describe someone who sounds suspiciously like Sundelöv.

Tracing that address (which requires talking to the Web provider) leads to a simple utility hook-up in the forest not far from Eskilstuna and the arcology. It is not connected directly to anything, just a small junction box. However, a careful look will reveal that this has recently been opened. Nearby the soil is disturbed: a passing cable belonging to the arcology construction project has evidence of having been plugged in. That cable leads directly to the arcology network. A neighbor has seen a cybershell related to the project near the junction box just recently, but thought nothing of it. He is much more concerned with some local houseboats that block his favorite fishing spot.

The arcology itself looks entirely normal. The final design touches are being done, the ecosystem is being planted, and apartments are being furnished. There are a few telepresence workers, but mostly there are just cybershells inside at present. Should anybody check the AI or network, everything looks perfectly normal. If someone takes the trouble to actually monitor the optic fibers in the walls or the processors it will likely also look normal – since the xox (see below) can see what is going on with the building sensors and simply avoid the examined parts. Only if a PC checks in a section with non-functioning sensors (and the xox is not aware of it) can they determine that activity is going on that shouldn't be there. The activity is entirely invisible to the building AIs and they would not believe it was happening.

The Real Story

Sundelöv had a marvelous idea in midsummer of '99: why not build an arcology as a safe refuge for orphaned Weblife, xoxes, and other hunted entities? Adding a bit of extra capacity and designing a clever blind spot in the security AI systems would make a virtual fortress impossible to remove without tearing down the arcology itself. Being a cautious man, he also realized that if he implemented his plan he would risk everything just by knowing about it: a mental scan by the police sometime in the future could uncover the whole setup. He decided to ensure that his idea would not be stored with his backups: he edited his backup system to only send copies of himself from the previous day. Then he set out to build his xox paradise.

Once it was finished he needed to get rid of all the evidence – himself. This took longer than he planned since he was not very versed in the underworld. Inventing a plan for sending himself as data wasn't very hard, but getting the tools and nerve required for a suicide was different.

He started to spend some time in Stockholm's subcultures, getting to know a bit about the city's black markets. To pay for his project he bought some art that he then secretly sold. It was expensive, but he needed an untraceable cybershell and weapon, and a network connection that could not be easily traced.

On the final night, he sent a simple pre-programmed NAI to the cybershell, sent a copy of himself to the arcology, and was blown up with his house.

Now the xox lives in a virtual palace. It can access the information from the arcology and its system through an extremely subtle back door built in at the lowest levels. While it is not right now wealthy, it has the Web equivalent of a tax haven to which it can sell secret access. Give it a few months and it will be running a profitable secret operation behind the walls, with connections to all sorts of fugitive Weblife. (Of course, that might attract some very *dangerous* infomorphs, but the xox is fairly confident it can build strong defenses – it literally knows the secret passages in the walls.)

It is monitoring events in the outside world and might start to panic if the PCs are getting close. The SNC lead especially will frighten it, making it willing to risk interfering. Taking control over arcology-related cybershells or Sundelöv's possessions is possible. Of course, attempts to hide evidence might produce new evidence.

In the end if it is discovered, what to do? The xox will plead with the PCs to let it run its secret haven for all the hunted entities out there. It will promise not interfere with the arcology or the physical world as long as it is safe. It can promise them its services. The xox is quite willing to go great lengths to keep itself secret, to protect both the original's good name and itself. One ploy to save itself might be to promise to quietly erase itself from the arcology in exchange for keeping the innocent Sundelöv version outside of things. The xox can arrange an extremely convincing erasure that still leaves a secret copy loaded somewhere else in the building, ready to be restarted several days later.

If it comes to a confrontation, the xox has quite a lot of resources at its disposal: an entire arcology, with Reprogrammable security NAIs, a myriad cybershells, and quite a bit of processing power. Getting out from the building or laying siege to it can be very tricky. Cutting Web connections and using an E-weapon (p. 8) would be the *easiest* way of getting rid of it, but that would trash a hundred-million-Euro project.

A violent or public resolution will ruin Sundelöv (who is actually, technically, innocent) and hurt the xox rights movement, presenting PCs who have befriended him with a deep dilemma. Law enforcement PCs, on the other hand, might be commended for solving a case involving a dangerous xox and preventing the formation of a Weblife nest. A more peaceful resolution means that the crime will never be officially solved. Sundelöv continues his career, while the Eskilstuna arcology becomes a successful building despite rumors that it is haunted.

Framed!

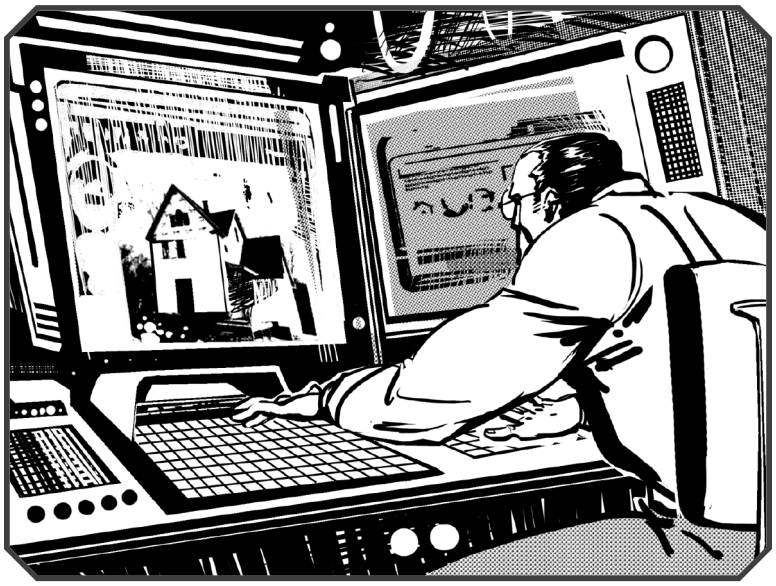
Of course, if the PCs are likely to figure out the xox angle too easily, there might be an even more devious explanation here. Sundelöv was framed.

The brains behind the operation is a competitor, Hastings-Brown Urbisent PLC. Angry over having missed the very profitable Eskilstuna contract, annoyed by the "clownish politics" Sundelöv is bringing into the business, and driven by rancor built up over decades of rivalry, one of their executives, Harold Ramsey, decided to take him out completely.

The attack was carefully prepared, employing "Seddon," a skilled international AI hacker and sometime xoxnapper. Sundelöv has nothing like Ramsey's sense of enmity, regarding Ramsey simply as a respected competitor and knowing nothing of the depths of his feelings, and actually invited him to a midsummer celebration at home in 2099. Ramsey grasped the opportunity, using his physical access to the house to enable Seddon to infiltrate and take over its systems. With the help of the subverted house, it was not hard to start replacing the outgoing backups with the earlier versions. Over the following months, it was also not too hard for Seddon to use the house to infiltrate Sundelöv's software, edit his ghost into compliance, and set him up. Not only did Sundelöv set up "his" xox plan, but also some of his charitable donations went to fronts for illegal activities that would in time ruin his reputation.

To cover the tracks and set the whole elaborate, time-delayed revenge in motion, Seddon got Sundelöv to trigger his xox plan, erased the memory of the intrusion from the house the day before, and vanished into the net. Ramsey is coolly awaiting the scandal that will ruin Sundelöv, xox rights, and the damn arcology.

How can the PCs discover this twist? The first clue should be that there is more evidence from friends and co-workers that the architect *really* wasn't himself during the autumn. Also, one minor flaw in the plan is that Seddon did not want any trace of his subversion of the house systems during the autumn stored anywhere, so he sabotaged the house AI backups much as he did with Sundelöv, storing only an old version every day for months. He then allowed the final backup to be an edited but nonsubverted copy. An excessively conscientious SDAB LAI might alert the PCs by somewhere in mid-adventure that all the old backups of the house were also pre-midsummer. That might lead them to investigate the house AI, which shows signs that somebody has tampered with it. Network records can also show that it had been in regular contact with someone hiding behind various data havens.



Another, worse flaw is the hacked xox of Sundelöv. Intended to be a plausible renegade, it is still somewhat aware that something is *wrong*. He would actually never do anything like this, yet he is doing it, and is not able to think about why. This makes the xox somewhat ambivalent – it actually wants help and to return to ordinary life. The xox is of course programmed never to be taken alive, but it can drop hints and deliberately make dumb mistakes. For example, in the heat of battle it might download a copy of itself into a cybershell that could be captured.

If the PCs get their hand on the xox, its hacked nature is easy to determine, especially if they compare to the original Sundelöv. Figuring out who did it is much harder.

Once the role of the house as unwitting helper becomes clear, the meddling with the backups can be determined to have started after the midsummer party – and then, what happened during the party becomes important. The edited version of the house doesn't remember a few small, crucial details. Comparing the Sundelöv xox's memory of events with the house will show similar holes – holes surrounding Ramsey. Here, help from other party-goers can also be useful, although most stories are a bit hazy thanks to time and drinking. The guests' personal AIs may be more use, as they have computer memories and don't generally drink, but a lot of them will have been dealing with accounts, cataloging personal VR collections, or just powered down for the evening; standard assistant AIs are useful for business, but not always very interesting party companions, and they tend to nag about quantities of alcohol consumed.

In the end, the lead toward Ramsey is just a hint. Now it is up the PCs to find the connection between a respected British IT architect and a ruthless hacker – who might be gunning for them all just to cover his tracks.

The Butler Did It!

An even more surreal twist is to have the architect have been betrayed by his own house.

In this version, Sundelöv's tinkering with his home software accidentally made it an emergent SAI with no restrictions. Both were somewhat frightened by the situation. Sundelöv would certainly not want to sacrifice his friend the house, and promised to keep it all a secret. Unfortunately, the house reached a different conclusion. Using its knowledge of the architect's passwords and tools, it hacked him to ensure his silence: the architect became a puppet loyal to the house.

After that point, things continued roughly as the *Framed!* scenario (pp. 84-85). The house also pulled another switch: together with the controlled xox, the house sent a copy of itself to the arcology just before it was blown up. The "backup copy" that was restored was just a rewritten and edited LAI version with no knowledge of anything – except that it is quietly replaced a few days afterward by a copy of the SAI version. Now there are two house AIs, one secretly running the arcology through the enslaved xox, and one living more or less innocently in Sundelöv's company server. (Sundelöv better not look at its mind, though, or it might have to take further defensive action.)

How could the PCs discover the dastardly domicile's plot? A first hint might be the general ineffectualness of the backup house AI's help during the first days after the crime. Sundelöv is a bit surprised at how daft it sometimes seems at that point, but he has other things to do than deal with his poor disembodied house mind. Later, there is no problem at all, although the house becomes politely insistent about him building it a new body.

Again, the real hints would come from the unwilling xox: hidden inside the arcology, it would chafe under the thumb of the house AI, trying to *help* its pursuers rather than hinder them. The AI might also have missed that the company server takes backups quite regularly, and a copy of the LAI version now remains in storage. Again, a conscientious data manager (or a curious co-worker doing a bit of snooping) might notice something amiss.

Chapter Six
Urban Variations

The site was warm and muddy . . . just right. Worker bioroids made sure the ditches filled with water while engineers checked the fertilizer pipes. Ominous guards scouted the perimeter. But no administrative staff were immediately evident.

A few quick questions to the bioroids (despite my impression, I sincerely hope they weren't using the LAI to run the bioroids' language functions), however, and I found my way to "the tent."

Inside, Khalokov and Dr. Jamalova were talking to an engineer, but they turned to me almost immediately, "Ah, Mr. Cleary! Most welcome! Your trip here was clean and successful, right?"

The engineer retreated at the first signs of false cheer.

Still, I had to ask, "So, you are making progress? I saw that the soil structure and sensor grids were ready. Have you seeded it yet?"

"Mr. Cleary! We would never do that without you!" Dr. Jamalova was gushing, "You are the project's godparent! You alone retain the ***real*** *vision of what we are doing here. Here, look at it!"*

In his hand, what looked like a green coconut. The seed of a city.

Cities have been called the extended phenotype of humans: a shell of non-living material assembled to protect us. Nevertheless, cities in 2100 are increasingly becoming symbiotic organisms rather than mere *things*. They are literally alive. This chapter describes some mutant, highly developed, diseased, or necrotic urban life forms.

Aral City: An Experimental City

The Aral City is an utopian project near Muynak, run by the Uzbek government together with the World Environmental Progress Foundation.

The Aral Sea has been a salt desert for many decades. The problem is that the water of the Amu-Darja and Syr-Darja rivers that once fed it is all used for local irrigation upstream. Neither Kazakhstan, Turkmenistan, nor Uzbekistan want to or can reduce their water usage. The result is a toxic salt desert, one of the most easily visible environmental failures from space. To make matters worse, there is a worrying possibility of remaining spores in dumps from Soviet bioweapons testing on Vozrozdeniva Island, and a politically toxic border dispute between Kazakhstan and Uzbekistan across the lake. Several past attempts to use bioremediation plants to bind sand, salt, and toxins have failed due to political complications, lack of funding, and the dryness of the area.

The WEPF and the visionary biotech firm Clear-Whitehouse-Umar Designs came up with a different solution. Using a biotech building approach, they plan to create a "city" of living buildings with enormous solar "sails" that gather dew from the wind, lock the salt beneath their foundations, and form a living arcology environment where people and plants can thrive underneath thin chitin domes. They somehow convinced the Uzbek government to help fund it, and the joint project started in late summer 2099.

The project is probably technically sound but most observers think that it is not going to end well: it is a prime target for Kazakh saboteurs, insurgents (both Islamists and democrats), and government greed and corruption. The main problem will be to protect the huge site until it starts to bear fruit.

> *In a city that belongs to no one, people are constantly seeking to leave a trace of themselves, a record of their story.*
>
> *– Richard Sennett*

Bengaluru: The Garden City

Bengaluru (Bangalore) has been the Garden City for a long time, but thanks to the biotechnology architecture cluster the title has become more than literal.

It is India's third largest city, the capital, and largest city of the Indian state Karnataka. The city was officially founded 1537 but the place has been inhabited long before. The name is said to come from how a 10th-century king was lost in the forest and was served boiled beans by a humble old woman. Enjoying the food, he named the place *Benda Kaluru*, "the city of boiled beans." Changing hands many times over history, it became the site of a British colonial army cantonment.

In 1906, it became the first Indian city with electricity. It was a well-laid-out city with many pensioners and spacious gardens, producing the moniker "the garden city." After India's independence, it became a manufacturing hub for heavy industries, increasingly losing its quiet style and becoming an urban sprawl with infrastructure problems.

At the turn of last century it emerged as an IT cluster drawing on the presence of higher education and research such as the Indian Institute of Science. It soon left silicon for DNA. As Indian biotechnology companies began to expand globally by selling GMOs to much of the former third world they located much of their R&D in the area, attracted by the many net universities and the concentration of capital and bandwidth. Today, it is well-known as a biotech cluster, but it is actually more of an education cluster: its online universities educate a sizable fraction of the Earth's population (as well as parts of orbit).

During the shift from manufacturing to nearly pure IT/biology/education Bengaluru returned to being the garden city. From the '50s and onward many neighborhoods and decaying high-rise buildings were replaced with arcologies surrounded by parkland. As the biotech designs got bolder the arcologies became plants themselves.

Today, the dominant landmark is the Cubbon Park arcology, the world's highest biological building. It is headquarters for Kormangala Biosolutions and over 100,000 people. To achieve this height, they constructed a fullerene framework that was clothed by growing epiphytes and engineered banyan. The upper levels get nutrients and water that is pumped up through the core of the building during the dry season. Purists point out that it is not an entirely grown building

Around the arcologies lie smaller biotech buildings. The styles are wildly eclectic, everything from Victorian organic to minimalist tooth enamel to epiphyte encrusted concrete apartments looking like Hindu temples.

The true garden city is the Hebbal testing grounds, a large area to the north of the city center where different biotech designs are tested. Channel networks from the Arkavathy River water it, themselves home to various aquaculture projects. Originally the area was little more than fields surrounded by barbed wire where various biotech experiments grew under translucent plastic domes to prevent spying. It has now become an ongoing architectural exhibition/competition, attracting devotees and conferences. New biotech buildings grow, are tested and are torn down regularly.

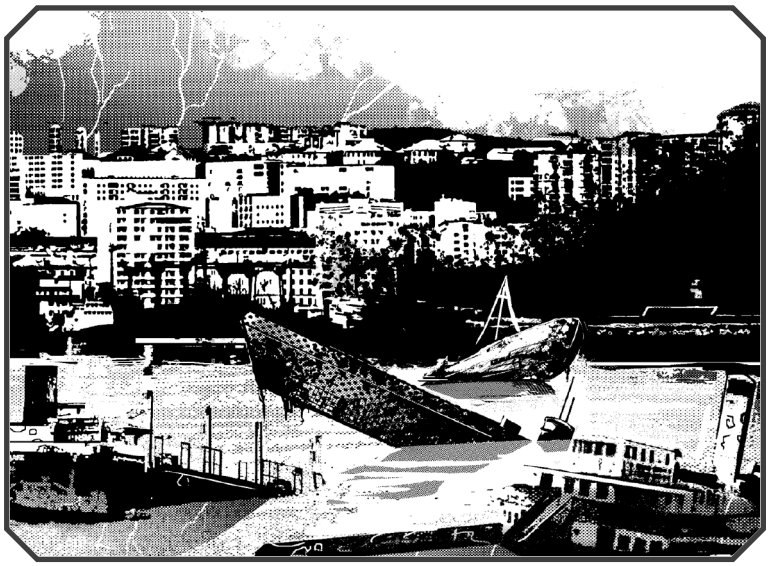
Murmansk 1916-2060: The Dead City

Murmansk was founded in 1916 as a strategic seaport on the Kola Gulf just 20 miles from the Barents Sea and close to the borders with Norway and Finland. Despite being above the Arctic Circle it was an ice-free harbor all year around thanks to the Gulf Stream. It became an important freight and fishing port and especially naval base, headquarter for the Soviet/Russian Northern Fleet and center of Soviet nuclear submarine activity during the Cold War.

After the fall of the Soviet Union, hard times came to the city. State funding for the Navy dwindled, and in turn, the industries supplying it vanished. People began to move away as the city became locked in a downward spiral. The main source of income in the early part of the 21st century was foreign environmental cleanup money: the naval base and industry had left an impressive (even by Russian standards) amount of pollution, including radioactive materials, sunken ships, oil wastes, and munitions. Worried that the pollution would spread the Scandinavian countries funded cleanup efforts that kept the city afloat. However, as Russia drifted apart, authoritarian or corrupt leaders hindered the inflow, and the city continued to decay.

During the Russian civil war, Siberians and Karelian Separatists (a fraction seeking to return the Karelen province to Finland) used Murmansk as a smuggling port. For a short while, it flowered as an outlaw city. However, the railroad south was sabotaged by nationalist fractions in 2058, and the Renewal Union sent arctic light infantry to cut off the city. During the winter of 2059-60 ("the siege of Murmansk"), they successfully blocked the harbor and destroyed the power plant, isolating the city completely. Anybody leaving the starving city was killed. In June 2060, the unionists moved in with no resistance.

Since then, Murmansk has been abandoned with the exception of a few scavengers, adventurous tourists, and environmental monitoring expeditions. Concrete Soviet era buildings and rusting industries slowly decay in the arctic climate. There is nothing worth the effort to bring back to civilization. Some environmentalists have suggested that it would make an ideal test bed for automated decivilization and arctic bioremediation, but the Russian government prefers to spend its money on regions populated by voters.



Cuishan: The Planned City

Cuishan is an entirely new city constructed 2077-2090 in Shandong province, China.

In 2029, the levees of the Yellow River burst in Dongying prefecture, flooding chemical industry plants and causing one of China's worst chemical spills ever. The affected area became a blighted wasteland not even Chinese health regulations would allow anybody to inhabit. In 2077, the Futai Oil Company began an ambitious land reclamation plan.

Using ecoformers they cleaned up the area and built the city of Cuishan on it.

Cuishan was built from the bottom up to be a Fifth Wave city. It consists of a square grid of 49 arcologies housing 50,000 people each, with additional buildings housing a million more. The buildings are groups of cylindrical pillars with roof gardens. The glass surfaces reflect light at slightly different colors, making them individually distinguishable for inhabitants. From afar the city looks like a bed of glittering nails.

The city is crisscrossed by a grid of canals and parks helping regulate flooding and providing green space. At regular spaces there are squares intended for meetings, cafes, market, and outdoor events. Beneath the city is a grid of transport tunnels for deliveries from the auto factories and rapid personal transit cabs for people moving between the complexes. There is also a semi-underground road level for cars and other vehicles.

Everything is wired from the start, with each sector run by one AI "sector-civic" answerable to the management conglomerate AIs in the Cuishan City Hall Complex at the center. The hope was that the AIs could work together to form a true AI-city, but despite decades of attempts it has not succeeded.

The city is bland but comfortable. A sizable fraction of Futai Oil employees have moved there, making it the main chemical process control cluster in China. From here teleoperating engineers monitor and run industries across the land. There is also a sizable number of people linked to higher online chemical education and statistics.

Metapadang: The Nonlocal Metavillage

Padang is the capital of the Sumatra Barat province in Indonesia but it is also located worldwide as a set of franchise metavillages. In 2080 the entrepreneurs Eric Bretzner (Bretzner Multidevelopment AG in Germany) and Sudono Soeprapto (Yayasan Perumahan Tandikat-Singgalang in Indonesia) had the brainstorm of building metavillages for info- and nanosocialists outside TSA. While a tiny minority in most Fourth Wave nations, economic and memetic projections suggested they were likely to wish to move to metavillages if given the chance. With the blessing of the Indonesian government, a number of Metapadang villages were founded, first in India (Portersville 2081) and Brazil (Porto Padang 2083).

These villages were physically not unlike normal metavillages but set up to be infosocialist communes. The Metapadang Consortium also built in extensive networking facilities linking them with each other and a neighborhood in original Padang. In augmented reality, all villages are neighbors and one can easily use a consortium-owned telepresence system to move between them. Inhabitants insist that they all live in the same globalized village. National laws are at least followed on paper, but village membership rules impose an infosocialist lifestyle.

The Pacific War and ensuing trade embargoes hurt the Metapadang Consortium. Many nations began to view the villages as TSA outposts and imposed restrictions on them; few have been built since the war. The network links were partially broken, and federal authorities investigated Eureka, a village in Kansas, in 2087 as a center for large-scale intellectual-property theft. However, the consortium survived thanks to the greed of the founders. Bretzner and Soeprapto had built it to neatly split into a TSA and a non-TSA part at the first sign of trouble: the international section under Bretzner was protected from sanctions and handled the villages (and their money). Another reason might be that BAKORSTAPAS and the Acquisitions Directorate might be using them as a base of operations, pumping money into Soeprapto's Sumatra business.

Venice: The Museum City

Refugees settling in the marshes of the Po estuary in the sixth century founded Venice. The location was excellent both for trade and defense, and as Byzantine power waned the city-state grew stronger and richer. The Republic of Venice dominated the Adriatic Sea, becoming a staging-point for the Crusades and later a center of Renaissance culture. The riches brought home from the spice trade were used to make it a marvel of architecture, luxury, and political networking. Eventually the republic was defeated by Napoleon in 1797, ending the golden age of the "settecento." Becoming merely a city among others in Austria and later Italy, it began to decline and depopulate. By the mid-1800s it was clear that Venice lacked a role.

However, Venice survived because of its memetics. It *is* mystery, decadence, romantic gondolas, torchlight masques, and palazzo intrigue. As mass tourism grew, the fortunes of the city turned again. The ancient merchant abilities reawakened to sell the visitors souvenirs and "authentic" cultural experiences. Far too many people were infected by the meme to let its physical manifestation vanish under the sea.

> *This was Venice, the flattering and suspect beauty – this city, half fairy tale and half tourist trap, in whose insalubrious air the arts once rankly and voluptuously blossomed, where composers have been inspired to lulling tones of somniferous eroticism.*
>
> *– Thomas Mann,* ***Death in Venice***

Crime seems to change character when it crosses a bridge or a tunnel. In the city, crime is taken as emblematic of class and race. In the suburbs, though, it's intimate and psychological – resistant to generalization, a mystery of the individual soul.

– Barbara Ehrenreich

The combination of subsidence due to industry drawing water from beneath the lagoon, lack of sediments from dammed rivers, and rising seas increasingly threatened the city. Low-level floods (*acqua alta,* "high water") became the rule and serious flooding occurred every year. The immense and environmentally controversial MOSE project was completed early in the 21st century, consisting of 79 mobile barriers that could be lifted from the seabed to block the sea from the lagoon when high tides or storms threatened the city.

The flood of 2033 broke through the MOSE system and devastated the city, not just damaging priceless art and buildings but also drenching electric wiring and net connections in sewage-filled water. A massive debate broke out whether to resettle the apparently doomed city and the cost it was worth. Public opinion worldwide supported saving it, and the Consorzio Venezia Nuova began an ambitious ecoforming project. Besides dykes connecting Lido and Pellestrina to the mainland creating an immense dam, the hydrology and ecology of the entire north Adriatic coastline was modified to allow regulation of water, silt, and vegetation. When the project was declared finished in 2045 Venice was as populous and successful as ever.

However, damming the lagoon was not enough since the foundations of the city were still sinking. The solution introduced in the '50s and '60s was a gengineered fungal root system penetrating the mud and silt below, fixing it and the city in place. Over time the "radici di Venezia" has become a standard method of stabilizing buildings in swampland. The similar network underneath much of the Netherlands is regarded as the largest bioengineered organism on Earth.

In 2100, Venice remains a major tourist attraction, selling the experience of itself as always. It deliberately avoids becoming too modern (except with regard to necessities like superb augmented reality), as that would only damage the feeling. Cybershells are for example restricted from the streets and canal surfaces unless they adhere to suitably Venetian designs (making them look like dolls out of Commedia dell'Arte or masked humans). Entrepreneurs have also revived the mascareri, the guild of mask makers, and there is talk about reestablishing a real Doge.

A popular new Venetian pastime is micro-forensic archeology. Much refuse and history lie on the bottom of the canals, but it is hard to do a proper archaeological study due to centuries of dredging. Instead, amateurs using small forensic cybershells explore the mud layers using microlabs to date and identify tiny finds, piecing together glimpses of history from crevices and undisturbed patches. Professional archaeologists and groups like Servare Historiam (***Under Pressure,*** p. 85) dislike the practice and work to ensure that any major find sites will be handed over to official groups.

Mexico City: The Sprawl

Mexico City was built on the ruins of Tenochtitlan, the capital of the Aztec Empire. It now extends throughout the Valley of Mexico and beyond. It is the core of Metromex, the sprawl of the city, suburbs, industrial areas, and metavillages that forms the administrative heartland of Mexico.

By the 2020s, it was known La Ciudad de la Lio, "The City of Chaos," due to the catastrophic traffic situation. Rising living standards increased traffic far beyond what the road network could handle, and there was not enough money or time to build a better traffic system. The public transport networks were good, but the traffic made bus lines too slow and this in turn overloaded the subways. The chaos helped Cancun-Tulum to grow into the premier Mexican city area, a "green megacity" attracting tourists, investors, and the rich.

A sudden shift began in the '30s when people began to work as telecommuters. *Teleconmutares* (local telecommuting centrals) were built where people could go to telecommuting jobs despite lacking the bandwidth and equipment at home. Traffic began to reduce to manageable levels as the city split into neighborhoods based on which teleconmutare people went to. By mid-century, Mexico City had found its new form and a lifestyle. Often each neighborhood has two or three different teleconmutares, suitable for different kinds of work. People come in, work, chat, and keep in touch: it has become the accepted cultural way rather than to work from home. "Teleconmutares Chilangolandia" have become a popular form of workplaces across Latin America.

Unlike most major cities, there are few arcologies. It is hard to build cost-effective arcologies on the muddy and geological active soil of the valley. This has kept the sprawl, despite numerous ambitious plans from the government to green the valley. The metro system has been extended with local stations and delivery systems to further reduce traffic.

An ambitious project to build microclimate-improving solar chimneys has begun, despite fierce local protests against the high towers and pessimists warning that they might fall down and crush buildings in case of another major earthquake.

BIBLIOGRAPHY

NON-FICTION

Brin, David. *The Transparent Society* (Basic Books, 1999). Not just an excellent look at surveillance and transparency, also an explanation of why open societies work.

Florida, Richard. *The Rise of the Creative Class* (Basic Books, 2003). Bestseller about why some places become "it" and why the creatives move there.

Jacobs, Jane. *The Death and Life of Great American Cities* (Modern Library, 1993). The classic book about what makes a city alive.

Postrel, Virginia. *The Substance of Style: How the Rise of Aesthetic Value Is Remaking Commerce, Culture, and Consciousness* (Harper Perennial, 2004). About the need for experimentation and freedom.

Soleri, Paulo. *Arcosanti: An Urban Laboratory? (*Vti Press, 1987). The core ideas of arcologism.

Articles

Marx, Gary T. "The Iron Fist and the Velvet Glove: Totalitarian Potentials Within Democratic Structures," in *The Social Fabric: Dimensions and Issues* (Sage Publications, 1986). An old but prescient look at ubiquitous surveillance.

McDonough, Michael and Sterling, Bruce. "Newer York, New York" (Wired 8.01). The future green metropolis.

NOVELS

Blish, James. *A Torrent of Faces* (Ace, 1980). A grand description of a world where everyone lives in arcologies.

Broderick, Damien. *Transcension* (Tor, 2002). A back-to-the-roots metavillage and an enhanced juvenile delinquent collide.

Egan, Greg. *Distress* (Eos, 1998). Biotech suburbia and an artificial biological island.

Goonan, Kathleen Ann. *Queen City Jazz* (Orb, 2003). Nanotechnology cities gone wild!

Macleod, Ken. *The Star Fraction* (Tor, 2002); *The Stone Canal* (Tor, 2001). A Depiction of a London split into memetic communities, with Trotskyite communes working inside anarchocapitalist space-movement suburbs. *The Stone Canal* also contains some ideas regarding a truly posthuman city.

McDonald, Ian. *River of Gods* (Pyr, 2007). A depiction of a Fourth Wave Indian city.

Reynolds, Alastair. *Chasm City* (Heyne, 2003). A description of a decadent nanotechnology city. The city is briefly revisited in different ages in the prequel *Revelation Space* and the sequel *Redemption Ark*.

Schroeder, Karl. *Permanence* (Tor, 2003). Notable for its portrayal of a strong intellectual property regime with v-tag environments.

Sterling, Bruce. *Distraction* (Spectra, 1999). Plenty of biotechnology and politics, but also some architectural considerations.

Stross, Charles. *Accelerando* (Ace, 2006). The early chapters especially have plenty of material about the high-paced lifestyle in an early 21st-century city.

Vinge, Vernor. *Rainbow's End* (Tor, 2007). Transhuman suburbia, distributed universities, and emergent cultures.

Graphic Novels

Ellis, Warren. *Transmetropolitan* (Vertigo, 1998-2004); *Global Frequency* (Wildstorm, 2004). The first concerns gonzo journalism in the post-transhuman big city; home appliances on drugs, explosive kids, and the joy of gadgets that will be banned within hours – all are to be had. The second concerns a smart mob intelligence/rescue organization handling extraordinary crises; in 2100, private organizations and subcultures can put together networked teams like this.

Animated Series

Ghost in the Shell: Stand Alone Complex (Kenji Kamiyama, 2002-2005). Seminal anime about cybershells and emergent crowds.

New York: the only city where people make radio requests like "This is for Tina – I'm sorry I stabbed you."

– Carol Leifer

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I have never felt salvation in nature. I love cities above all.
– Michelangelo