
for EABA™ v2
grep™
if you can think it, you can make it...
BTRC
greg porter

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grep™

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Introduction

We developed a three-terminal device, termed the transcriptor, that uses bacteriophage serine integrases to control the flow of RNA polymerase along DNA. We realize permanent AND, NAND, OR, XOR, NOR, and XNOR gates actuated across common control signal ranges and sequential logic supporting autonomous cell-cell communication of DNA encoding distinct logic gate states. The single-layer logic architecture developed here enables engineering of amplifying logic gates to control transcription rates within and across organisms.

from ***Genetic Logic Gates*** *(Science 03-28-2013)*

BEGINNINGS



The alien ship crash landed in Red Square on the last night of March 2018 with the slow majesty of a descending soap bubble. A hundred meters long, it crumpled without a sound in the cold winter night, a full ten meters of its stern collapsing under its weight. No one on Earth saw it coming, except for the few guards who caught a glimpse of its light-absorbing bulk in the seconds before impact. Most of Moscow did not even know of it until the next morning. Of course, all the major nations had their own assets in place and knew *something* was up, even if they did not know *what* it was. Morning broke to the sight of an armed cordon around the alien hulk, with numerous news crews paying exorbitant bribes to film from the windows of nearby buildings (the rooftops were the exclusive province of missile crews and snipers).

The ship emitted no radiation or radio signals, but the hull nonetheless appeared to ripple and shift in subtle ways.

Armed with hazmat suits, air tanks and hand-held sensors, the first 'first contact' team in human history made its way towards what a hatch that was barely above the level of the pavement (the fact that humanity's first contact was handled by Russians did *not* go unnoted by Russia at the time, nor by every-one else later on). The eyes of history upon him, the scientist-cosmonaut-colonel in charge stepped towards the hatch, tripped and fell through the ship. Not into the ship. *Through* the ship. The hatch was no more substantial than a piece of paper. The rippling of the hull, thought to be remnants of a stealth field of some sort, was actually the paper-thin hull shifting in the morning breeze. It was as though the touch catalyzed a reaction. The alien ship began to dissolve into nothingness, starting at the hatch and spreading in every direction. Alarmed, the contact team took no concern for their own safety and ran into the ship. Cameras running, they ran down corridors, ran through ephemeral bulkheads, filming, seeking something, *anything* solid enough to recover. Crumpling structural beams like paper and wadding them into sample jars, only to see them disappear into nothingness. Even the engine room was nearly an illusion, massive alien machinery that had form but negligble substance. The most haunting image though, was the ship's bridge. Stations for dozens of beings, but only one was occupied. The most watched video of all time was the alien, dressed in what any sentient species would call a ceremonial uniform, hands on the arms of the command chair, dignified even in death, dissolving into motes of dust that flashed briefly before vanishing altogether.

In three hundred sixty-seven seconds it was over. The ship was gone as though it had never been there in the first place.

It was April Fool's Day.

It was presented as the greatest April Fool's joke of all time. Countless theories were proposed, television specials devoted to debunking it, magicians recreating small versions of it and so on. But at the highest levels of government, people were worried. No real evidence remained, no samples of anything collected turned out to be anything but normal air. But the sample containers used were found to be porous at a molecular level. The *unused* sample containers were not.

Something *had* been in there. *And now it was loose*.

June 2020: The first reports of something strange going on came out of Africa a little more than two years later. The civil wars in Africa had long been along tribal levels more or less indpendent of the colonial boundaries set by Europeans, and the ways and means of warfare always had an overtone of superstition to them. Charms and curses, potions and talismans were given as much credence by some as bullets and bombs. So, when word that the rebel faction in the Ugandan civil war was winning victories because they had shamans on their side was given the same credibility as these stories usually are. But a French television report is what got people's attention. In what appeared to be some very clever sleight-of-hand, a so-called shaman was shown to reach into barrels of toxic industrial waste and simply pull out weapons. Knives, grenades, bullets, even pistols. It was assumed that the items were simply hidden in the sludge in a way that the journalist could not find them, even though he risked all manner of maladies by plunging his own arm up to the shoulder in the hazardous waste to see if there was anything in there but liquid.

By various back channels, a few of the rounds of ammunition and a sample of the sludge brought home by this journalist made their way to DARPA labs in the United States. Under a battery of sophisticated tests, the bullets were shown to be made of an alloy that no one in their right mind would use. The casings, bullet and propellant were made completely of materials that could be extracted from the sludge. Under an electron microscope, the structure of the alloys looked more organic than crystalline, not machined nor worked by tools. And all the tolerances were off. The cartridge, while perfectly functional, would work in no known firearm except the one the shaman 'created'. And every aspect of the cartridge had now-inert but identical remnants of some sort of artificial structure in it.

Nanotech. It was said in hushed tones, explained in simplistic detail to generals and presidents and prime ministers. There was no smoking gun to connect Red Square and Uganda, but no one doubted the link. And if it had made it from Moscow to Uganda, then it was *everywhere*.

By the time the analysis and briefings were done, the first reports had started to surface elsewhere. From Rome, water had been turned to wine. In Colorado, a prisoner in a Supermax facility shot a guard with a gun made from what looked like melted cement and a piece of his steel sink. In Antwerp, a flood of untraceable diamonds had landed on the market. *And that was just the beginning*. Those familiar with the term 'technological singularity' quit their jobs, packed their bags and headed for the hills.

Post-scarcity had arrived. Some wit named the phenomenon 'Grep' from the Linux utility global/regular/expression/print, and the name stuck. It was 3D printing literally at will. It was not necessarily easy, but with practice anyone could do it. There were limits and hazards, but they had yet to be discovered.

The disaster unfolded in slow motion, from the least developed and most repressive parts of the world, to the most free and developed. During the interval while the Internet still worked and was mostly uncensored, videos, how-to guides and training manuals surfaced, were downloaded and passed around. At first, it was just a party trick. Put the terminals from a battery charger in a pot of vinegar, dump in a handful of shredded aluminum foil, stick your hands in it and concentrate and generate a tiny aluminum ingot. Of course, there were also home recipes for synthesizing THC jellybeans and other interesting compounds. *Lots of people poisoned themselves trying these out.*

Because when people advanced from simple party tricks to advanced ones, things turned ugly. The chemical processes to create 'get you drunk' ethanol are quite close to those for making 'coma, blindness and death' methanol, and quite a few people failed the 'hold my beer and watch me make another one' test. There *were* people out there making diamonds and designer drugs from scratch, but they were the naturally gifted ones, with some affinity for grep that most everyone else lacked. Despite warnings, their online videos gave many people the impression that *anyone* could do what they did. Most people failed utterly when trying something that complex, and some lacked the sense to test their work before applying (or consuming) it.

In other parts of the world grep was more than just a trick to impress your friends or turn a quick profit. Gun control became impossible when anyone with a pile of scrap metal, some organic garbage and an electrical outlet could in a day or two, grow a perfectly workable assault rifle. And those with a little more practice or daring or anger made car bombs, rocket launchers and nerve gas. And even if your nerve gas was inefficient and filled with contaminants, it was still *nerve gas*.

The governments of the world cracked down swifty, sometimes brutally, but ineffectively. Anyone with wits and raw materials could make anything and everything they needed to survive just by wanting it bad enough. *Food, shelter, clothing, weapons*. And for some people, flawless copies of paper currency turned out to be ridiculously easy to make, right down to the holograms, watermarks and embedded security strips. The global stock and commodity markets shut down after the frenzied sell-off began...and never reopened.

Those at the top of the supply chain no longer had leverage over those they supplied, taxes were impossible to collect, people no longer trusted paper money and electronic transfers became problematic when networks started failing. The final tipping point was when someone with a lot of anger and a lot of talent spent a month in the Chernobyl exclusion zone and came out with a working atomic bomb. No one ever figured out who it was or what they were trying to say when they set it off in downtown Kiev, but it catalyzed the extremists on every side of the issue. Governments became ultra-controlling to stop the revolution, and the people rose up to rebel against being controlled.

Both sides won. *And lost*. When the slightly radioactive dust settled and the skies cleared, most of Earth's one billion people were free. Of course, there used to be *seven* billion. But this freedom was the freedom of anarchy. With no government to keep order, law was a matter of local custom, and which local group could enforce it or give themselves immunity to it and get away with it. Governments, such as remained, were in relatively small enclaves, tiny fractions of their former nations, using tech and industry to maintain firm control over the areas they still held, but not having the numbers to regain control over the masses.

It was 2021. That was ten years ago.

Welcome to the New World disOrder.

What it's about



Grep is apparently the third **EABA** supplement built around the idea of some sort of nanotech in its past or present. Maybe even the fourth if the ancient disaster in **Ythrek** was nanotech. **NeoTerra** was a singularity event that had nanotech as part of it and **Age of Ruin** was a world where humanity survived but only *after* nanotech had consumed the technological trappings of civilization. *So then, what is **Grep** about?*

Grep is about freedom. *Terrible, terrible freedom.* A person with one skill (grepping) can be self-sufficient and extremely mobile. If you can make clothing, food, shelter and modern weapons and armor out of raw materials that are just lying around, you can make your way in life *anywhere*. If you do not like the people where you are, you can easily pack up and do what you do somewhere else. And with six billion people's worth of living space on Earth currently unoccupied, you *can* find someplace to your liking, or even better, find people who think the same way you do and believe what you do and make a home for you and 'your people' that no one can take away from you. Politically, it is all things to all people. Which means people like it for the benefits it offers to their beliefs, but simultaneously dislike it for the ways it benefits their ideological opposites. *Grep gives people the power to make the world a better place for everyone, or for the selfish to merely make it better for themselves.*

The old governments of Earth still exist in very limited form over very limited areas. If you have sufficient force and are willing to use it, the group always defeats the individual. But the scope of things like the 'United States' is much bigger in claim than in reality. A lot of the old ways are simply unworkable. No nation on Earth can tell its people "you must accept this piece of paper money as having intrinsic value". *Diamonds are just rearranged coal*. Rubies and sapphires are just aluminum and oxygen with trace contaminants that give them color.

Taxes, money and payments have to take different forms. Many skills are still useful, so there are exchanges of labor and exchanges of goods. If you specialize in being able to nanofab a particular thing, you can do it faster and better, and someone else might be willing to trade you the product of their skill for yours.

Now that grep has been figured out, no one is malnourished, grep-based medicine can regrow limbs or organs, and techs considered the realm of science fiction are difficult, but possible. Quantum communication networks, fusion power and super-strong materials are now part of humanity's toolbox. The scars of the Dark Days *are* still there, but for most of humanity the world is a better place. *They just wish the road there had not been so rocky*.

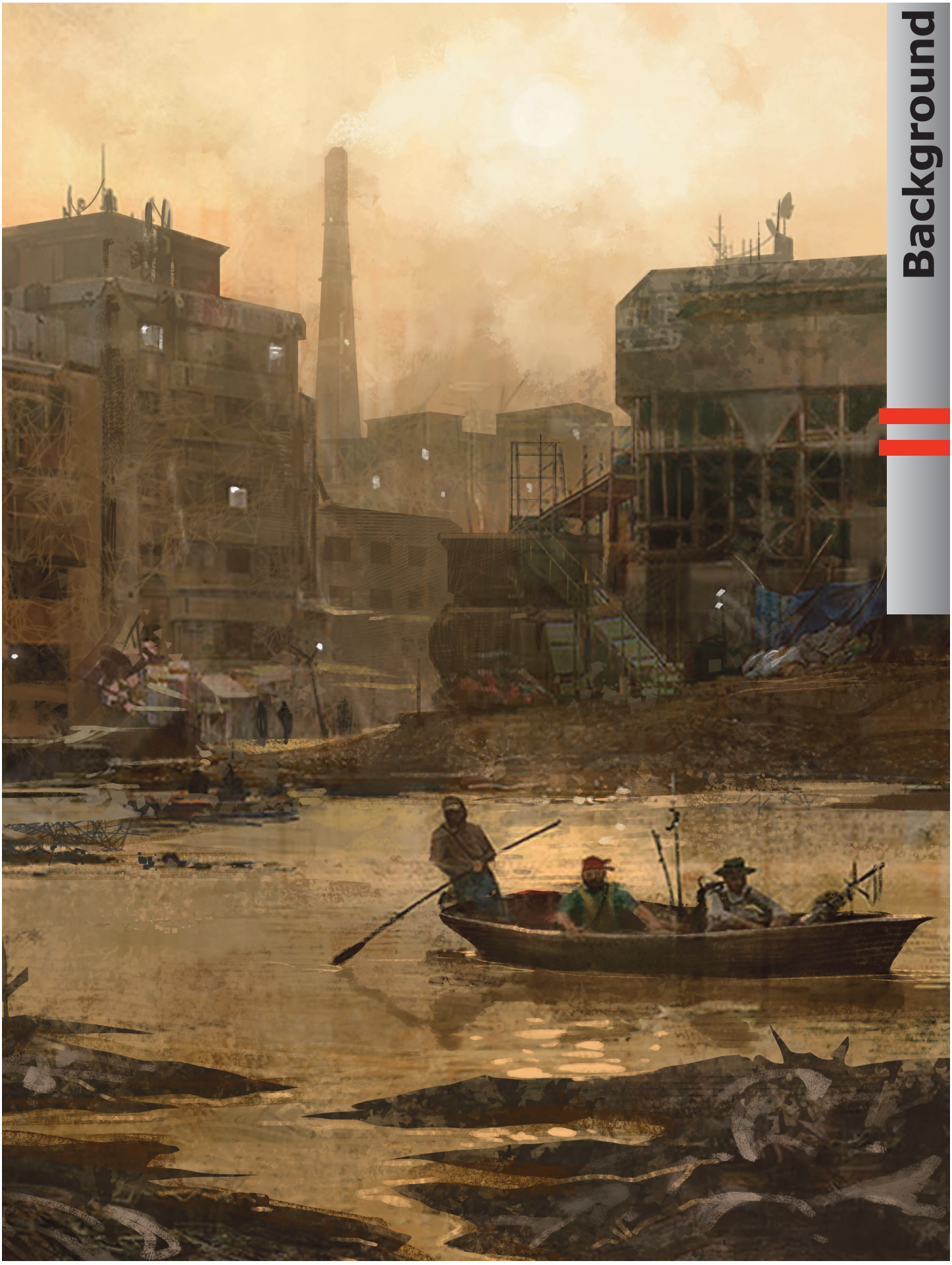
Grep also gives you the freedom to be yourself. Even if that 'self' is something very different. Remember, properly configured nanotech can reconfigure *any* matter into something else. Even *living* matter. Improperly configured nanotech can do it as well, but this is not something most people have the leisure to do more than once.

Grep gives you the freedom to excel or fail, to be some*one* special or some*thing* awful, and the only way someone will be there to catch you if you fall is if you made the one thing you *cannot* make with nanotech...*friends*.

And there is more to **Grep** than that. *Why* did that alien ship land on Earth? Was this its original destination, and if so, why? What happened to it? These were all things that governments were thinking about and to some extent still are, and players should be as well, for it is almost certainly important.

Coming up...

The next chapter gives a little more history of what happened in the years between 2018 and 2031, to give players a feel for the world and give them ideas of the sort of adventurer they want to have. After that will be the rules for making adventurers.



By genetically engineering vinegar bacterium into blue-green algae, Brown's lab has created organic factories capable of making nanocellulose on a potentially industrial scale. Nanocellulose shares some similar properties with cellulose, though it's notably more versatile - lightweight, stiffer than Kevlar, and, under certain conditions, conductive. Brown says bacterial nanocellulose can also be used to create ballistic glass, aerospace materials, or even wound dressings.

theverge.com (03-08-2013)

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VIGNETTE



The truck was old. All trucks were old these days, but this one showed it. There were dents, the plastic grill had been replaced by chickenwire, one door was a different color than the other, and two bullet holes adorned the driver's side of the bed. But the off-color door was a match for the model and year, the chickenwire was perfect, and the bullet holes had been sanded down and primered over. *Marks of distinction, but not a focus for rust.*

The truck cruised down what was still called Route 622. It was not the shortest route between Rova and Beeburg by any means. It barely got enough traffic to crush the under-growth that kept creeping out from the verges, and in two spots small bridges had failed and you had to go into all-wheel drive, crawl down the embankment, ford a stream and crawl up the other side. Only fools did it without a bumper-mounted winch as a backup.

But 622 was the route you had to use if you'd been visiting the Geezer. He never gave his real name, and if you looked through the old records and figured it out, he wouldn't answer to it. To say that he liked his privacy was an understatement. His turnoff was nondescript to the level of looking unused, but the burned out cars and skulls on posts once you got out of sight of the main road were the exclamation points on the faded 'No trespassing' signs.

You didn't visit the Geezer unless invited.

Even so, hardly anyone knew about him and he preferred it that way. Lenha and Will were returning from an overnight there, and that was always a good sign for business. Geezer grew his own and then grep-distilled it into something else. It tasted like smoke and went down like honey-coated lava. After a few of those you were no good for anything but talking for the next eight hours, but you'd be damned if you remembered what you'd been talking about. When Geezer started rambling about the old days and started pouring, you knew he'd invited you to spend the night, and that was as close as 'friend' as anyone ever got to him. Lenha and Will ate it up, even if the details disappeared in the Smoke. They were only kids when it happened, old enough to remember the horror of the Dark Days, but not old enough to remember the world before.

The best part of Smoke was the hangover. *There wasn't one*. You woke up clear as crystal. The previous night was a laser-edged void in your memory, but one so clearly outlined that you could tell what was missing by its shape, even if the finer details remained unseen. Geezer didn't sell Smoke. He didn't give it away either. He poured, you drank, that was it.

Lenha and Will were occasional invites and overnighters, which was unusual considering that they were young enough to be Geezer's grandchildren. *Or perhaps not*. They had never met any of his other invites. At least not any they knew about. The first rule of visiting Geezer: *You don't talk about visiting Geezer.*

Geezer was one of the Naturals. *He had to be*. No one that old could grep that good otherwise. And the Naturals were *always* trying something new, it was just one of their things. Geezer was spry, but didn't get out much, so he had people like Lenha and Will scrounge his raw materials for him. Which brings us back to an old truck on Route 622 and a conversation going on therein.

"Lenha, what the hell are rub-i-dum salts?"

"I think he said 'ru-bid-i-um salts', but it's gotta be one of those freaky rare metals. We'll look it up on Qoogle." Neither of them bothered to check the smartphone sitting on the dash. There was no signal out here, no profit motive to put in towers. Bill looked back at the handwritten list Geezer gave them.

"The five kilos of supermagnets I understand. We can get those anywhere. *He* can get them from *anyone*, so why is on *our* scrounging list?"

"Yeah, but DC has a standing order for them and the spot price is pretty high. If we bought them at DC prices, the premium that Geezer is offering barely covers the cost of fuel and time to deliver them. If we want to turn any profit on that we'll have to scrounge them ourselves. And I bet Geezer knew that to the cento when he made the offer. The other stuff?"

"Yankee Candle Company, Apple Cinnamon, 1 case. *Exactly* one case. Saltville brine, 100 liters, freshly pumped and sealed in an airtight container. Pennzoil 10W30 motor oil, in steel 1 quart cans. Where the hell do you get motor oil in steel 1 quart cans?"

"Antique malls is I think what he said."

Will jerked upright in his seat like he'd been zapped. "Whoa! Lenha, stop the truck, I saw something back there."

"I didn't see anything."

"Just humor me. Back up about a hundred meters or so."

"Eff that Will, I'll just turn around. Hold my beer and watch this!"

"Like hell you're doing a bootleg in this thing! Just Y it around like a non-crazy person would."

"*Killjoy*." She slowed down and swung wide, but still had to stop and back up a little bit to get fully turned around. "So, what's the deelo?"

"Something Geezer said last night. There's a hole in my head that says something about *this* place is interesting. Stop by that dead tree fallen over there on the left. I want to check it out."

"Will, we've driven by here a hundred times. It's the middle of bumruck nowhere."

"Humor me, Lenha." She scowled but stopped the truck at the spot. The diesel went quiet. Lenha rolled down the window and put a hand on the pistol-grip 870 that was tucked between the seats.

"*Fine*. We're here. Now what?"

"Keep an eye out while I take a quick look." Will left his rifle in the door scabbard, to which Lenha scowled, but Will had a pretty good sense for these things. He worked his way around the greenbriar and disappeared from sight for a minute. Lenha could hear him tromping through the undergrowth, probably deliberately loudly for just that purpose.

"Jackpot!"
"Whatcha got, Will?"

"Just a sec, I'll come back out. We'll need some stuff from the truck." He left it at that, just because he knew Lenha hated being left in the dark on a find. He was back at the truck a minute later, pulling thorns out of his jeans and checking himself for ticks.

"That tree and the ones near it have been down as long as we've been using this road, right? We thought they came down during the Dark Days ice storms. Turns out they were cut, cut *deliberately* to block and hide a road entrance. The mailbox had been yanked out of the ground and dumped back in the woods. There's a road back there. *And no one has used it since the Dark Days*."

"Okay, you win. What's there?"

"*Dunno*. The road curves up the hill and out of sight. Road's full of brush and saplings, no way to get the truck up there. Anything we want to haul off, we have to carry ourselves. Anything big, we'll have to chainsaw our way to the end of the road or hire a dozer."

"And split what's there? *No way*."

"My thoughts exactly. So, we park and secure the truck a ways up the road to not give the spot away, walk back here through the woods, see what's up there and see if we can make bank for the week in one afternoon."

An hour of cursing, sweating and briar scratches later, the kilometer of so-called driveway ended at what people used to call a 'McMansion', except most of those were falling apart after a decade of looting and exposure. *This one seemed in pretty good shape*. Patches of the driveway were still showing, though the yard had long since succumbed to berry canes, greenbriar and the occasional sapling. Will sheathed his machete and reached into a jacket pocket for a set of lockpicks. Too many people just used a crowbar or sledge, but a nice door or a nice lock was still worth a few creds. *It also would show if someone with less finesse came by later*. Lenha shrugged, pulled a glass cutter out of her pocket and headed for what looked to be a detached garage or workshop. By practice so old it was unspoken, they met back in the driveway twenty minutes later.

"What you got, Lenha?"

"2020 Mustang. Not a speck of rust."

"Sweet! Last one made before the factories shut down. A collector will pay big for that. Worth the trouble to bring in a professional hauler, for sure."

"*Problem*. Full house in there. Dad, Mom and kids. Looks like they climbed in, lit her up and closed the garage door. Religious nuts or something."

Will shrugged. "What's the problem? Jerky for four. Yank the sticks out of there and see if they've got anything useful on them."

Lenha shook her head. "The 'stang was in the shade. They all gooped out. I didn't even open the doors. It's been ten years and you could *still* smell it. I think the stench from the dried puddles under the car soaked into the drywall."

"*Frack*. Not salvageable?"

"Dead flies on the dash were a quarter the way up the windshield. They soaked into *everything*."

"Total writeoff, then?"

"S'like it. You'd have trouble getting a dealer to take it even for the scrap metal."

"Tires?"
"Dry rot."
"Wheels?"
"Plain steel."

"Sprung for one of the last Mustangs ever built and didn't get the magnesium wheels? Cheap-ass dirtbags. Fracking inconsiderate of them."

"How about the house?"

"Left the back door open. I guess they had pets or something."

"Ha! So much for 'mister lockpicks'. How much time did you waste finessing the front door?"

Will lifted his head and looked down his nose at Lenha. "I'll have you know it was *less* time than it would have taken to walk around back."

"Smartass. *Check the back door next time.* So, what of the house?"

"You know the saying 'does a bear shit in the woods?' Well, as it turns out, he uses the living room. Pantry is empty, clothes are eaten by mice." Will held something aloft in each hand.

"But, iPhone 8. Unopened Jack Daniels! *And* a Gen 6 Glock on GoopDad's desk. Magazine springs are weak, but otherwise spotless."

Lenha perked up. "*Not bad*. Makes it worth the walk, anyway. As long as we don't drink it ourselves."

"Eh, we might. Also a laptop, a tablet, a bunch of Blu-Ray movies and a big ol' flatscreen that is probably worth hacking a path for the truck so we can get it out."

"Will, leave the television."

"Why? Those things fetch a nice price. They're big, they're hard to grep and they just aren't making them the old way anymore."

"Will, why would you loot our nice new house?" Will's expression slowly changed with the realization that this wasn't the usual half-collapsed crapped-out ruin where you'd be lucky to find a few meters of copper that other scrappers had somehow overlooked. Sound roof, all its window glass. A miracle as far as abandoned houses went. The garage was a writeoff, but the Mustang could be dragged out and burned, and the garage used to store anything that wouldn't pick up funk.

"Right....This is Jefe Santino's territory isn't it?

"I keep telling you, *never* call him Jefe, not even as a joke, not even to *me*. He's 'Councilman Santino'. *You* know he's more than that, *I* know he's more than that, but if he wants to be just a member of the Rova Council, then you call him 'Councilman'. This is *his* district, he's 'legitimately elected', and if you get both your legs broken because someone heard you call him Jefe, the rest of the Council will not utter a single word of protest about it. *Got it*?"

Will looked somewhere between chastised and angry, but grudgingly said "We could use the Jack, the phone and a few other goodies to get an official homestead reclamation from *Councilman Santino's* people." Lenha nodded, and added "Put in a generator and some solar panels...

"...steel shutters for the doors and windows."

"...a few land mines".

"...some booby traps."

"Home Sweet Home!", they said in unision. Will laughed. "We'll save the Jack as a deal sweetener for the Councilman's people, but there's a bottle of tequila in there we can celebrate with. Help me load some trade stuff into the packs and we'll hump it down the mountain. With any luck we can get the official skids lubricated by the end of the day and start cleaning bear crap out of the living room by tomorrow."

Sweaty and tired, but smiling, they started back for the house. Will made a mental note to grab that manila envelope labeled 'to whom it may concern' that the Glock was lying on top of. *Might be some interesting reading...*

Endings

Grep did not destroy our civilization in a nanotech-fueled cataclysm, like some global equivalent of a volcanic eruption or earthquake. Rather, it was a slow burning fire that occasionally flared up, yet nonetheless consumed everything in its path. It was the 'tragedy of the commons' on a global scale.

Never heard of the 'tragedy of the commons'?

A medieval village might have a common patch of land on which the villagers grazed their animals, 'the commons'. Even if no individual owned the commons, this still worked out. Everyone knew who everyone else's animals were, the herders could take turns minding them, and there was enough grass for everyone.

This works fine...as long as you only have a certain number of animals. If the commons can adequately graze 100 sheep and you have 101 grazing, it means that the grass is not going to grow back fast enough to keep up with the grazing, or if you restricted the grazing, all the animals would be getting just a little less food than they needed. If you had 150 animals grazing, it would ruin the commons in short order and you could just forget about trying to graze 1,000 animals there. The only way to maintain 'the commons' would be to keep it from being common. Some group of villagers would have to coerce the others to stay out. And the more villagers there are, the more people there are that get screwed. Insert whatever analogy to modern government that you think works.

Another example would be a bunch of towns on a river, each getting their drinking water from the river and dumping their sewage in the river. This works out fine as long as the towns a small enough and the river is big enough. But once a few of the towns get big enough, it quickly reaches a level where it sucks to be everyone except the town at the most upstream end of things. And everyone wants everyone else to spend the money needed to stop what they are doing first. Again, compare this to modern international disputes on things like pollution.

Grep did the same thing to everyone, everywhere, for *everything*. There was no *one* thing that brought humanity down, except possibly human nature, but a good example was money. If a *few* people figured out how to grep paper money, it would be no problem. If you grep a thousand dollars or Euros or pounds to help yourself out, the local and national economy is not going to notice. But if you start making bathtubs full of 100 Euro notes and post videos online with a how-to guide, then *everyone* gets in on the action, and everyone simultaneously loses confidence in paper money. *And then everything in the economy that depends on that confidence fails*.

And face it, modern paper money is *literally* a confidence game. It only works because *you* have confidence that the 100 Euro note you earned through your work will get you 100 Euros worth of stuff, and the person you hand it to for that stuff has confidence that *they* can pay 100 Euros worth of bills with it, and so on down the line. The same applies to electronic banking. If people *believe* that other people have developed an ability to arbitrarily make themselves electronically rich, then that is going affect everything from the LIBOR (the interbank loan rate) to how much you or I can withdraw from a cash machine. Businesses using solely electronic transactions found themselves untrusted, unable to process transactions or both.

So, if your small town suddenly has a dozen people who seem to have won the lottery, it affects people's confidence. If there is a lot of new money floating around, prices go up since sellers know the big spenders have the money (i.e. inflation). In response to higher prices, people grep even *more* money, and so on.

It is like governments running the printing presses overtime to print money to pay their debts. There are real-world examples of this spiraling out control, like Germany after World War 1, where the value of your paycheck would drop between when you cashed it and when you got to the market to spend it, or relatively recently in Zimbabwe, where in 2009 the government was printing 100 *trillion* dollar banknotes. Not a hundred trillion 1 dollar bankknnotes, but individual banknotes in a *100 trillion dollar* denomination. At the time, inflation made these worth about US$30 (and you can currently get them for less on eBay).

A few people grepping money is not a problem. Lots of people grepping money, or a *perception* that a lot of people are grepping money, *is* a problem. Even though there was never any danger that electronic money transactions were compromised by grepping, there was the perception and fear that they *might* be, and this fear sparked a sell-off of electronically traded items like stocks. Remember that in any delicately balanced system it only takes a handful of irrational actors to throw a wrench in the works. For an example many people are familiar with, it only takes a few bad drivers to cause an entire freeway of rush hour traffic to grind to a standstill. Not by causing accidents, but by driving in a way that causes a chain reaction in what other drivers do, making an already slow situation worse.

In just about everything that civilization relies on, grep generated the global equivalent of a dozen people slamming their brakes, honking the horn and leaning out the window and shouting obscenities at the person in front of them.

The Dark Days

The Dark Days are the period from early 2021CE to about the end of 2023CE. For Americans, the beginning usually starts with the nerve gas attack on Washingon DC. On a global scale, the Dark Days are when the cumulative effects of grep and human nature reached a tipping point from which there was no going back.

In the United States, the nerve gas attack wiped out a majority of Congress and their staffs, plus a number of cabinet-level officials (the President and Vice-President had filtered air systems on their dwellings and offices). It was not the work of a crazy loner, but coincided with grepped single shot cannon aimed at major electrical substations, and this shut down virtually all services inside the beltway. In the chaos that followed, no one was ever sure if it was caused by foreign terrorists or domestic extremists (the recently elected president was a Democrat). This uncertainty did not stop lynching of hundreds of Muslims and a score of mosque burnings, almost all at the hands of conservatives of various stripes.

For their part, the liberal response was a national declaration of martial law, suspension of various Constitutional protections and mobilization of all National Guard units. Unfortunately, by this time many people were *already* unhappy with the government for its responses to 'the grep problem', including currency controls, travel restrictions, violation of privacy and so on, and a small number of Guard units basically gave the finger to their Commander-in-Chief. Two states had their Guard units given orders by the governor of that State that conflicted with Federal orders, and chose to follow the State orders.

And the combination of rogue units, armed 'citizen militias' and Guard units ignoring Federal orders to instead obey State orders encouraged more of all of the above. Noisy and overly-armed but not very dangerous groups of soldier-wannabe militias drew malcontents who actually *were* soldiers. These encouraged state governors to stop out-of-state deployment of their loyal Guard units to keep insurrectionist 'militias' from doing anything stupid, which was seen as an excuse by *other* governnors to use their Guard units to protect *their* state interests. And the occasional lone crazy doing something stupid and violent with grep did not help matters any.

The resulting chaos shut down just about everything past a local level. Cargoes were stuck in ports because trains were not running. Trucks had nothing to deliver, and fuel stocks were not being replenished to help them get delivered. What few news reports got out of Washington DC showed a city alternately burning, being looted or patrolled by heavily armored military vehicles, while the President made announcements from an 'undisclosed location' and wrote executive orders that no one was listening to, while people used grepped and increasingly worthless money to clean off store shelves that no one was able to restock. *And it went downhill from there when World War 3 started up*.

In Europe and Asia, all the tensions of 2018CE were still simmering. Russia was intent on reclaiming the territory of the former Soviet Union. China was still expanding south, building artificial islands and then using those islands as military staging areas to make resource claims on the surrounding ocean. While the United States sputtered and ground its way to halt over the course of a few months, someone or someones set off an atomic bomb in downtown Kiev, obliterating the city center and generally ruining the day (and all future days) of about a million people.

If you think this is an extreme and unlikely set of responses, first remember that it is just a game and this is just the backdrop. Second, think about how little it takes to put authorities *and* populations into an irrational mindset. After Hurrican Katrina (2005CE), police in New Orleans were eventually convicted for unwarranted shooting of civilians (including multiple times in the back), while other New Orleans police, backed by the National Guard, went door to door without warrants and pre-emptively confiscated firearms in the name of 'public safety'. The Boston Marathon bombing (2013CE) resulted in curfews and armored vehicles with machineguns in the streets. The Christopher Dorner manhunt (2013CE) had some over-eager police pump over 50 bullets into the *wrong* vehicle...in a residential neighborhood. The death of Freddie Gray in police custody (2015CE) sparked riots that resulted in twenty buildings set on fire, destruction of over a hundred vehicles, over fifty businesses looted, over two hundred arrested, a curfew and military vehicles in the streets. After the 9/11/2001 attacks, every airline flight in the country was grounded. Now imagine a major terrorist attack on a national capitol at a time when tensions are already high, and it is not that much of a stretch to have things go sideways in the worst possible way. Especially when everyone is hearing on the news that all the weird stuff in their area is happening everywhere else *at the same time*.

The surviving government in Kiev (actually, a unilateral decision by the military) responded with a small number of nuclear missiles at the perceived instigator, who responded back in kind. Not all of these missiles launched, not all of them detonated, and not all of them landed on the right targets. But enough landed on the *wrong* targets *and* detonated to make central Europe into a big popcorn popper, with atomic kernels exploding into fluffy white goodness every several hours for a period of about two weeks. Eventually, this fracas became international. A strike on the outskirts of Moscow was responded to with a general level retaliation that included cities in China and the United States, with three bombs hitting over the course of the first hour.

One of these, either by design or accident, detonated in the ionosphere over southern California and the resulting electromagnetic pulse fried a lot of the electrical infrastructure on the west coast. Other EMP-enhancing detonations elsewhere in the world seem to indicate this was a deliberate measure, and since Russia, China and the US were targeted this way, all three were likely culpable, though none have ever admitted doing so.

After the first strikes on May 16, 2021CE, erratic strikes each day or so for continued for another few weeks, with the last bomb of unknown origin striking Portland, Oregon on July 5, 2021CE.

The US of course responded in kind, though with admirable restraint (or so we are told). Two of these retaliatory strikes hit missile launch sites in Siberia, setting abaze great chunks of drought-dried taiga and the methane deposits underneath. Moderated by the vast quantities of permafrost that had to be melted and turned to steam, the methane fire spread slowly but unstoppably until it had turned several million square kilometers of ground into soggy ash and put several hundred gigatons of ash into the air.

And *this* is why they were called the Dark Days. The amount of dust and smoke put into the air by nuclear detonations and burning cities was nothing compared to the amount of soot pushed into the stratosphere by a fire the size of Alaska (Siberia is a *big* place). The disruption to climate and the growing season was as catastrophic as you would expect. The northern hemsiphere lost much of its food production for the latter part of the year, as well as the ability to feed anything but the hardiest of livestock. The following year was mercurial, with unseasonable frosts in the summer and alternating crippling snowstorms and torrential rains in the spring and fall. Combined with grep-related disruptions, crops and livestock dropped to a small fraction of their normal amounts.

Anything that *could* be collapsed by too much snow, was. Anything that *could* be washed out by a flood, disappeared under muddy water.

The southern hemisphere did not suffer the darkened days to nearly the extent of the north, but you cannot change the temperature on one half of the planet without radically affecting the climate in the other half. Weather extremes broke all records. Continental interiors became too hot to allow human life in some places, only to be followed by torrential rains that washed away the dessicated corpses of those who could not find cool underground shelter and flooded the underground shelters of those who could. Multiple typhoons the size of Australia roared over the southern Pacific and completely obliterated small islands.

The only saving grace in both hemispheres is that the tremendous spring rains the year after the Great Siberian Tire Fire (no one knows why it was called that) washed most of the fallout out of the land ecosystem and into the ocean depths. Every place on Earth not built to withstand a '1000-year flood' was inundated, leaving behind mud, toxic waste, raw sewage, uprooted trees and lots and lots of dead things.

For historical reference as to how much a single event can affect climate, look to the explosion of the Tambora volcano in April, 1815CE. This is by most measures, the largest volcanic eruption in human history and 1816 (the *following* year) became known as the 'year without a summer'. Frost occurred in the Roanoke Valley (for real) in August. No state in the northern half of the United States had *any* month where temperatures did *not* dip below freezing. For the meager harvests that *could* be made, food prices went up by a factor of eight. The Great Siberian Tire Fire in **Grep** was an event of lesser magnitude, but it went on for *months*, with a cumulative effect that was far greater. The stated climate disruption to the southern hemisphere is unlikely in real-world terms, but is useful for setting the stage for the opening of a campaign.

While all this was happening, people were frantically trying to learn how to grep things in order to survive. Simply rearranging something you already have (metal scrap) into a gun is easy enough. *Relatively speaking*. Turning a bunch of elements into a complex compound like food is another matter. For instance, the chemical formula for drinking alcohol (ethanol) is CH_3CH_2OH, which will give you a nice buzz. The chemical formula for antifreeze alcohol (methanol) is CH_3OH, which will destroy your optic nerve and kidneys. One shot glass worth of methanol in a fifth of grepped liquor can ruin your life. Add in that all sugars have a CH_2OH chunk and you quickly understand that grepping anything that goes into your body is something you have to be *very* careful about.

And it is hard to spend the necessary time to be very careful when you and your family are starving.

What all this meant is that it was usually easier to use a gun to take existing food from someone who already had it, or grep up something like a steel crossbow if you did not have a gun. The chemical complexity of modern gunpowder and impact-sensitive primers had the same problems as food. Making something that would blow up was fairly easy. If you got it wrong and had 20% impurities, it just went 'boom!' 20% less well. But if you get a bullet stuck in your barrel because the propellant was too weak, or blow up the gun because it was too powerful, you have a problem.

The places that survived the best had the combination of some food to begin with, a supply of organic material for making more, and several individuals who could combine their talents to grep something edible and several more who could grep items to support the defense of the community. And everyone else contributed the skills they had, medical, cooking, teaching or even holding a gun or crossbow and manning barricades.

The survivors tended *not* to be the prepared loners whose canned goods eventually ran out, but groups of people that had enough durability to survive the loss of a few of their members. Most of these groups ranged in size from several hundred to several thousand members and had a variety of leadership styles mostly based on the random chance of who took the first steps to organize things and made it work. Some were semi-democratic, some were quasi-military, others had councils.

It was only after the skies lightened and the Dark Days ended that groups considered expanding out of their safe havens and joining other groups to form larger communities in the looted, burned and flooded remnants of their cities. This did not always happen, leading to major cities with several governments and boundary lines, usually friendly, just *not* friendly enough to join together.

Grep sickness

If all this was not enough, the winter of 2021 had an epidemic so-called 'grep sickness'. It was characterized by fever, joint pain, then blinding headaches (sometimes with extreme aggression) followed by to seizures, coma and death. It was attributed to grep in the same way the influenza outbreak of 1918 was called 'Spanish Flu' in many places. People wanted to blame it on someone or something else, and grep was the scapegoat.

Later analysis showed it was actually a form of communicable meningitis. There has never surfaced any *proof* it was weaponized, but its spread across the entire globe in a matter of weeks leads some to think it was a deliberate and coordinated release on multiple continents.

It had an abnormally high fatality rate, made worse by overloading what medical care there was, and hitting a population that may have had their immune systems weakened by hunger. *Billions died*. More than by war, more than by famine, more than by the weather. *And then it disappeared*. It is a popular if touchy topic among conspiracy theorists.

The darkness ends

Depending on where you were, the Dark Days ended sometime in 2023CE or 2024CE. That is when the population reached its minimum and people started pulling themselves back on their feet. And with the start of play being about 2031CE, it means that the new 'normal' is fully in place and stable systems of life, government and production are the norm. Civilization, the *new* civilization, is back on track. But there are still a lot of places *outside* of civilization, and the things we do to each other even as civilized people still leave a lot to be desired.

Dead Zones

Areas did not fare equally poorly during the Dark Days. Some areas had as few as 10% casualties. Adequate resources, a sense of community, strong leaders, isolation from refugees, looters, grep sickness, plus a bit of luck helped some small communities weather the worst of it almost unscathed. Other areas were virtually wiped out. Some of them were gradual die-offs or abandonments over the duration of the Dark Days, with a combination of hunger, weakened immune systems and unseasonable cold taking their toll alongside violence and lack of preparedness for things like floods and blizzards. In a few places, the death toll was far more immediate and excruciating. A few cities suffered the same fate as Dresden did during World War 2. On February 13, 1945 a joint US/British bomber force dropped several thousand tons of high-explosive and incendiary bombs on the city of Dresden. The resulting firestorm burned roughly 6 square kilometers of the city down to smoking rubble and killed about 25,000 people.

In a period without high-tech fire departments able to do their jobs effectively, one major fire sometimes turned into two into several and just kept going. This was more frequent in cities that had lax building codes combined with very high population densities, and when it happened the destruction was nearly total.

For **Grep**, take the Los Angeles area in the United States. Most of the deaths during the Dark Days took place there in the first month, and the death toll was approximately 99% of the population. Why?

They died of thirst.

For some it only took a few days. For others it took weeks. The watersheds that provide Los Angeles with its drinking water have a total area of about 600,000 square kilometers. That is, it takes a watershed the size of France *just* to support the fresh water needs of Los Angeles. This watershed extends over several states, and the vast majority of the water has to be pumped at *some* point in its journey. When an enhanced EMP nuclear device (presumed to be Russian) detonated over the west coast on May 16, 2021, it knocked out the most of the power grid in California and Nevada, much of Arizona and Utah, and parts of Idaho and Oregon. The actual damage was fairly minor and many generating stations still worked, though maybe at reduced capacity. However, the large distribution substations had major damage, for which a sufficient supply of repair parts was simply not available, and which because of previous interruptions in the transport chain, could not be gotten to where they were needed. *Or at least not fast enough to make a difference.*

As the spigots dried up and bottled water (anything drinkable, actually) disappeared off the shelves, things got ugly quick. The few who left early while the roads were still clear were the lucky ones. Those who waited for the lights to come back on and the water to start flowing again, not so much. When it became clear that water was *not* coming back and you were down to your last six-pack, things got ugly.

Those who had numbers and guns (often the police), guarded or took over places with swimming pools. Everyone else had to get out of town and probably had to take their chances with whatever standing water they came across. Predictably, traffic jams soon blocked anything bigger than a bicycle or motor scooter and *those* were stolen, jacked, and fought over. The few who saw the jammed traffic and drove out on the empty inbound lanes turned into a flood that soon jammed those as well. So people got out and walked. *And died*. Of a municipal population of 13 million, about 150,000 survived, and most of those were from the outskirts. Of the nearly 1 million who did not succumb to dehydration, 850,000 died from illnesses contracted from drinking bad water or fighting over limited supplies. Quite a few early survivors went to places like the Santa Fe dam, but the already dubious water quality there was quickly degraded by poor sanitary practices and cholera spread through the survivors. Estates with armed guards and large swimming pools eventually ran out of ammunition and were overrun by hordes of thousands of desperately thirsty people. And while such a bounty could sustain a thousand people for a few months if managed properly, the water supply never came back on and the torrential rains that ended the Dark Days were still months off. So these isolated pockets of survivors only had a temporary reprieve. They too, had to either find a reliable source of water, flee the city with what water they could carry, learn to grep fresh water, or perish.

By the end of the summer of 2021, Los Angeles was a ghost town. Its survivors had an uneasy truce with each other, collecting water from questionable open sources each day and retreating to someone's abandoned but defensible mansion to purify it with bleach (or grep), spending the rest of their time scavenging for food and fuel. And if they were smart, finding light motorcycles they could use to get out of town if they needed to.

Similar stories played out in Las Vegas and other cities dependent on water imports. While the American southwest was habitable by early settlers without imported water or electricity, the modern population densities in many areas are not. When the outside water dried up, the amount of people the land could support dropped to pre-industrial levels. *Either by evacuation or die-off.*

On the other flip side of casualties, Hutterite religious communities and those like them in the United States fared pretty well. Already adapted to communal living and growing crops and raising animals in a less tech-intensive fashion, they simply had to deal with the fiercely unpleasant climate of the Dark Days (and hungry, jealous neighbors). Similarly, subsistence farmers and herders in equatorial Africa, or nomads of the Mongolian steppes were not too badly off. Much of the Nile River valley and Amazon basin came through on the reduced but still adequate bounty of these areas. In fact, some of these groups had their lot *improve* if they learned how to grep. *Theoretically*. The inhabitants of the Middle East still had to deal with the problems endemic with either their government or the lack of it. *Slavery, religious wars, atrocities, or as most people there would call it, just another Tuesday.*

The distribution of deaths during the Dark Days and when those deaths happened can have a large bearing on what the setting the adventurers start in looks like. So, as a gamemaster you can think about where you want adventurers to start and what kind of neighbors you want them to have. *Do you want a campaign where exploring empty city ruins is important?* Then put one down the road or over the next mountain range. *Do you need a tight-knit community that is a strong base to operate from but has quirks that make you itch to get away sometimes?* Then set one up. It may be *our* setting, but it is y*our* gameworld.

Society and daily life

A lot of things are the same as they were before, a lot are radically different. The notion of 'big government' requires a monopoly on certain aspects of daily life. It does not matter if it is a tyranny, a theocracy or a democracy. If there are rules, then someone needs to be able to enforce them on those who do not comply. In primitive times, strong men, armor and blades were that force, backed up by harsh and swift justice (or something called that, anyway). Religious laws, castes, fealty, and so on. In more modern times, a dizzying assortment of laws, codes on weapon or armor ownership, surveillance states and the threat of prison are the main coercive factors, along with the powerful but usually not legally enforceable social codes that vary from place to place.

All of these still work to some extent in grep. Just because you can whip up a batch of high explosive in your bathtub does not make government and law enforcement any less effective than it was before grep showed up. Most people are *not* the sort who *want* to make a batch of high explosives in their tub, and to a large extent *their* lives would not be changed all that much. The problem is not with TNT or assault rifles or even homemade nerve gas, it is the accumulated weight of everything that people *can* grep and the ways in which this grepping reduces the power of government.

Think of everything you own that is regulated or subject to inspections or standards (food, fuel, electrical devices, liquour, clothing, just to start), and which *can* be regulated and taxed because it is centrally produced, sold through stores which are themselves licensed, imported through controlled ports or all of the above. *Grep short-circuits all this*. Guns have serial numbers that are unique and traceable. *Not if you grep one*. And anything you make yourself completely evades the tax system.

Or, every country in the world relied on paper currency, which by 2018CE was backed with nothing but promises and the tacit acceptance of that paper as a means of acquiring goods and services. But if someone can make a stack of 100 Euro bills with nothing more than a handful of colored pens, an old T-shirt, two paperclips and a roll of toilet paper, everything in society that relies on the acceptance of 100 Euro bills vanishes.

The grep economy is based on raw materials. Grep cannot transmute elements, so the basic building blocks of items *still* have value and still have scarcity. Old electronics have been dismantled for their gold and tantalum and copper, batteries for their lead and lithium, and so on. The rarer elements are commonly grepped into currency of standard weight and size, verified by something as simple as precisely dimensioned slot and a counter-weight. If the coin is too big or too small or weighs the wrong amount, it probably is not the pure element it claims to be. So, there are coins of gold, silver, iron, nickel, tantalum and copper, depending on the region you are in and how much you want to spend.

Industrial metals like iron and copper and nickel are also available in bulk quantities of course, but still serve a useful role as 'small change' for consumer transactions.

On the other hand, things that have value simply because they are a combination of elements or a particular arrangement of an element have little or no value aside from the difficulty of grepping them. It is not *that* much harder to grep a diamond the size of your fist than it is to make a lump of coal the size of your fist. Just because diamonds are formed *naturally* under extreme temperature and pressure does not mean grep cannot *artificially* finesse the same atomic lattices with nothing more than a pressure cooker on your stove.

Similarly, items valuable because they are unique have lost *some* of their lustre. You *can* grep a precise duplicate of any museum piece, right down to the carbon isotope ratios, the pollen embedded in pigments and elemental ratios in stone from a particular vein in a particular quarry. So, while having the 'original' of something may mean a lot to the owner, that item is not really unique anymore.

If a nation had strict codes about drugs or guns, they are unenforceable. The segment of the population who embraces violence as a way of business or of life can make a gun, use it and then dissolve it back into its component elements and no amount of border controls can stop it and no forensics team can trace it.

A lot of people do *not* develop any serious levels of grep skill, but it is *incredibly* useful for the lower and middle classes, and virtually puts an end to agricultural or animal-based monopolies. If you can turn grass clippings into sirloin steak, old newspapers into fine wine and scrap tires into a fancy new outfit, the only thing an urban grepper needs to buy is raw materials to replace whatever goes down the drain or gets flushed (and to be honest, a lot of what they buy as raw materials is merely dried versions of what goes down the drain or is flushed). Face it, almost everything we eat, drink and wear is a mix of hydrogen, carbon, nitrogen and oxygen, none of which are in short supply and all of which are infinitely recyclable with a bit of energy, energy which we have shining down on us for free for half of each day. While large scale farming and herding has fallen out of fashion, small scale is quite common. It is easier to have a chicken coop than to grep eggs, or have a fruit tree, or small garden. But for *industrial* operations it is easier to grep locally than do it conventionally and then ship in the resulting produce.

So, all of this makes geographically broad oppressive governments and monopolistic economies based on large factories and huge distribution networks a losing proposition. Companies today can make a 2 liter bottle of generic soda in a distant factory, ship it to a store, pay the overhead of running that store and still make a profit on a shelf price of 1 Euro. But you can buy it from a local grepper out of the back of a truck for less, and it is probably a *better* soda.

Governments in 2031CE tend to be variations on a few themes:

Standards & practices: The government sets standards for commodities and makes a profit by selling things made to those standards. It has an enforcement arm for what it does, but otherwise exerts very little actual control over its 'nation'. For instance, everyone in an area might agree 'these guys grep the money and keep an eye out for its purity'. Everyone agrees that 'the government mint' has authority to regulate currency, and accepts some form of laws and 'police' involvement when it comes to someone messing with the trusted measure of exchange. But other than that, states, counties or other political subunits do what they want. An S&P government probably also maintains standards for industrial or other items that need to be compatible with each other. You want the nuts you buy to match the bolts you already have, that sort of thing. The S&P government has various inspectors who will give a 'stamp of approval' on batches of items for an 'inspection fee', and S&P governments usually work together to make sure stuff is compatible as possible across the biggest possible area. Similarities to 'kosher' or 'halal' certification are deliberate, and in some places an S&P government might actually *be* a relgious authority.

A S&P government might also have a 'peace-keeping force', a small army that is marginally big enough to be a deterrent to outside aggression and *is* big enough to take on any one state within its borders that decides to be a problem for whatever reason. This would be something like the United States 'National Guard', a distributed force that can be called together if necessary to be a real army.

City-states: This is the typical form held by the remnants of national governments, most of which are grep-unfriendly and fairly coercive. They control a very limited region, typically urban, plus some surrounding resource base, and they guard and police it *very* jealously. They may be several widely spaced cities that are all part of the same pre-catastrophe nation. They cannot prevent *all* grepping, and rely on some grepping for their existence, but they have a number of societal controls to minimize unregulated grepping by citizens. An example would be Washington DC in the United States. A combination of grep and massive earthmoving equipment has made everything inside the Capitol Beltway a walled city (a wall about 100 kilometers long that encloses an area of a bit over 1,000 square kilometers), surrounded by several thousand square kilometers of farms, ranches and small satellite and trading towns.

Pervasive security cameras, spectrographic analyzers on every other block sniffing the air, monitors on everyone's electricity usage, analyzing the waste from every building, these are the norm. The average person who is not doing anything wrong is unaffected and is usually indoctrinated in public schools about the 'hazards of unregulated grep' and knows the penalties for getting caught at it *and* the rewards offered for turning in those doing it.

It would be like the average person who has to work in one of the legislative buildings in Washington DC right now. You know that you are going to be screened going into your place of work, your online habits may be monitored, you may not be allowed to have a smartphone on you in certain places, you may have random drug screening or have background checks run. But people take these jobs and work in these places and raise their families there *anyway*. There are plenty of people in Washington DC who work in the same job in 2031CE as they did in 2018CE, and whose overall life and lifestyle is little changed in that interval.

These city-states typically grep their raw materials (refining elements from scrap) and then make much of their goods with old-fashioned machine tools or injection molding or other mundane technologies. Interestingly, city-states have the best educated tech workers and the best of pre-grep equipment, and are often the ones doing the most cutting-edge grepwork. They *want* the edge that advanced alien tech can give them, and are probably trying to see if they can de-engineer grep to make it useless to all but a chosen few or 'train' grep to destroy other grep (both of which are *highly* unlikely).

This self-imposed reliance on non-grep tech gives them an edge and certain economic benefits. The more complex, reliant on esoteric knowledge and fault-intolerant an item is, the harder it is to grep in quantity, but this is where *industrial* processes excel. You may be a rugged loner who can grep all you need to survive, but if you want a personal computer for your kids, the industrial infrastructure of the city-states is where you go to get it a lot of the time. And one of the benefits offered by most city-states is affordable access to these things. If you were an urban professional in 2018 and want to keep that lifestyle and have your children grow up someplace that is not 'out there', then a city-state is where you live. Your attitudes towards 'out there' are what the government *likes* to see and hopes to instill in your children.

City-states have very well defined borders and take those borders *very* seriously. Trade with outside regions is limited in type and scope, and outsiders are tolerated for business reasons, but are more closely monitored than the average citizen. Self-modification or any sort of biological modification is usually not permitted in these areas. Smuggling of banned items *does* happen, but it is a risky business and tends to be done by 'businessmen' who understand that the penalty for killing you is really no different than the penalty for getting caught at what they are doing.

Niches: These are often micro-states, at times no larger than a farm or single large building, up to maybe a county, small state or very small country. Most niche governments are rural and small town-ish, but they could also be enclaves (sometimes hidden) in large cities. This could be 'hidden' as in 'living in unused sub-basements' *or* 'we look and act normal but we are actually a cult that meets secretly'. A niche government is formed by people with a common ethos, which sometimes is expressed in physical form. An Amish community is a niche government. A herd of self-modified grep centaurs is a niche government. A Native American tribe is a niche government, as would be a white supremacy movement or a cannibalistic alien-worshipping cult.

The common feature of the niche government is that everyone feels the same way (within reason) about the way people should live and the way government should work. People are drawn to that area because they want to be part of what *that* government or society is, rather than because it has good paying jobs or a nice climate or no state income tax. This tends to make the inhabitants a little elitist and insular, possibly touchy. You don't go into a bar in 'Centaur Town' and start cracking bestiality jokes unless you want the crap kicked out of you (and hooves *hurt*).

Certain types of niche governments have the tendency to go 'full asshole' in response to seemingly innocuous events, going from 'we like our way' to 'our way is the only way and we are going to build an empire', which leads to war, genocide of the unbelievers, bad feelings all around and a fair number of plots for adventures.

Warlords: A quasi-feudal model where someone or a small group has accumulated enough force to intimidate or control any possible opposition within a region, and which is usually smart enough to not tangle with adjacent groups of similar power or overextend itself. This is both reminiscent of feudal domains and indirectly of modern nations. Warlords are obsessively concerned with maintaining their own security while at the same time they often work to undermine the security of neighboring areas in hopes of annexing them. Since the post-grep world is only about ten years old, there are no dynasties yet. There are a few ancient grudges in areas where unfriendly nations or ideologies have adjacent warlords. There are already a few inter-warlord marriages to cement alliances or mutual defense pacts.

Warlords typically have a fairly high tax rate on their citizens, and this is usually in the form of grepped raw materials that can be used to support their disproportionately large and well-equipped military forces. They welcome trade, but at the same time are suspicious of possible spies or outside agitators. Since they employ these against their neighbors, they assume their neighbors are doing the same to them. Unless a territory is completely surrounded by less desireable places to live, the population cannot be oppressed *too* much, otherwise they would pack up and go elsewhere. So living conditions may not be perfect (high taxes, occasionally arbitrary laws), but are not bad enough for most people to want to leave and restart their lives elsewhere. People may also have a perverse loyalty to their oppressor for being better than the alternatives. *Sure, taxes are high and President-for-life Marcos has his moments, but he does keep us safe from that murderous dictator next door.*

In general, warlords only exist in areas that were exceptionally hard hit, where a small and ruthless group can seize control, gain approval through 'restoring order' and then maintain control by use of force after their initial popularity wanes.

Freeholders: Not so much a government as a description of a region. Some areas may be claimed in name by some other form of government, but not actually controlled, defended or taxed to any significant degree. This is usually because the area has limited habitability (even for grep users) or some sort of geographic isolation that makes it too unimportant to get worked up over in a strategic sense or impractical in a resource-extraction sense. A real-world example would be the 'Empty quarter' in Saudi Arabia, an area of about 600,000 square kilometers whose borders with other nations are not clearly defined because no one cares enough about the region to make a fuss over it.

Hermits living in the middle of Death Valley, aborgines in the Australian Outback, Alaskan or Siberian preppers, self-modified isolationists who are merfolk or live at altitudes normal humans cannot survive at, floating communes drifting on ocean currents, that sort of thing. Sometimes freeholders are small communities along some other model, but sometimes are just a few families who are separated from their nearest neighbors by a kilometer or two on a big chunk of land that no one else wants. Being a long way from anyone else, freeholders are usually good at general-purpose grepping, though usually at a low level of standardization (it is just for their personal use, they have no need to be compatible with anyone else's stuff). Anything that they cannot grep, they will trade for, usually in seasonal or yearly local fairs or get-togethers.

Freeholders are usually fairly formidable for their numbers, but their numbers are small and so they are vulnerable to a large outside force. They tend to avoid outside entanglement and allegiances in hopes of avoiding being the secondary target of someone else's wrath. Freeholders generally have a 'lack of proper respect' for laws of neighboring governments, and may be more accomodating of things like smugglers passing through, especially since they are off the normal trading routes.

Slavers: This is not common, but *does* occur in areas with a significant and economically useful raw resource. Absolute force is used by an elite to coerce physical labor and sometimes grepwork from a class of people who are for the most part, physically imprisoned. An example would be a mine for a precious metal. There is not *too* much danger of miners making solid gold guns to overcome their guards with. Because of the ease of grepping other dangerous things out of seemingly innocuous raw materials, oversight is constant and as high-tech as can be managed, and discipline is brutal, with extended, painful death for even minor infractions as a means of intimidating the rest of the workforce.

Slavers are usually a subset of warlords, but may also be a standalone 'government', especially if the mine or resource is in an area with little possibility for escape. If it is too hot, cold or dry to live outdoors, you simply make sure the slaves have no access to what they need for extended outdoor survival and then ruthlessly hunt down any who do escape immediate control.

Slavers are generally not loved by whatever neighbors they might have, but cheap access to large quantities of material that someone might need will make those in power overlook the conditions under which those materials were acquired, as anyone in the first world using a smartphone can attest to (much of the tin (in solder), tantalum (in capacitors), gold (in contacts) comes from mines in Africa, while the lithium for most lithium batteries comes from China, and of course they are assembled in factories which probably do not meet the workplace safety standards for the country the smartphone owner has in *their* job.

In **Grep**, slavers mostly exist as an isolated plot device rather than central or even necessary feature of the setting. It is something you would be more likely to find in Cameroon rather than Connecticut or Cologne.

International perspective

So far we have looked at things from a fairly American perspective. Other parts of the world suffered about equally in terms of loss of life, but their geography and recent history made a big difference in what they turned into after the Dark Days. As a simple example, take the state of Wyoming. Prior to the Dark Days there were only two counties in the state that had a population density of more than 4 people per square kilometer. And the state of Wyoming has an area of 250,000 square kilometers (600km x 450km), making it the same size as the United Kingdom (England, Scotland, and Northern Ireland), but with only 1% of the population. There is not a single spot in all of Western Europe as big and empty as Wyoming. This means that the degree to which people can get away from each other is a lot less, and this in turn affects social structures and international relationships.

It is fairly safe to say that any large country has ended up balkanized in some way, and that central government control with uniform laws across a large region is gone. Smaller countries or those with exceptionally strong and uniform cultural identities are more likely to hold together, as are those whose 'nationalness' is largely defined by geography. So, a nation that is also an island would be more likely to stay whole than one which has several neighbors, if only because the people have nowhere else to go and any government force has less external foes to worry about.

Remember that the world of **Grep** has been hit hard, but is recovering swiftly. There are regular flights from Washington DC to London and Paris, there are just a lot fewer people wanting or needing those flights. Adventurers could easily be sent far from familiar haunts by the needs of adventure.

With that in mind, here are a a handful of national and regional outlines for you to think about.

Russia

Russia is a heavy-handed major player. They are not so much a threat as they are an impending threat. Hit fairly hard in the limited nuclear exchanges, they dropped to levels of barbarism and grep-based desperation that US residents consider somewhere between tall tales and horror movie fodder. Their recovery, however, has been very fast by virtue of its absolute brutality. Vladimir Putin maintained control of Moscow and the local military through the worst two winters in the city's 900 year history, and when the skies cleared and the ice melted, the military was ready to move.

Russia today is three types of area. The first is city-states like Washington DC. Everyone except farmers lives and works within a control zone, and everything for 50 to 100km around each city has been razed to the ground, and every greppable resource scavenged to central warehouses. There is literally nothing to scavenge except rocks and plant matter. Any mineral resources in the control radius are miniature cities of their own.

This makes any sort of grepped organized resistance impossible anywhere near the city, plus the lack of shelter and cover makes approaching by stealth very difficult.

Within the Russian cities, grep is used quite commonly, but *only* under government control, with multiple levels of oversight, surveillance, surprise inspections and the like. Draconian punishments for unauthorized grepping are the norm. If someone is found grepping outside of their permitted parameters, their entire family is executed, including relatives in other cities. You would likely be arrested and vigorously interrogated if your neighbor is caught grepping, and you would consider yourself lucky if you kept your job and did not get evicted for your lack of vigilance in knowing what your neighbor was up to.

Yes, this generates a lot of resentment, but it generates even more *fear*. Even the ubiquitous organized crime cartels toe the government line on this subject.

Remember, this doesn't mean that grepping is *not* done, just that no one and we mean no one, greps anything other than *exactly* what their job requires them to. So, if you help whip up vats of grep-bread, you would not dare to divert a little raw material to make some grep-vodka. If you were grepping armor-piercing projectiles for tanks, you would turn in your best friend at the factory if you caught him grepping lugnuts for his car. Any sort of grep innovation comes *only* from government labs, and *only* after extensive testing. So, the level of commercial grep is lower tech than elsewhere, but on the other hand it is always standardized. Grepped parts are generally hand-stamped (or laser etched) with a tracking number so that where something was grepped, when and by who is known.

As a result of the extremely strict controls on grep, corruption and diversion of resources tends to be the old-fashioned kind. You steal a little bread and make an old-fashioned still and get your vodka the normal way. Your friend takes castoff metal chunks and makes lugnuts with machine tools.

The second type of area in Russia is all the wilderness and small towns outside the control zones. Those who choose not to live in the cities or who have fled them for one reason or another live there. These areas are technically under central control, but in practice they are not. Patrols of armored vehicles remind residents where the power lies, and city traders come in armored convoys to buy salvage of various types, but as long as the patrols and traders are not hassled, people pretty much do what they want.

These areas are slowly disappearing as the city-state control zones expand. When they do, people either have to move elsewhere or go to live in the city. However, Russia is a big place and there will always be someplace for the malcontents to go. The idea is to simply keep them so small in numbers and resources that they can never be a threat to the government.

The last area is the handful of major cities that have chosen to not join with Putin's vision of a resurgent Russia and which retained enough of a military force through the Dark Days to make a direct assault an unprofitable proposition at this time.

These cities are under constant low-level assault from Russian agents. Sabotage, the occasional assassination, 'terrorist' attacks on infrastructure, things that slowly bleed out resources and reduce the population's will to resist. Russia's increasing economic ties to Europe are also being used to demand trade terms that exclude the 'rogue cities', and few businesses or governments are willing to stand on principle and lose a significant profit for the sake of these independent cities.

The vast area to the east of Moscow is largely terra incognita. Moscow has annexed Petropavlosk and Vladivostok on the Pacific coast, and Yakutsk in the center, but the rest of Siberia might as well be on another planet. The only line of civilization is the trans-Siberian railway. While it does make regular trips across the continent, each train is a rolling grepworks and army base in addition to whatever cargo or passengers it carries. It has the ability to repair any track damage, including bridge repair, and carries a pair of attack helicopters and a handful of armed surveillance drones. And every other trip requires use of one or more of these features.

Europe

There is not room to list the details of *every* nation in Europe. For the most part, Western Europe stayed peaceful during the Dark Days. At least in terms of governments not trying to invade or annex other national territories. There was as much banditry as anywhere else, some of it by men and women in uniform, but almost everyone stayed inside their particular lines on the map.

Because of the much smaller national areas and higher population density (even after the death toll), the normal situation turned into a combination between city-states and a standards & practices government. Everyone still wants a uniform electrical grid, railways and such, but everyone also has a low level of nationalism, a 'this is ours' and 'this is who we are' feeling that keeps them separate (which suits Russia just fine, by the way). Border controls are back in place on major trade routes, but are largely ignored for individual travel. In general, there is not the manpower or money to mount a vigorous surveilance and fast response across an entire national border for any but the smallest nations.

In general, consider Europe to be like it was after World War 1. Recovering from war and economic depression, a bit more nationalistic than at present, but at peace and with a decent communication, transport and power infrastructure between the major cities.

Weapon laws are far more permissive than before the Dark Days, but are still not as 'anything goes' as they are in Rova. Laws on ownership are fairly relaxed, but laws on public carry are not. A number of people still carry concealed, but to do so *legally* requires permits now, and these are becoming more difficult to get and even more so for non-citizens. Those who cannot legally carry and do so anyway generally carry grepped pistols with fingerprint resistant coatings. That way the weapon can be ditched if needed and with little chance of being traced back to its owner.

Things are not so sanguine in Eastern Europe and the Balkans. This is virtually a post-Ruin environment, even a decade after the Dark Days. Areas like Poland are the best, supported by ports like Gdansk and close enough to Germany that Russia does not feel like military adventurism, while tiny countries like Lithuania barely cling to independence. Outside the major cities, things are fairly lawless. This does not mean anarchic, more like 'we take the law into our own hands' sort of thing. These nations are net resource exporters. They have enough material for their own grepping, and trade salvaged surplus for things they do not have or cannot easily grep. In the long term this is a bad policy, but in the short term it helps keep those in power, in power.

The Balkans (Albania, Bulgaria, Bosnia, Croatia, Serbia and nearby areas) are a total disaster. The entire region is nothing but feuding warlords, where everyone is paying protection money to keep the local bullies in check because the neighboring bullies are even worse. This is one of the few areas where old national borders are strictly patrolled and well defended. Italy and Austria devote a significant amount of manpower to stop smuggling and raids across their land borders, and Italy has to maintain a constant patrol boat presence in the Adriatic and Ionian Seas for that reason as well. If you wanted an area where slavery still exists, this would be one of them.

Greece was an economic disaster going into the Dark Days, and while it has maintained a semblance of civilization, it has reverted to what some consider it to be its natural state, a hopelessly corrupt collection of barely cooperating cities. It has no known imports or exports and its only military forces are the city guards of communities on its northern borders, who exist mainly to collect bribes from the smugglers who travel in that direction. Its only international relations are refueling and docking agreements for Italian patrol boats, and even these are individually negotiated on a port-by-port basis.

United Kingdom
Great Britain is now England, Scotland and Ireland. Northern Ireland split off and in a quirk of diplomacy that might still unravel, has peacefully unified with the rest of Ireland. The breakup and reconsolidation of these nations is not complete and is not along the same lines.

England is doing the city-state plus wilds model, with very strong control in a corridor up the center (the London-Leeds-Liverpool triangle), and lesser control to either side. The easiest way to describe the areas outside the major cities is 'do not tax us too much and we will not put up a fuss' and the attitude of the cities is 'do not step too far out of line and we will let you pretend you are independent'. This varies from token obesiance to London in much of Wales, to total compliance inside most of 'the Triangle'.

The major cities have much the same attitude towards grep as Washington DC. It is a tech that is forbidden except for specific uses under the strict control of the government. Also, under the state of emergency decree of 2022 (and renewed annually ever since), there is zero expectation of privacy, with the exception of government workers who have security clearances. They have total privacy from those who do not have security clearances, but zero privacy from those who supervise them. This is enforced by simply having surveillance cameras *everywhere* in the cities.

And yes, this includes the bedrooms and bathrooms. There are simply not enough people or computers to actively monitor everyone at all times, but the process has been streamlined to cover a lot. Facial recognition identifies people, and the software can tell if a person changes their habits (pops up some-place a long way from home), disappears from sight for an extended period, or spends a lot of time with someone under observation due to an investigation.

The news is full of reports of violence stopped because of cameras alerting the police, people with medical emergencies being rescued and all sorts of other benefits that justify the continued surveillance. And it is not like the people have any choice in the matter other than to leave the cities entirely.

Scotland's situation is closer to that of Rova, and to a first approximation is about the same size. There is a central 'government' of sorts in Edinburgh, a council composed of 34 county representatives, one of whom is an elected chairman. These representatives have very limited power, and this generally revolves around issues of infrastructure maintenance, common defense and 'standards & practices' sort of things. Individual counties have a common set of laws based on a subset of pre-grep code, but societal norms become more and more individualistic the further north you go. Remember that Scotland as a whole is fairly far north (the capital is more than six hundred kilometers north of the top edge of the continenental United States). They only survived the Dark Days because of warmth from the Gulf Stream, but parts of Scotland did have the same problems as parts of North America north of the **Frost Line**. And while they do not like to admit it, some parts are *still* like that (a few of the county representatives in Edinburgh are...interesting individuals).

Ireland is basically Dublin and 'everywhere else'. Dublin survived because of the port (for fishing) and a significant high-tech population that turned their expertise towards slight but significant bonuses to grepping, and the other parts managed through animal husbandry, fishing and grepping. Casualties from grep sickness were lower than the global average, but deaths due to weather were higher. The government, such as it is, is very loosely organized, and while different districts may have significant cultural differences, these are mitigated by a universal 'right to move'. This reduces tensions in the short term, but concentrates differences, which makes some areas susceptible to demagougery.

Africa

One constant of any civilization-wrecking disaster is that you cannot drop things in an area to *below* the level that a group in that area can make for themselves. A corollary of this is that the farther you fall, the harder it is when you hit bottom.

A great deal of the African continent had the dubious avantage that it had less far to fall, and many of its people had modern technology as a luxury or convenience, not a necessity. According to a UN study in 2009, about a quarter of the people living in cities lacked electricity and about half of the people living in cities lacked indoor plumbing.

The biggest problem in Africa as a whole during the Dark Days was a lack of food imports to the cities and a lack of medical care for victims of grep sickness. Between the two of these, the casualty figures were high, but the survivors who could grep often found themselves better off. There was not much innovation, but their skilled greppers could *copy* most of the medium-tech stuff that would have been imported luxuries beforehand.

Unfortunately, the ease of grepping weapons and any number of lingering grudges have radically balkanized the continent. There are a handful of well run city-states, but none of them have any pretensions of ruling an area the size of a country. Rather, they are stable, support themselves, trade to the extent they need to and present enough force that their small and disorganized neighbors leave them along. Both Cape Town and Pretoria fall into this category, and while they are governed separately they are commerically and militarily allied. Dakar and São Tome are marginal, but survive since those with power realize the value of the city as a reliably safe port means more than sole control but without the outside trade. So, the competing factions split the profits and work together to keep anyone else from horning in on the action.

Mombasa and Namibe are for all intents and purposes, cutthroat pirate dens ruled by vicious warlords who maintain their rule by force. The cities exist only because they are ports that are fairly close to rare-earth mineral deposits that the rest of the world has an increasing appetite for. In Europe especially, most of the readily salvageable electronics have been salvaged, and even though you can recover most of them through grep-based recycling, increasing demand and increasing population mean that it is becoming profitable to import the elements from their natural source. None are really complaining that the source involves slave and child labor, since that keeps the cost down. These two cities have really only become important in the past few years, and only to Europe and China at this point. The traders who show up do not need large ships since the minerals have undergone a step of refinement to make them easier to transport. The traders do, however, need to be heavily armed, since they are carrying payment for said minerals. A payment that is often in the form of advanced and standardized weaponry that is hard for local groups to grep. One thing they are not selling at the moment is anti-ship missiles...

Cairo is a mixed case. On one hand, the productivity of the Nile Valley kept the region fairly well supplied in food. On the other hand, the city took an airburst nuke to its port area, killing millions and destroying the harbor infrastructure. Secular and religious infighting continued for years and only stabilized a few years ago, with the city partitioned into a secular area and two Muslim areas (Shia and Sunni), with a small Christian enclave in the secular quarter. Each group's rules apply in their quarter, there is some pooling of resources for infrastructure like electricity generation and distribution, water, sewer and phone service, but the overall attitude seems to be less of 'let's just agree to disagree' and more of 'we're too tired to fight'.

All three factions allow grep and all three have different restrictions. Most of the Muslim restrictions involve making sure nothing unclean was any part of the grep process, and that nothing unclean is made.

Surface radioactivity in the port area has died down, but rebuilding the infrastructure will take years. For now, each faction has a chunk of the edge of the port area and handles its own shipping. Competition is actually encouraging each side to make its area the most amenable, and shipping from European ports is on a slow but steady upswing.

India

When the Dark Days started, India had a population of about 1.4 billion people, living in an area about one-third the size of the United States. At the start of a **grep** campaign the population density is now about the same as the United States had *before* the Dark Days. They *should* be a major global power, but grep and human nature collided there with negative consequences just as it did everywhere else. Like other large nations, India fell apart under grep, but managed to pull itself back together better than most. Unfortunately it did so with the social stratifications of class and caste, made stronger by the presence of grep.

Certain types of grepwork are only done by people of particular social rank, and this cultural pressure is nearly impossible to rise out of, greatly reduces the efficiency of the existing government, and fosters a rebellious element that has taken to using force as a means of implementing change. Unfortunately this change is not going to happen short of a total destruction of the caste system, which is highly unlikely.

The current government of India is a mish-mash of types. There is an overall Parliament and a Prime Minister chosen from its ranks, but each member is in effect nobility and represents a ruling family in a particular district. That is, every district has its own rajah or prince or governor, Parliament is simply an assembly of these ruler's representatives and the Prime Minister is a voting tiebreaker with a few other perks in terms of determining who gets what. They agree to scratch each other's backs, fight for prime grep or conventional building contracts, contribute materials and men to a common defense (as well as having their own private armies), and otherwise act like a bunch of medieval barons with an elected king.

It is in none of their best interests to be militarily adventurous, they do not actually *want* their individual subjects to be all that better off and are mostly content to live in leisure from other people's toil. Out of the hundred or so districts there are exceptions who are noticeably better or worse than average, but the average is the way to bet.

Relations with Pakistan are as always, strained. Pakistan is fundamentalist Muslim at this time and still has nuclear weapons. There is no telling whether or not they still work, but they know that India has more than they do. So, the two nations trade insults and have occasional skirmishes over territory claimed by both and that is about it. The locals are getting tired enough of being fought over that there is an organized resistance that is on the verge of kicking both groups out, and secret negotiations between India and Pakistan may actually let this happen someday. *But not today.*

China

China broke apart much like the United States and failed to rejoin in the same way. Individual regions, usually centered on large cities, each declared themselves the heirs to the power of the central Party (which was nearly destroyed along with Beijeng), each of which also has some portion of the People's Liberation Army loyal to it. None of them really want to fight each other, but none of them want to be subservient to another, so the situation has stalemated.

The attempt in virtually all these cities is to more or less act like nothing has changed. The Party, the judicial system, the corruption, it is all still there, it just takes different forms (bribing someone with a sack of cash just does not work anymore). The high-tech industry of places like Shenzhen has been replaced with a much smaller amount of industry and a larger amount of grep. Cities famous for the toxic leftovers of the electronics industry are still toxic, they are just much more efficient at extracting and separating electronics down to their core elements.

One thing that has changed is that the central rule of the Party (or its local successor) does not extend into the countryside. While a lot of the pre-grep ways are still held to, there is a much greater degree of personal freedom from petty small town Party leaders, and the ability of people to just walk away from situations they do not like means that many repressive rural areas are becoming on average older (since the young people are leaving) and more repressive (since those who remain are more hardcore). Tibet has regained its independence, since the local Party bloc no longer has the force or will (or perhaps both) to crush the newly indepedndent region by use of (expensive) force. Communes based on alternate lifestyles have sprung up in isolated areas and all sorts of counter-revolutionary bourgeoisie nonsense is being experimented with.

Japan

Pre-grep Japan imported about sixty percent of its food. So there was a great deal of suffering when the global supply chain started coming apart at the seams during the Dark Days. In the interval between when the imports slowed to a trickle and the grep sickness hit, nearly a third of the population starved. Because of a lack of skilled agricultural workers, even the reduced population left after the grep sickness was barely getting by and even then it was only because of heroic efforts by early food greppers. It is believed that the Japanese pioneered the 'shared effort' technique for group grepping, and also utilized an assembly line technique where one group would purify the raw materials to increase their quality, the next would try to make the most marginal product possible and the third would try to improve the quality or standardization. This made the most of low skill levels and allowed each group to become better at that aspect of grepping rather than a grepper or group doing each of those steps.

As the Dark Days ended, the most successful communities were ones where each person had self-specialized to be as good as possible in a particular role, including the managerial roles to ensure the most efficient use of time and materials. In a lot of ways they were like a very tightly run corporation and this model continued as they encountered each other. There were mergers, acquisitions, trades and yes, a handful of violent squabbles. But on the whole, these groups are now the *de facto* government. Even as a whole they only control a small percentage of the island's area, but it is the *best* area, the best farmland, the best port facilities, the best grep industry, etc.. The rest of the country is ungoverned and manages passably well on its own. Organized crime in the country is betwixt and between. Some of its members are very good in roles the well-organized communities need, but intimidation, thuggery and protection rackets are not among them. The Yakuza still exist, but are evolving into something new to fit into the revised social structure that grep has brought about.

Australia
Australia fared better than the northern hemisphere in terms of weather. The disruption in the north that caused brutal cold turned into merely moderate winters but a few brutally hot and dry summers. The central part of Australia simply became uninhabitable. The aboriginal population dropped to near zero, and small towns in the center (like Alice Springs) virtually ceased to exist.

Australia took its hits from several causes. The biggest was that it relies on imports for a lot of things, and while grep helps out amazingly in that regard (especially for oil), it was not available for that purpose during the Dark Days. So a lot of things like food and oil and in many places water, ran out very quickly and people had to find alternate sources or suffer the consequences.

The distributed yet concentrated nature of the population (pre-grep population of 25 million, of whom half are concentrated in four cities), meant that reconstruction after the Dark Days was usually on a regional basis, with very little outside help. For instance, of the four cities just mentioned, the closest ones are still 800 kilometers apart and the most distant one is 2800 kilometers from the nearest other. That makes the closest two as far apart at the distance from Washington DC to Atlanta, and the furthest would be comparable to the distance from Washington DC to El Paso. Or in European terms, the closest would be the straight-line distance from Paris to Prague and the longer from Edinburgh to Istanbul.

Like the United States, Australia has air travel between these cities. Grep means the need for major freight shipments is negligible, but if needed these go by sea.

Grep in Australia is legally regulated but not coercively enforced. If you are caught with one of the many things that are illegal (in the cities), then it does not matter whether it was grepped or conventionally made, the same laws apply. So, there is a thriving black market for illegal things that people want but either cannot grep or do not want to take the time to set up a grep for. Others will buy soup starters for things that they might want to grep but do not want to be caught with at the moment (like many firearms).

Outside the cities, anything goes. However, if you want to sell a legal good in a city, grepped or otherwise, you need to have the appropriate business and/or manufacturer's license. Grepped goods do not have to have a serial number like they do in Russia, but you do need to be able to trace the item back to the supplier and goods like foods or medicines will require that supplier to have a city seal of approval, indicating certain standards of quality.

South America
South America avoided the dry blistering heat of Australia, but suffered significantly anyway. Vast sections of the Amazon dried out to the point that fires were able to rage over millions of square kilometers. These were many fires and not at the same time, so the effect was not the same as the Great Siberian Tire Fire, but a large area was denuded of vegetation, indiginous peoples were displaced, and the later rains washed cubic kilometers of bare soil out to sea, leaving a ruined mudscape of gullies, marshes and cities and towns destroyed by mudflows. These areas were quickly recolonized by plants and animals, but are still mostly uninhabited.

Remote areas far from government control, especially in the Andes, are probably better off than before the Dark Days, but a visitor there might at first glance not notice any difference between a remote Andean village circa 2016CE and circa 2030CE. Even the grep sickness seemed to hit these areas less.

Politically, South and Central American nations have never been a model of democracy and stability, and the Dark Days did *not* improve matters. In terms of population concentrations there are few if any 'good' places to live. Any group of people big enough to be important has acquired someone who wants to be most important. Quite often, this is someone who had significant criminal and/or military connections, with a lot of generals claiming chunks of territory and colonels doing the local enforcing. Grep is used to keep their arsenals of second-tier military hardware in good order, and taxes in the form of raw materials are the norm. There are numerous laws against grepping certain things, but these really just exist to increase the cost of doing business (i.e. pay a bribe to have local officials look the other way).

Many just see this as an extension of business as usual. They live in cities and towns and try not to get on anyone's bad side. The other 'business as usual' aspect is people heading into the hills and joining guerilla movements, who with grep can keep themselves in food, weapons and ammunition indefinitely without any need to appeal to other nations for support.

The politics, tactics and atrocities on both sides are reminiscent of the worst parts of 20th century South American history. For those needing an example, from 1976 to 1983 upwards of 30,000 people 'disappeared' in Argentina alone for opposing the government or being thought to oppose the government (actual numbers are unknown but of course vary depending on which side of the issue is asked).

Today, instead of being weighted down and tossed out of airplanes over the ocean, the disappeared are simply killed and used as grep raw materials (trying to disassemble them while still alive is significantly more difficult as their own grep acts like an immune system).

Mexico

Mexico can for the most part be considered an extension of the South American case. The further you get from the old border with the United States the more this is the case. The closer you get to the United States, the more things are blurred. In some border areas there is a lot of tension, while in others the border is more or less gone and trade and movement is unimpeded. El Paso is an example of the latter. The Dark Days conflict between the US military and the Mexican cartels ended rather abruptly with a handful of synchronized missile strikes on key cartel personnel, and in 2030CE the city is open and governed by a council from both sides of the border. It does not mean there is *only* a good side. There is still plenty of crime and corruption, but there are a lot fewer people there now, those who do not like each other have room to avoid the others, and those who feel like picking fights understand the level of grepped weapons they are likely to run into.

Some parts of southwest Arizona would be the opposite. Getting by on a trickle from the Colorado River they suffered below average losses during the Dark Days, but also took some self-inflicted damage from what was effectively a race war. In the end, the white population was on the winning side and the area has remained that way since through aggressive patrolling and policies bordering on barbaric. There is no *official* policy sanctioning the crucifixion of any non-whites trying to cross the border in that area, but there have never been any prosecutions for it either. The area is self-sufficient, non-whites know to avoid it, and that's that.

The remaining Mexican cities on the Gulf Coast have a little bit of trade and commerce with the United States, but grep means that there is not all that much to trade for anymore. The main commerce is as a place where those with money can go to do things that would be illegal or morally frowned on back home. As the saying goes, 'what happens in Cancún stays in Cancún'.

Beliefs

In addition to government types, people in **Grep** have quite a few personal or cultural beliefs and the combination of the two can keep the gamemaster and players busy for years, either as background for adventures or complications to them.

All of the pre-grep beliefs, biases and quirks of humanity are still in place, often magnified by the lack of a powerful central authority to moderate it. So, there will be areas notorious for racial, religious or sexual intolerance (*and* tolerance), new wars being fought over old borders, tribal genocides and so on. Much of Africa has been in continual grep-armed conflict since 2019CE. Any place that had a border dispute, violent separatist or homeland movement in 2018CE has one in 2031CE. So, there is insurgency in the Balkans, most of the Middle East, Shining Path in South America, Tamil Tigers in Sri Lanka, an occasionally radioactive border zone between India and Pakistan and so on. But in addition to this, there are a handful of unique beliefs or sub-beliefs of the post-grep world.

Denialists: These are the very conservative adherents of multiple faiths (usually Judeo-Christian) who deny the alien origin of grep and believe that it is a tool of Evil to corrupt mankind, and may or may not believe that we are currently in the early stages of a Tribulation or End Time. Because they have a strong religious aversion to use of grep, they *have* to live the old-fashioned way, and interestingly enough, are a core source for various basic skills like farming, animal husbandry, leather-working, clothmaking, blacksmithing and such. They range from ultra-purists who will not use *any* material processed by grep, to the more liberal ones who will use grepped items of *some* types, but will not do any grepping themselves. In terms of political alignments, they naturally associate more with the city-state remnants of national governments, but may also be niche communities.

Xenophiles: On the opposite end of the scale are the xenophiles. Back in 2018CE, before grep became known, these would have been cosplayers, fetishists and some who would fall into the 'early adopter' category. Fascinated by the reality of alien life, they downloaded every bit of publicly available data on the alien ship, discussed them endlessly online, and formed their own community along the lines of what they thought the alien society might be like. When the reality of grep became apparent, the xenophiles were the first to hypothesize that the aliens might have uploaded themselves to the grep, though there was (and still is) no way to confirm this. Even so, xenophiles were probably the first to create non-human technology with grep.

In the world of 2031CE, they are either a small community within a larger polity, a faction or political party that is extremely pro-grep, or a niche community. In some areas they are valued because they tend to have some insight into grepping alien tech, while in others they are discouraged or go underground because of a sometimes unhealthy obsession with the subject.

Xenophiles aware of and using some forms of alien tech are geographically limited to the outskirts of the campaign area, and for the most part are simply rumors (*"if the aliens encountered other races, maybe we can find traces of their tech in grep!"*). As these rumors become reality, xenophiles will gravitate into two camps that become increasingly unhappy with the other side, and to the extent xenophiles affect local politics, it can affect relationships between adjacent 'nations'.

Empty-nesters: These are the people who see grep as humanity's ticket off-planet. The ability to create anything you need for life out of raw materials, to modify yourself for extreme environments or have thought-based space manufacturing has energized these people. Within larger populations they tend to be harmless advocates for that cause, but a distinct minority that has little influence on overall policy. However, there are a number of niche communities worldwide, ranging from small to significant, trying to restart the space program from scratch. Even with grep, this is easier said than done. No one has reconstructed whatever the aliens used to propel their ships with, so humans have to get themselves into orbit the old fashioned way. Communities are experimenting with everything from chemical rockets to massive ground lasers to fusion reactors to space elevators, each of which has its advantages and disadvantages and spectacular failure modes.

At the time a campaign starts, none of the groups has gotten past the early stages of their program. The chemical rocket types have managed a successful suborbital shot or two.

The ground laser niche group in the Mojave Desert has boosted small capsules to an altitude of several kilometers and is expanding their massive solar array and energy array as fast as manpower allows (and it doubles as a defensive deterrent).

Fusion engine enthusiasts feel they are just 'a few years' from a self-sustaining stable fusion engine, but even with some alien advances it is a dauntingly complex project. Since actual fusion reactors are now possible, you can *technically* have a fusion rocket engine, but that engine cannot loft itself into orbit, they are not small enough to loft into orbit the old fashioned way and no one has decided it is worth the effort to do it in several pieces (part of which is nuclear space politics).

The biggest space elevator group is based in the Andes and has bio-engineered themselves to high-altitude living, which means they are generally not intefered with. They are using a mountaintop as the anchor for their elevator, which is still in the massive and resource-intensive stage of working its way out of the lower atmosphere, so it has to be strong and stable enough to handle wind, snow and ice. In their favor, they have advances in material science that are stronger than any known pre-grep human material, but it is still slow and dangerous work.

Eschatonists: These are people who think that material existence assisted by grep is a dead end. They think that grep itself is alive and conscious, and human life and use of it is really just a symbiotic relationship. The grep benefits from humans providing resources and opportunities for the creation of new grep, while the humans benefit from what the grep makes. They have not yet 'communicated' with the grep, at least not in any repeatable fashion, but this failure is attributed to the difference between human thought processes and the 'higher intellect' of what they call the 'grep-mind'.

Extreme eschatonists tend to biomodify their own neural structures in hopes of becoming one with or at least understanding the grep-mind, but generally just end up insane. *Even this is seen as a hopeful sign by some of the eschatonists.*

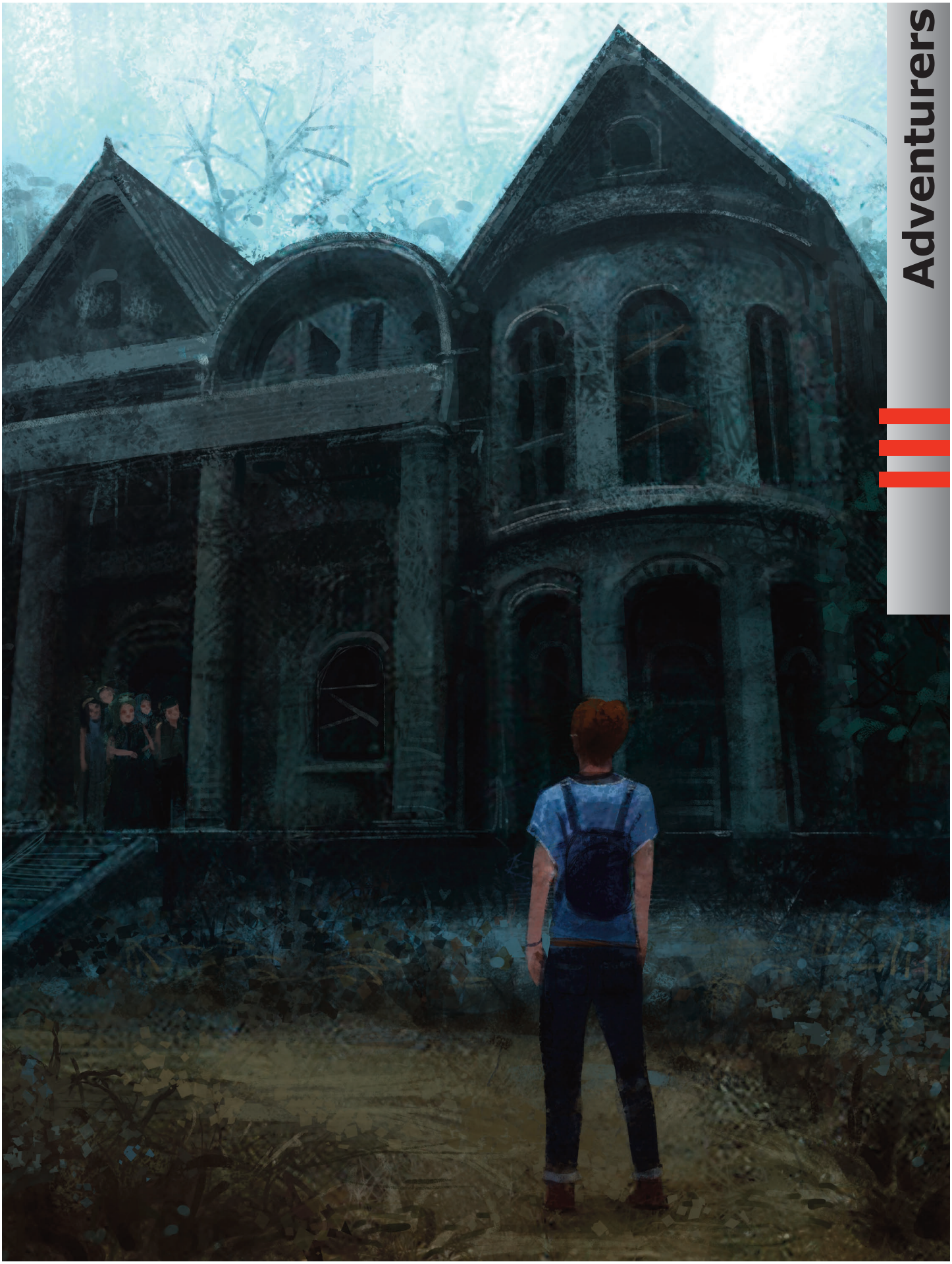
Eschatonists tend to be a fringe element in most societies, but they do tend to have the highest levels of grep skill, though this is often associated with high levels of eccentricity and an occasional disconnect from normal human morals when it comes to furthering their research. To the extent that Eschatonists and Xenophiles overlap, groups with both are likely to be the ones accidentally causing something very bad to happen.

Freemen: They are sort of a word play between 'free men' and the Fremen of Frank Herbert's *Dune* novels. They are the 2031CE equivalent of preppers and survivalists, living within other societies but having their own particular code. In public they tend to look and act like everyone else, but they secretly eschew any law other than 'what works for me'. They will ignore weapon laws or anti-grepping laws and grep whatever they want like someone else might have grow lights and marijuana plants in their basement, or at the very least have a secret collection of 'soup starters' for forbidden items in the same way someone in 2018CE might have a bunch of computer files on explosive mixtures and firearm parts. In city-states, Freemen are a staple of editorial cartoons, a mocking stereo-type of those living outside the security and benefits of the city-state.

Like Dune's Fremen, a common Freemen item is a 'survival suit', a lightly armored body suit that conserves virtually every bodily excretion so that its raw materials can be grepped back into whatever its user needs, and which starts with a number of pouches containing water, electrolytes and protein mixes. It also includes small batteries and kinetic generators so it can power small electronic devices or provide a slight assist to grepping simple items, as well has having built-in handlights and a heat-dispersing or -conserving circulatory system. A fairly skilled Freeman can survive for months off just the contents of their survival suit, though a significant part of each day would be involved in the process if no outside energy, water or biomass is available. The suit is inherently anti-microbial, but anyone wearing one for more than a day or so will become quite 'ripe' and the funk inside a survival suit can never be *completely* washed out. This plus being form-fitted for each user means that used suits are rare, though individual modules from older suits are often recycled.

Grep timeline

March 31, 2018	Alien ship crash-lands in Red Square
April 1, 2018	Alien ship disintegrates, releasing grep into the global ecosystem
June 13, 2020	First news reports of 'shamans' in ISIL conflict in Ethiopia
August 24, 2020	First use of the term 'grep' (BBC news interview)
August 29, 2020	First YouTube video describing in detail how to grep an aluminum ingot
September 1, 2020	First YouTube video of a grepped single shot firearm being fired
September 2, 2020	First YouTube video of an 'edible' item being grepped (Slim Jim)
September 3, 2020	First emergency orders forbidding the use of grep (UK, USA)
September 15, 2020	First YouTube video of grepped counterfeit currency
September 16, 2020	YouTube shut down, global internet restrictions put in place
October 1, 2020	First confirmed reports of self-modification using grep
October 21, 2020	First grep-assisted overthrow of a national government (Cameroon)
November 2, 2020	First civil war in a first world nation (USA)
December 20, 2020	Near-total breakdown of global economy and distribution of food and energy
January 21, 2021	Grepped nerve gas cloud kills 3,000 in Washington DC
May 5, 2021	Downtown Kiev destroyed by grepped A-bomb (37 kiloton)
May 21, 2021	Nuclear strike ignites arctic methane deposits
June 21, 2021	First known quantum mesh network device, birth of the grep Quantumnet
January 1, 2031	Start of play



The rearrangement of molecular energy levels by coupling to the quantum vacuum has important consequences for molecular and material sciences. As we have shown here, it can be used to modify chemical energy landscapes and reaction rates and yields. Both rates and the thermodynamics of the reaction will be modified...The coupling was done here to an electronic transition but it could also be done to a specific vibrational transition, for instance to modify the reactivity of a bond. In this way it can be seen as analogous to a catalyst which changes the reaction rate by modifying the energy landscape.

Modifying Chemical Landscapes *(Angewandt Chemie, 01-10-2012)*

INTRODUCTION



This is where you put together your adventurer. This is based on both your feelings about how you want to fit into the world described in the previous chapter, and what the gamemaster has in mind for the campaign. After all, the adventurers need to have some common frame of referece for adventuring together. They could all be from the same area, they might share a common belief, a common employer or even a common enemy. They might all be escaped slaves being pursued through a jurisdiction that allows this. They might all work for the government of a city-state, with a comfortable high-tech life and unaware of what goes on outside their controlled area. They could be a crew of licensed bounty hunters, tracking down ne'er do wells for fun and profit. Or, they might all be freelancers who meet a mysterious grep wizard in a tavern someplace, who offers them a job procuring interesting things for him.

But seriously, you *do* need to get some feedback from the gamemaster as to what is going to fit best. All of the beliefs and government systems are going to have people with certain personalities as the norm. Maybe you come from a city-state, but you rejected their system and are a newbie in the outside world. Maybe your body could not handle the high-altitude and cold-adapation grep needed for your parent's niche community in the Alps. Maybe you are an old-timer from before Grep who makes a living repairing old machines that people still rely on, or the new generation who has known grep all their lives like some children play with tablets and smartphones before they played with crayons.

So who and what are you going to be? And what are your goals? The notes at the end of adventurer creation in **EABA v2** are perfectly applicable and the gamemaster is within bounds to have the players do a background writeup for their adventurer.

Grep adventurers are going to be slightly better than average, in one of two ways. Your adventurer can either start with superior physical traits and a lesser amount of training (40A and 10S), or average physical traits and better training (35A and 15S). In both cases, adventurers can add up to a total of 10 points from Traits, with the exception of Background, Age and Motivation. Points gained from these do not count towards the 10 point limit from Traits.

! Complex biomodification like the aforementioned grep-centaurs is not within the scope of normal adventurer generation. The gamemaster and players would have to work out a package of traits and there has to be an explanation of some sort for it, since the skill levels and facilities that such a transformation requires would be well beyond that of a starting adventurer. A more likely possibility for such extreme modifications is a later start date for a campaign, where you start with a small population of extremes and they naturally breed from there.

Attributes



All attributes work in the standard way for **Grep**, including using Fate for luck. Fate is also used to represent how 'in tune' one is with grep and higher levels can make grepping easier or high levels might be required for certain tasks. Adventurers who have an Age of 'Physical Prime' or less can have a starting Fate of up to 7, those who are older can only have up to a Fate of 5.

Quick Attributes: If you commit yourself to having 40A or 50A spent on Attributes, you can just choose one of the following groups of numbers and just apply it to your adventurer. These sets of Attribute scores cost *exactly* 40A or 50A, and they can be rearranged to suit a particular concept for an adventurer.

40A	STR	AGL	AWR	WIL	HLT	FAT
Strong	10	8	6	6	7	3
Agile	7	10	6	6	8	3
Smart	6	6	10	7	8	3
Tough	8	6	6	7	10	3
Lucky	6	8	8	6	7	5

50A	STR	AGL	AWR	WIL	HLT	FAT
Strong	11	10	8	8	9	4
Agile	8	11	8	9	10	4
Smart	8	8	12	9	9	4
Tough	10	8	8	9	11	4
Lucky	9	9	9	8	9	6

A player decides on a generalist (35A and 15S) and commits to taking 5A in Traits for a total of 40A, then decides they want to take the 'Agile' template. They customise it a little bit by trading the numbers for Health and Awareness, giving them an Awareness of 8 and a Health of 6. Note that some values of the Age trait can get you some of the A you need, so you do not have to take only traits that give you A to get to the 50A level.

An adventurer who is in college or who has a college degree should have an Awareness of at least 8, though this could be handled by having a Forte on an Awareness of less than 8.

Skills



Grep is a world where just about *any* sort of background is plausible. You could be a city-state resident who is attending college, a person old enough to have a pre-grep skill that really is not being taught much anymore, a survivalist getting by on common sense and a bit of grep, a commune dweller who knows a little bit of a lot of useful things, or a specialist in doing one particular thing really well.

free skills - All adventurers get their native language (spoken and written) at +0d, one Area Knowledge of their choice at +0d (this is usually relating to the culture or geography of the place they live), and one skill at +0d that is specific to your region or culture. For instance, a city-state resident might have 'computer use' and a rural resident might have 'equestrian'.

These free skills can be bought up to higher than +0d, as though the adventurer had already put 1S towards the cost.

grepping - The details on how grepping actually works are in a later chapter, but the short form is that it is a Will-based skill that is often easier with high levels of knowledge (Awareness) and a **special affinity** for grep (Fate). If you want to be able to keep yourself alive through grepping food and making simple items, you will want a skill roll of *at least* 3d+2. If you want to grep more complex things, the more skill the better, and you can specialize in a fairly narrow grouping of item types (like blades), which does not care about the *material*, or materials (like plastic), which does not care about the *form*.

scrounging - This exists in the normal 'find food and shelter', but in most areas shelter is as close as the nearest abandoned building and food can be grepped from anything organic. The more common form of scrounging is the ability to find raw materials for grepping, either for something you are trying to do, or bulk materials that you can sell to recyclers. In modern terms, scrapping. You can pull copper plumbing out of walls, know what parts of a dead computer have the most rare elements and gold plated bits, and of course, the easiest organic material to grep a dinner from.

Jack-of-all-trades - This skill is allowed if you meet the requirements for it.

hobbies - These are often under-utilized, but even if using a 'best two' roll, you can still do a number of things competently for a minor investment of points. This *can* include some sorts of grepping and can, for a point-limited adventurer, represent training but not hands-on experience. For instance, a soldier who has not seen combat yet, someone with a new driver's license, that sort of thing.

professions - Since anyone over the age of 30 has a chance that they had been in the pre-Dark Days workforce for some years (over 35 for degree-based jobs), the gamemaster should consider a 1 or 2 point bonus for an adventurer built around a realistic pre-grep career. The player is *choosing* to be less than optimum for the gameworld and this makes them more of a 'real' person than someone who was built for this setting. The career could still be useful for **Grep**, just not overtly so. A mechanic or a doctor was and still is a useful profession, but a mechanic might own a garage and have employees (an organization) or a doctor might have status and have to put time on their schedule for social functions or charity work (friends). On the other hand, Lena and Will grew up *after* the Dark Days, *are* designed for it and would not get this sort of bonus, only the usual Background and Motivation.

TRAITS

Most of the standard traits will apply in **Grep**, with a few elaborations.

◆Advantages ±varies

There is only one real Advantage specific to a **Grep** campaign and that is to be grep-adept. This is simply a Forte on Will that only applies to use of grepping skill. *You are a natural at it*. Because these adepts are rare, only one adventurer should be able to have that Trait.

●Age ±varies

People in **Grep** are baseline humans and have the normal age traits:

age range(human)	points		maximum
young adult(13-15)	-5A	-3S	9(3d+0)
adult(16-20)	+0A	+0S	11(3d+2)
physical prime(21-25)	+5A	+3S	13(4d+1)
mature(26-40)	+0A	+6S	11(3d+2)
middle-aged(41-60)	-5A	+9S	9(3d+0)
elderly(61-80)	-10A	+12S	7(2d+1)
extr. elderly(81-100)	-20A	+15S	5(1d+2)

However, because of the arrival of grep and the resulting chaos, there are sharp differences in what things you can do at certain ages.

If you are a young adult or an adult, most of your life has been spent in a world with grep. Will and Lenha are 'adult'. As a *player*, think of how much of your life you remember from before you were 10 years old. If you are in the 'adult' bracket in **Grep**, that's how much of your pre-Dark Days life you remember. Because of the general drop in the need for and training in some skills, adventurers in these brackets cannot have more than a +1d in any sort of engineering or skill involving conventional manufacturing.

Adventurers in the 'physical prime' bracket were adolescents at the time of the troubles and have stronger memories of things like the Dark Days, but they were still not of college age when it happened and higher education was not a big priority for much of the decade from the arrival of grep to the present.

They are limited in skills in much the same way as the younger brackets, and cannot have more than a +2d in *any* skill. Your time from the Dark Days to the present has been spent learning *several* new things as conditions changed over that period.

Adventurers in the 'mature' bracket are the first who could have been out working and living in the real world when things went sideways. Any profession or skill available in the pre-grep world is allowed to you.

Those who are middle-aged were well into a career at the time the alien ship arrived. You are (or were) almost certainly married and possibly had children. What became of them should be part of your background. In addition, the mental flexibility needed for grepping is for some reason harder for those whose neural development matches certain stages in the aging process. You *cannot* have a grepping skill of more than +2d, and you *must* have a real-world 'career' skill at a level of at least +2d.

Those who are elderly or very elderly adventurers had a life and most of their working career before the Dark Days hit. You could have gone through multiple marriages, had children and grandchildren, the works, all of which is important to your background. You cannot have a grepping skill of more than +1d.

As a possible exception to the normal rules, adventurers who are middle-aged or older at the start of play may buy an extra level of Status if they also buy *at least* two extra levels of Wealth. *You are established and successful.*

Background +1

This always a good idea and a free point, but it is not required unless you have some other Trait dependent on a Background. You may with gamemaster permission, create your background later and get the point for it then.

Boon/Bane ±varies

There are a few grep-specific boons and banes. They all represent permanent changes to your body that are the deliberate or accidental result of grep experimentation on you. Maybe you chose it, maybe you were the target of hostile grep, maybe you were an unwilling guinea pig for someone's grep experiments. Since all of these use P as the gain or the cost, the gamemaster has to set guidelines on how many P can be spent on them.

Before you decide to go this route, note that many (almost all) places stigmatize those with obvious grep effects on their bodies. Some of these you can keep hidden, some you cannot. It is like having huge Yakuza tattoos on your arms. You *can* wear a long-sleeved shirt all the time, but it is going to put a crimp on your swimming, shirts-or-skins basketball games and dating opportunities.

In general, we recommend that you cannot spend more than 1P on any particular Boon, and a total expenditure on Boons of more than 1P requires getting the same amount of P from Banes. The Boons you are allowed to get are:

boons	costs
age one-half as fast	1P
walk speed of +3 normal	1P
recovery rating of +3 over base	1P
biological requirements of one-half	1P
+4 toughness	1P
+4 stamina	1P
+5 hits (option: +1 hit bracket)	1P

Most of these can be hidden from casual scrutiny, but close or detailed observation or simple testing will reveal them. The Banes are similar and the ones you can take are:

banes	gains
age twice as fast	1P
walk speed of -4 normal	1P
recovery rating of -4 normal	1P
2 stamina lost from uncommon item	1P
1d non-lethal hits from uncommon item	1P
1 lethal hit from uncommon item	1P

Enemies +1 to +3

There are several groups that are readily available as Enemies, depending on the background of an adventurer and the kinds of grief they are willing to put up with.

bounty hunters: This is so overdone as to almost be a cliché, but it *does* make sense in **Grep**. Governments or government-like groups do not have the geographical reach or long-range influence they used to, and an individual is seldom worth the threat of starting a war or trade disruption, but no government wants people who commit crimes in their area to be able to flee elsewhere with impunity. So, there is an official to semi-official set of reciprocal bounty hunting agreements. If there is an 'international' bounty for your return to a particular jurisdiction, any registered bounty hunter can apprehend you, show the warrant to local authorities and then transport you back to where the crime or other offense was committed to face justice. Such papers have to be verified, there are procedures at the border, bounty hunters have to follow certain procedures that vary from country to country, but you get the idea.

Bounty hunters as a group would be worth 1 or 2 points, and this presumes your background includes something important enough to be worth the effort. No bounty hunter is going to try to collect a bounty unless there is going to be a profit worth their time.

A single bounty hunter or bounty hunting team that has a specific interest in *you* is worth 1 point. Again, there needs to be a profit involved, but the reason could also include *personal* considerations. A specific bounty hunter on your tail does not mean he or she is following you around, but it *does* mean they are keeping a constant watch for news of your whereabouts and they will make detours or side trips to check out leads that might help them find you. Less scrupulous ones might use people you care about to get to you.

If you are hunted by local law enforcement or local criminals and flee their area of influence, this will eventually turn into a bounty of equal value on you. *You cannot escape the Enemy just by running.*

local law enforcement: This just means you are a wanted felon in the main campaign area. Bounty hunters are *not* needed, since the local police or their equivalent are keeping an eye out for you. To the extent that the area has central record-keeping requirements, this could make it difficult to get any sort of official permits, and any employer who *actually* checks up on your background will trigger alerts. Similarly, any sort of official border crossing will have notes with your name, picture, aliases and known associates. This sort of Enemy is only possible if the starting campaign area supports this kind of organized police force, and is worth 2 points for minor offenses and 3 points for serious crimes. Remember that there is a lot of empty space and this could just mean you spend a lot of time off the beaten path and outside official notice.

local crime: Just about every place of any decent size has an organized criminal element. This does not have to be a 'Mafia'. It could just be some local bigwig who has influence, an area-wide biker gang, a cult in the shadows or even a secret or illegal government group. Treat like local law enforcement, except the headlines will read 'local resident found dead in ditch' instead of 'local resident arrested'. The methods and people used to keep an eye out for you are different, but people are looking for you nonetheless. This is worth 2 or 3 points, depending on whether the local ne'er-do-wells want to just collect a debt, break your legs or use your skull as a bowling ball. Simply having an organization *in* an area (like 'Councilman Santino) is not worth points.

Forte/Weakness -1A/+2A

The ones in the core rules apply, as well as the previously mentioned **Advantage** you can get for Will.

Friends +1 to +3

Friends fall into the same groupings as Enemies and the core rules, but groups with which you are Friends generally have less power and reach. Remember that if you are acting as the official agency of a governmental entity, the package of duties/responsibilities generally includes that organization acting as your Friend so long as you are doing the business of that organization.

Looks ±1S

Applies normally. You could be strikingly good looking, be the victim of a grep disfigurement, or be self-modified in a way that others find freakish. In the latter case, the Looks is a positive benefit when among others of the same type or class.

Motivation +1S

Motivation is always an easy 1S towards an adventurer, but it is not required in **Grep**.

Mythic Archetype special

If you have a group that meets the trait requirements, go for it.

Organization -varies

There are plenty of government or quasi-government organizations adventurers can be a part of, but for making their own, there is one grep-related possibility:

SMOF: If you do not know what the acronym stands for, we cannot tell you, and if you already know, we do not need to. SMOF is the loosely run group that is the leadership (such as it is) of the Xenophiles (**page 2.11**). Adventurers could be the founders of a local chapter and their 'organization' would be part of the larger whole. What special snowflakes drift down to them for being part of this organization is up to the gamemaster.

Permits -1S

Because of the extreme balkanization of the world, permits are generally not something you have to spend points on, but which you may need to have nonetheless. A permit to do particular things would be part of a job benefit for a government employee (no points needed), but otherwise the paperwork is something that adventurers will have to acquire the old-fashioned bureaucratic way, with as much or as little role-playing as the gamemaster wants to apply to it. Bounty hunters certainly need to have permits to operate in any jurisdiction and probably have to have a license issued by their home country before they can do anything outside of it.

Merchants dealing in particular commodities will need permits, and people regularly making border crossings need a visa or the like, though this is usually only a feature of the city-states.

Personality +varies

Aspects of Personality are as normal under the rules.

Secret +1 to +4

There is always the possibility an adventurer could have as aspect that they really do not want to become public knowledge. Aside from being sideways regarding local behavioral norms (sexual orientation, etc.), you might have hidden grep alterations or defects, or you might be a fugitive of some sort living under an assumed identity. Having the secret revealed would result in a corresponding different trait. Having your assumed identity revealed as false might result in an Enemy, having grep problems might be a Looks stigma if everyone knows you have it.

Status ±varies

A adventurer's default status is average for **Grep**. No more than one level of global Status is possible for starting adventurers, and even this requires working in an official capacity for a government. Bounty hunters could have one level of very limited status, which reflects the *slight* extra authority they have, but retaining this status requires adhering to local laws and codes of conduct regarding their profession.

Unusual Background -1

There are not too many unusual backgrounds in terms of how this Trait is meant to work. Almost all the possible unusual backgrounds will somehow be tied to grep. *Maybe you were there at Red Square the day the alien ship disintegrated?* The gamemaster could also set up a unusual background for the entire group of adventurers, some common aspect of their past that draws them together and gives them a special advantage or insight. This would be the gamemaster saying "you all get 1 extra point for free', but I'm not telling you why."

Wealth/Poverty ±varies

Wealth in **Grep** has a few quirks. First is that *abstract* wealth is almost non-existent. Credit cards, online transactions and such are a thing of the past. You pay for things with tangible goods or actual services. There is *still* money, but that money is objects that people consider valuable in their own right, not because they represent a promise of value. The only forms of abstract cash tend to be temporary and local. A company might pay workers in checks that are cashed at a local bank. But this only works because the workers know the company and the bank knows both, so the potential for fraud by fabricating bogus checks is much diminished. City-states sometimes have their own scrip, and they avoid grep-counterfeiting by means described later.

Among other things, this means banks for storing money and convoys for transporting large sums, both of which can be robbed, and since money is in the form of raw materials, a smelter is all you need to 'launder' the money into a perfectly untraceable and legal form.

Starting goods

An adventurer's grep skill does *not* affect what goods they afford. Their skill can be what they make a living with and thus indirectly influence what they could buy. But starting wealth represents both your cash and the time you may have spent personally grepping things.

One thing this *does* mean is that if you have the skill, you can start play with any item you can afford. Legality is *not* a concern. You could live in the capitol of a city-state and have a secret closet full of grepped machineguns and rocket launchers. What you would need is both the skill to make them and a personality and background to explain *why* you made them. Furthermore, if you had any skill at using them you would have to explain where you got it from. It would be like a current resident of England (where private ownership of pistols is prohibited) making up a pistol on a 3D printer.

Why exactly did you feel a need to commit a felony, and what are you going to do with it now that you have made it?

If you look on the gear list, goods will have a difficulty score in addition to their other stats. If your grep skill roll in general or for that class of item cannot do a 'take 2's' roll that matches that difficulty, you cannot say you grepped that item yourself. You might still be able to buy it with starting cash, but it has to go through the normal *legal* channels for the area you live in.

> An item you want is prohibited in the area you live and has a listed difficulty of 9. If your grep skill is 4d+1 or more you can 'buy' it anyway (you secretly grepped it), otherwise you may have to wait until the start of play and role-play a situation that lets you get hold of that item.

Finishing up

The information you have so far should be enough to get you started, to have at least one foot planted in the setting and with an idea of where to go from here. The next three pages have some ready-to-go sample adventurers for people who just want to dive in, and you can adjust their personalities to make extras for them to run into. They *all* have room for a few more traits for extra points.

Think about the world you live in right now, and the setting the gamemaster has described as the starting area.

If it is rural, imagine a world where ninety percent of the houses are empty. Some of them have succumbed to the harsh weather of the Dark Days, accident or vandalism, some are partially stripped of useful bits, others are used as storage buildings by the people living nearby. A lot of farmland has gone fallow and been overrun by brush or young forests. Some people still live in the family homes they had before the Dark Days. Others have moved close to each other for security, some are transplants from the cities who have taken over houses and land no longer occupied.

Small towns dot the landscape at major road junctions, selling services and the goods that people find easier to buy than to grep. Doctors or dentists, mechanics, barber shops, a general store, perhaps a sheriff's office or equivalent.

If it is suburban, imagine mostly empty neighborhoods. Survivors may have moved into the best empty houses and cluster themselves in cul-de-sacs for security. Maybe they live in an area that is stable, but have a gate and a high chain-link fence they put around their shared property as a just-in-case measure. There is probably a school that serves the local area and school buses and sports teams and all the usual features of suburban life. But in parts of the United States outside a city-state security zone, there are probably a lot of armed school bus drivers and an arms locker for the teachers, just in case. The usual parental admonitions of 'do not talk to strangers' have additions like 'do not touch skeletons' and 'stay out of vacant buildings'.

Central places like malls are probably still open, but rather than big brand stores it would be like a combination flea market and farmer's market. People sell salvage, soup starter or run small services like beauty salons. Electronics greppers hawk two-way radios and low-end smartphones. The local big-box hardware store has become the same, but for architectural salvage, and someone has cornered the market on automobile salvage by fencing in a huge parking lot and towing in every abandoned vehicle within a few kilometers. The government is either handled by a local city-state or is some sort of council of neighborhoods that can barely handle snow removal and pothole repair, and delegates legal matters to a local police force and a handful of judges, attorneys, bail bondsmen and skip tracers.

If highly urban, the urban areas are as depopulated as everywhere else. There is plenty of room for squatters, but most choose to live together in apartment- or condo-based communities.

Everyone pays a rent or a maintenance fee to keep a full-time staff to maintain and repair the building's infrastructure. Depending on the area, this can also include keeping up the local water, sewer and power lines, and include payments to a distant utility that provides these services. Or, the building might be topped with windmills and solar panels, be retrofitted to catch rainwater and so on.Other areas might have walled urban neighborhoods, gentrified two- and three-story rowhouses, or small business districts with shops below and apartments above. The key features are that people need a place to do what they do, proximity to people who need their goods or services, a place to live, security and basic things like water and power. An old megacity like New York City could have completely independent boroughs, each represented by several self-contained neighborhoods, each of which is surrounded by largely empty structures. In the city-states the population density is much higher, mostly because the population from the outskirts has moved in.

In all these cases, figure out where your adventurer fits in, how they feel about the rebuilding, improvement or perceived problems of the grep-enabled world, and what they intend to do about what they feel. Is your adventurer a visionary, an entrepeneur, a would-be conqueror or king, or just an average person trying to get by, thrown into strange circumstances not of their choice or making?

Remember that a big part of **Grep** is exploring and changing the world, and knowing *too* much about it would take away from the discovery process. Just because adventurers live in the world does not mean they know *everything* they need to about it...

Coming up...

The next chapter goes into using grep to do stuff, its benefits, limits and hazards, as well as a primer and some real-world thoughts on nanotech for those who are unfamiliar with the subject.

Survivor

"What you doing out here, and where you from?"



Strength	6
Agility	7
Awareness	8(11)
Will	7
Health	7
Fate	3

hits	13
stamina	7
toughness	2
move	4/6/8
dodge	4

Traits

Middle-aged(-5A,+9S)
Background(+1A)
Cautious(2)(+1A)
Forte(keen eyes)(-1A)
Secret(bounty)(+2A)
Friend(loyal dog)(-1A)
Poverty(-2 on lifestyle)(+1A)

Skill rolls:

grep: 4d+1
firearms: 4d+1
brawling: 3d+1
scrounging(grep): 4d+2
stealth: 3d+1
driving: 2d+1
horsemanship: 2d+1
mechanic: 3d+2

Homesteader or general loner who greps or hunts for the basics and sells scrap or salvage for when he needs cash. Has a mean old dog as a Friend. Good with pre-grep tech and rambles about the pre-grep world when he encounters younger travellers. Has a bounty on his head from some indiscretions a long time ago, but he looks different now. He hopes.

start of play hook: His dog is sick and needs urgent treatment, so he heads to the nearest town.

Rural doctor

"No, I don't take payment in chickens...or geese."



Strength	6
Agility	7
Awareness	10
Will	6
Health	6
Fate	3

hits	12
stamina	6
toughness	2
move	4/6/8
dodge	4

Traits

Middle-aged(-5A,+9S)
Background(+1A)
Friend(-1S)
Wealth(+2 on lifestyle)(-1S)
Enemy(+1A)
Maudlin(2)(+1A)

Skill rolls:

grep: 3d+0
medicine: 5d+1
(surgery): +1d
pharmacy: 4d+1
diplomacy: 3d+1
driving: 2d+1
history: 3d+1
firearms: 3d+1
martial arts: 2d+1
hobby(guitar): 3d+1

Circuit doctor who spends a week or so in a rural community before moving on to another. Has made a number of useful friendships over the years but seems to keep her emotional distance because of some undiscussed emotional scars. She has a low-level Enemy or a stalker, but does not know who or why, only that she gets vague, anonymous threats.

start of play hook: Her stalker sabotages her truck while she is travelling and she needs assistance.

Wheelman

"Don't much care what it is, I just get it there."



Strength	7
Agility	10
Awareness	10
Will	8
Health	8
Fate	4

hits	15
stamina	8
toughness	2
move	4/6/8
dodge	6

Traits

Phys. prime(+5A,+3S)
Adventurous(2)(+1A)
Background(+1A)
Permits(DC)(-1S)
Friend(-1S)
Wealth(+2 on lifestyle)(-1S)

Skill rolls:

grep: 2d+2
driving: 4d+1
firearms: 3d+1
pilot(boat): 3d+1
brawling: 3d+1
horsemanship: 3d+1
mechanic: 3d+1
area kn.(roads): 3d+1

If it can be driven, they can drive it, maintain it and fix it. They have a local reputation for being reliable and currently work for a Rova transport company. Uses their vacation time to do more interesting jobs that actually pay them to travel. Has transit and hauling permits for the DC area.

start of play hook: The company they work for has them on tap for an out of the ordinary hauling job.

Ganger

"Wave that finger at me again and I break it off."



Strength	8
Agility	9
Awareness	7
Will	9(6)
Health	9
Fate	4

hits	17
stamina	9
toughness	3
move	6/8/10
dodge	6

Traits

Adult(+0A,+0S)
Background(+1A)
Cocky(2)(+1A)
Poverty(-2 on lifestyle)(+1A)
Enemy(+1A)
Friend(-1S)
Weakness(touchy)(+2A)

Skill rolls:

grep: 4d+0
firearms: 3d+0
brawling: 3d+0
scrounging(grep): 3d+1
carousing: 3d+0
running: 3d+0

A child of the post-grep world, barely old enough to have memories of the way things were before. Lost one or both parents during the Dark Days and grew up fast and hard. Does not have much except himself (or herself) and self-respect and does not take kindly to threats against either. Is doing odd jobs for a local group of respectable businessmen, but draws the line at beating up people who have not done anything worth beating them up for. This limits their career opportunities and they have decided to look at other paths to take.

start of play hook: Wants to get out of town for a while and see what else is out there.

Greppie

"Tell me you did not just do what I think you did."



Strength	6
Agility	8
Awareness	10
Will	10
Health	6
Fate	4

hits	12
stamina	6
toughness	3
move	4/6/8
dodge	4

Traits

Phys. prime(+5A,+3S)
Background(+1A)
Friend(-1S)
OCD(2)(+1A)
Status(-1)(+1A)

Skill rolls:

grep: 5d+1
chemistry: 3d+1
electronics: 3d+1
scrounging(grep): 4d+1
brawling: 2d+2
firearms: 2d+2
driving: 2d+2
area kn.(ruins): 3d+1

Grepping is their life. *It is just so damn cool to turn thoughts into reality*. The only thing cooler than grepping is doing it with others or competing to see who is better at it. Most simply do not understand and think people who grep that hard are mentally off, but greppies do not care.

start of play hook: They need exotics for a special soup and no one in the local area has the goods.

Bounty hunter

"Are you surrending with or without an ass-kicking?"



Strength	9
Agility	9
Awareness	8
Will	7(10)
Health	9
Fate	4

hits	18
stamina	8
toughness	3
move	5/7/9
dodge	6

Traits

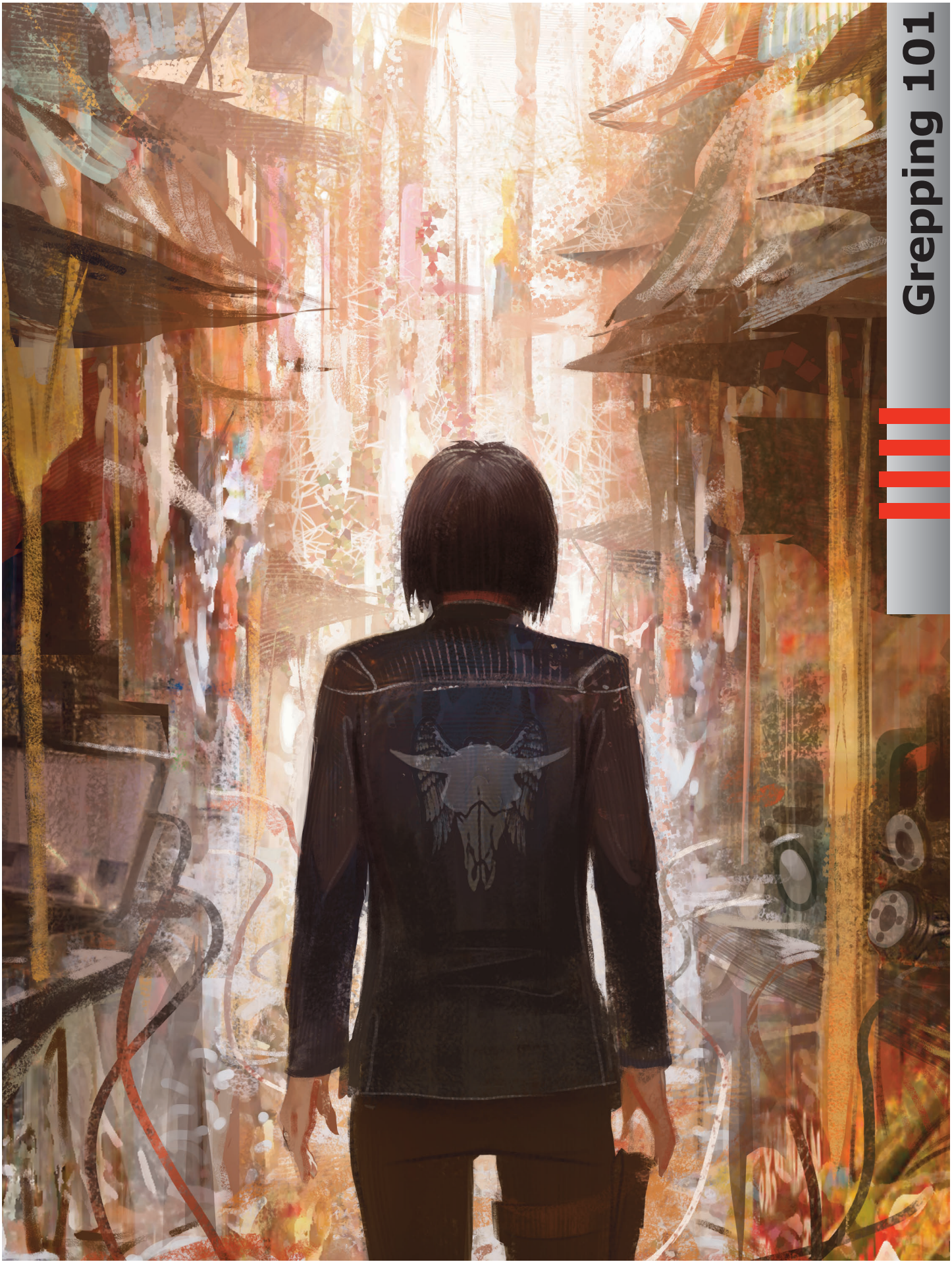
Phys. prime(+5A,+3S)	Pragmatic(2)(+1S)
Background(+1A)	Permits(DC)(-1S)
Friend(-1A)	Enemy(+1A)
Hit bracket(+1)(-2S)	Forte(tough)(-1S)

Skill rolls:

grep: 2d+1	**driving:** 3d+0
firearms: 4d+0	**law:** 2d+2
brawling: 4d+0	**lockpicking:** 3d+0
knife: 3d+0	**area kn.(crime):** 2d+2

More or less apprenticed to an older bounty hunter. Good, but not as good as they are. However, good enough to strike out on their own. *Maybe*. Has the requisite permits for operating in the Federal Exclusion Zone but still below par on the full scope of DC law regarding extradition and use of force.

start of play hook: An opportunity has come up to catch a few easy, low-value wanteds.



Grepping 101

With the ability to select a sequence of reactions from a predesigned set and specify a position for each reaction, complicated covalent shapes could be built a few atoms at a time. Expected reliability rates would allow billion-atom structures (~200nm diamond cube) to be built with low probability of even a single error. A molecular manufacturing system would use a small set of simple operations with extremely low error rates for both fabrication and assembly of precise parts. A manufacturing program could be expected to work reliably and produce a large number of billion-atom products without error.

Molecular Manufacturing Theory *(crnano.org)*

INTRODUCTION



What exactly is nanotech anyway? Right now it is mostly just a buzzword for marketing stain- and water-repellent fabric coatings, but that would not make for a very interesting rpg setting.

Nanotech is effectively artificial life. Microscopic assemblers and disassemblers that can create visible, useful objects by taking advantage of raw materials and energy in their immediate environment.

For instance, right now we have a nanotech-created structural material for construction purposes. It forms crude but usable linear shapes which are then industrially processed into standard sizes. It is durable, cheap, safe and biodegradable. We call it 'wood'. A similar comparison would be to you. Everything about you that is *not* learned behavior came from a combination of your genes and environment.

In other words, your *physical* form as an adult is the information content of one sperm and one egg cell, which drew upon energy and raw materials in a specialized environment to eventually become a human being. Obviously, molecular level self-assembly of complex, self-replicating structures *is* possible.

Nanotech is an artificial version of this, which is based more on electronics and computers than chemistry and biology. It can make things with the same fidelity as a computer copies files and can theoretically build things far faster than biology can. *Or maybe not.* A bacteria can duplicate itself in twenty minutes...

We still have a lot of questions about nanotech, mostly because *we* have not been able to fabricate something capable of self-replication or programmed construction, which makes it difficult for *us* to say exactly what is and is not possible. And that level of 'we do not know' is where all the potential for an interesting gameworld comes in.

So, what is grep?

The alien ship that crash-landed in Red Square belonged to a race called the Haaren, and grep is their nanotech. The word 'grep' is actually an abbreviation in the Linux programming language for 'global regular expression print'. The Haaren nanotech picked up that nickname after it was used in a widely broadcast interview in the first months after people realized its existence. It was a word play on the idea of being able to print (make) anything (a global variable). Most people did not get the reference, but the term stuck in the public consciousness and quickly became a noun ('it's a grep'), a verb ('let's grep something!'), an adjective ('a grepped item'), insults ('you couldn't grep grass clippings with a lawn-mower!'), a substitute for profanity ('you gotta be grepping kidding me!'), and probably more.

But what *is* grep? Grep is a cell-sized bit of assembler-disasembler nanotech combined with a low-bandwidth quantum transceiver and a memory composed of a small amount of information and a lot of pointers to other data. On the macro scale you would think of it as an industrial robot arm attached to a small flash drive full of torrent bits, attached to a mobile phone and an internet router.

Grep is inherently passive. Left to itself, it does nothing except repair itself and ping the surrounding area for the presence of other grep. If there is not a sufficient density of grep, it makes more of itself, often sharing information with nearby grep so that it is not an exact clone of its parent. By the time a campaign starts, everyone on earth probably has a hundred grams of grep (a handful) distributed throughout their body and this has no effect on their health or longevity. The same could be said for just about everywhere on Earth, with the caveat that grep tends to be more common where there are energy gradients and sufficient diversity of elements to make new grep. So, salt flats, Antarctic glaciers and similarly uniform areas have a low density of grep, while people and most of the temperate and tropical biopshere is fairly rich in it.

Grep would normally be of no use to humanity, because it was not designed for us and the Haaren never intended it to be used by anyone else. However, the Haaren got in an interstellar tussle with the Cryptbians (those few who know about them shorten this to something pronounced 'Krypts'). The Cryptbians managed to alter grep enough that it could adapt to non-Haaren intelligences, which it eventually did for us humans. Whether or not this had anything to do with the ultimate demise of the Haaren ship or how long ago this war happened is up to the gamemaster (it was a *long* time ago and is unlikely to show up here).

This is what makes grep important, amazing and civilization-wrecking. The grep itself is still not intelligent, but it adds complex neural networks to its own internal communications. And once that intelligence (like us) figures out what is going on, it can command the grep to do things. Originally, only the Haaren had this ability, but thanks to Cryptbian meddling, *anyone* can do it.

The way it works is conceptually simple, but a lot of things have to happen to be successful at it. The short form is that you think of what you want and where you want it, and the grep makes it for you. The long form is:

- you develop the skill and awareness to 'communicate' with the grep
- you visualize what you want in sufficient detail for your personal grep to generate a query
- your grep collectively broadcasts a request for what it thinks you want
- your grep eventually gets sufficient bits of information to have a set of plans for that item
- your grep directs these plans to the grep in the area you wanted the item made
- assuming that this area has the necessary elements to make your item, the grep in that area begins making dumb assemblers/disassemblers (AD's) customized for just this item
- these AD's make your item at a speed dependent on the skill of the person initiating the process, the complexity of the item and the energy available to assist in breaking and reforming atomic and molecular bonds
- you get your item

Or not. A failure in any one of these steps can cause a failure of the whole process, or end up making an item that is functional but flawed or non-standard. For instance, you might want an AK-47 but get a rifle that looks and works like an AK-47 but can only use whatever ammunition you made at the same time you made the weapon (e.g. instead of using 7.62mm bullets it uses 7.42mm ones).

Because grep is just about everywhere, you can grep just about anything. *Including yourself or other people*. The latter is difficult unless the other person consents, since they can command their own grep to regenerate their self-image, undoing hostile changes as fast as they occur. This is in fact a built-in defense mechanism for grep that have colonized a person and works to some extent even without any grep skill.

Since the distributed memory of the Cryptbian-modifier Haaren nanotech includes both of *their* technological bases, someone sufficiently skilled can grep items that are beyond known *human* science.

Grepped stuff does not just assemble itself on a tabletop. Theoretically, you *could* do this, but it would be extremely inefficient and time-consuming. Instead, you usually use some sort of liquid slurry that both contains the elements you need for the item and a means to shuffle them where needed with electric charges and tiny swimming AD's. This slurry is called 'soup'. In addition, for fastest grepping you plug a couple electrodes into the slurry and pump in as much electricity as the soup can handle without boiling or damaging the item being grepped. Obviously, for grepping a living thing you have to be a little more cautious with the content of the soup and the energy you pump into it.

What can you grep?

Grep does not *do* things, it *makes* things. Anything that a human industry could make, grep can make. Anything that humans can alter or reprocess, grep can alter or reprocess. And for those with sufficiently esoteric skills, the same applies to the technology of both the Haaren and Cryptbians. So grep does *not* make magic wands, teleport belts or invisibility cloaks.

Grep only *rearranges* existing matter. It cannot transmute one element into another. You could change a lump of coal into a diamond (both are carbon), but you could not turn lead into gold. And this is part of the economy of grep. Certain things you might want to grep may require certain raw materials that you have to purchase or trade for. The more advanced the item is, the more likely this is the case. This will also be part of the grep design process. A grepped item will have a recipe. We are not going to make you become an expert chemist, but a class of items might require something with a design modifier of 'rare 1' or 'extremely rare 2'. While in the *real* world that might be something like 'tungsten' and 'ytterbium', **Grep** is just going to assign generic names to broad classes of things.

Grep *can* refine things. You could make up a soup of crushed lithium ore and end up with a bunch of waste liquid and a lump of lithium, and then you could use that lithium in a grep operation that required it. You might think you could just dump the lithium ore into your item's soup and do it that way, but grep needs a certain concentration or threshold to work. Lithium ore might be 1% lithium in the form of a lithium-aluminum-silicon-oxygen compound, which grep can easily work with, prying the lithium loose from its atomic buddies in an air-free oil bath. On the other hand, lithium in seawater is in concentrations of .0001% and since lithium reacts strongly with water, using grep to separate it from seawater is a problem. All of the details like this are things that we just generalize as part of the design process.

How to grep

This is just a variation of the **EABA v2** power design process, using a bunch of templates and a few tweaks. What it really boils down to is this:

- **base:** there is a default difficulty to grep anything, and a minimum difficulty based on certain other parameters of the item.
- **size:** more massive things are harder to grep. *A tank is harder than a tank top.*
- **refining:** the fewer impurities there are in your raw material, the better.
- **composition:** the more exotic the materal or the more difficult it is to work with, the higher the modifier.
- **complexity:** any given item will have a relative complexity compared to other items of that size and type. More complex is harder.
- **danger:** the more energy that is embodied in the final item, the harder it is to grep. *A working hand grenade is harder than a dummy hand grenade.*
- **energy:** the more energy you have to power the grep, the easier it is. *Plugging a power cable into your soup makes it run better than letting the sun shine on it.*
- **time:** the more time you spend, the more likely you are to be successful. *A process you tell the grep to take a day completing is more likely to be successful than one where you demand results in an hour.*
- **skill:** having a high grep skill is obviously a good thing, and the more knowledge you have about the item you are grepping, the better. *A rocket scientist has a better chance of grepping a rocket engine.*
- **precision:** the more compatible the item has to be with other items, the harder it is to grep. *A chunk of refined metal from ore is easier than a bullet that has to fit every gun in its caliber.*

We will cover each of these, then some of the special overall cases (like rare elements and what happens if you fail your roll while a swimming pool of oil-based soup has a high-tension line running into it) and then a few of the esoteric topics like grepping a living being.

Because the vision you have for the setting might not be the same as ours, remember that you can tweak the grep rules to match the way you want things to be. So if you want a lot of vat-grown monsters roaming around, you make biological greps a lot less difficult. If you want things to be steampunk-ish, make everything but mechanical greps a lot harder.

Base difficulty

The base difficulty for you to grep *anything* depends on its mass and dominant type, which is the first number on the table on the next page. A limiting factor on *all* greps is that the *negative* modifiers (those that make grepping *easier*) for time or energy can never have a *total* of more than the base difficulty minus 10.

> The base difficulty for a mechanical 500kg item is +18. So no matter what time or energy modifiers you apply to make the grepping easier, *neither* effect will never be more than a -8 modifier (so, a maximum of -8 for the two combined).

The 'base difficulty' *does* include the adjustments for the type of grep. So for instance, adding a mechanical component to a chemical grep increases the **base difficulty** by +1, which *does* increase how much energy or time you can apply to the grep.

> The gamemaster can adjust the modifier limits for time and energy based on the type of grep. For instance, if you are grep-refining metal, you do not have any real limits on energy if you are fine with *molten* metal as the final product. Conversely you might want a lower energy limit if trying to run a regeneration tank for a person.

Minimum difficulty

The minimum difficulty to grep *anything* is the second number on the table on the next page. This keeps players from tacking on ludicrous modifiers to make large greps easy.

> The numbers for the biological 125kg item are 29/15. So the base difficulty is 29 and the difficulty can never go below 15.

Size

This is a variation of the size modifiers for gadgets. The nature of the grep and the final mass of the grep are your single biggest factors. *An exception is that you get no benefit for items of less than 1 kilogram.* As a result, very small items are usually grepped in lots.

The four types of things you can grep fall into the overall categories of: mechanical, chemical, electrical and biological. The main category you use is based on the final use of the item and its total grepped mass. For instance, a medicine is a *chemical*, but it is destined for use on a *biological* system, so it would be designed as a 'biological' item.

mass	mech	chem	elec	biol
1kg or less(pistol)	9/9	10/9	10/9	10/9
2kg	10/9	11/9	12/9	13/9
4kg(rifle)	11/9	13/9	14/9	15/9
8kg	12/9	14/9	16/9	18/9
16kg	13/9	16/9	18/9	21/9
32kg(hmg)	14/9	17/9	20/9	23/9
64kg	15/9	19/9	22/9	26/9
125kg	16/9	20/9	24/9	29/10
250kg(motorcycle)	17/9	22/9	27/9	32/12
500kg	18/9	23/9	29/10	34/13
1 ton(small car)	19/9	25/9	31/11	37/14
2 ton(truck)	20/9	26/9	33/12	40/16
4 ton	21/9	28/10	35/13	42/17
8 ton	22/9	29/10	37/14	45/18
added to grep	+1/+1	+2/+2	+3/+3	+4/+4
each 2x quantity	+1/+0	+1/+0	+1/+0	+1/+0

The 'added to grep' modifier is if you make an item that includes more than one category. For instance, a 1kg loaf of bread (biological) is +1 difficulty. A .6kg loaf of bread in a .4kg bread-box (*add* mechanical) is +2 difficulty. *Same mass, just a little more complex*. If you look at the table, base difficulties are 9 plus:

- mechanical: (mass level + 12) x .3(n)
- chemical: (mass level + 12) x .5(n)
- electrical: (mass level + 12) x .7(n)
- biological: (mass level + 12) x .9(n)

The '2x quantity' refers to the main item only. *Consumable* supplies generally count as just their type as long as they are *individually* 1 kilogram or less. So, a 1 kilogram batch of rifle bullets *or* a 100 kilogram batch would be *one* mechanical (bullet and casing) and chemical (propellant) item. If you were making 5 kilogram shells for an anti-tank gun, each 2x multiple would be a +1 difficulty *in addition to* the *total* mass modifier. Eight walkie-talkies is *not* a consumable item, so no matter what their total mass was, it would be a +3 difficulty (+1 for '2x quantity' three times).

The grepping process is *not* gameable, even if the game rules are. The default is that if there are two different ways to interpret how to do something, you go with the more difficult one. Here are some guidelines what an item 'is':

an element: *mechanical*. Even if liquid or gaseous you would consider it mechanical, but you might *also* need to grep or provide a container for it.
any industrial chemicals: *chemical*. This could also include household chemicals and runs a range from industrial solvents down to anti-perspirant or a block of salt.
a solid mixture of elements: *mechanical*. This is where the elements in question do not require anything more complicated than being in the same place and do not really react with each other.
an alloy: *mechanical*. The extra energy needed for the metals to bond properly is dealt with elsewhere.
any electrical component: *electrical*. This is things like individual microchips or display screens.
any completed electrical device: *electrical+mechanical*. This is a whole device, like a radio or laptop computer.
drugs or medicines: *biological*. This usually refers to anything that goes *into* a living creature. Topical ointments and such are usually just 'chemical'.
any cybernetics: *biological+electrical+mechanical*. This is rare in **Grep**, but possible. Items that are not really 'moving parts' would just be biological+electrical.

! Do not worry about the insanely high difficulties for large objects, there *are* modifiers like time and energy that can offset them.

If you wanted to make a 1 kilogram pistol, the difficulty (so far) would be:

base difficulty: 1 kilogram(mechanical)	9

If you wanted a slightly smaller pistol with a fully loaded magazine:

base difficulty: 1 kilogram(mechanical)	9
extra difficulty for chemical	+2
total difficulty	11

If you wanted a slightly smaller pistol with a fully loaded magazine *and* a laser sight:

base difficulty: 1 kilogram(mechanical)	9
extra difficulty for chemical	+2
extra difficulty for electrical	+3
total difficulty	14

In all of these it is assumed that the 'pistol' part of things is the biggest chunk and what the design intent is, so it is 'mechanical' with 'chemical' added to it. On the other hand, a glass jar of acid is a 'chemical' with 'mechanical' added to it. Note that you *could* supply your own jar and the grep would put the acid in it for you.

Now, there is a big difference between the mechanical complexity of a lump of steel and the mechanical complexity of a precision wristwatch, and we will get into that in a bit. Right now, you can see from the example that with a decent skill you can get the full product in one pass, but if you are not so good at it, you need to do it in several easier steps. And this becomes more and more true the bigger and more energetic them item you want is. For instance, grepping high explosives has a greater embodied energy than grepping a brick, so one will be harder (and have more significant side effects) than the other.

Refining

This is where there is a departure from the normal **EABA** power design rules. Grep does **not** note a difference between a tub of iron ore and a tub of uranium ore, it only looks at whether the stuff is concentrated enough to refine it and reassemble the bits into something else. The basic modifier is the difference between what you *have* and what you *want* in terms of raw materials and quality of the final product:

going in	mod	coming out	mod
junk	-6	marginal quality	-2
sorted	-4	average quality	+0
low quality	-2	high quality	+2
high quality	+0		
pure	+2		

Refining is a 'garbage in-garbage out' modifier. You figure out what quality of raw materials you have and what quality of finished product you want, and the ***difference*** is the difficulty modifier. So, if you want a high-purity or high-quality item, it is easier to start with a better quality of raw materials. For difficult greps it is almost required to have a preliminary grep that takes your raw materials and makes them as absolutely pure as possible.

If you wanted to make an 'average quality' spare part (+0) for a car engine and you started with a bunch of dirty scrap metal (-6), the difficulty modifier for grepping it would be +6 (because there is 6 points of difference between the two).

With gamemaster permission you can combine modifiers to have a total of less than zero, but normally this modifier can never make a grep easier, only keep it from getting harder. The 'pure' modifier is only possible with labaratory-grade procedures or a grep step that turns your 'going in' raw materials of lesser quality into 'coming out' pure quality materials.

If this is all you need to know on refining, skip to the next step. The rest here is just detail.

The gamemaster has to look at the modifiers on a situational and subjective basis. To help out with that:

- **marginal quality:** The minimum acceptable result that is going to do what it is supposed to do. Food will be edible, a device will function, medicine will not poison you, and so on. The food may taste awful, the device may be ugly, uncomfortable to use or have an irritating quirk, and the medicine may have unpleasant but not life-threatening side effects, but they all do what they are supposed to do.
- **average quality:** The result is 'consumer grade'. It looks and functions like it is supposed to, but is not going to win any awards. High quality raw materials and average quality finished product is the default for grep examples later in the rules, and is a +0 modifier.
- **high quality:** The result is exceptional in purity and appearance. Mind you, this is no guarantee that it actually *works*, but if it does so, it works very well.

That last point is actually very important. A grep can fail but still *look* good. There could be defects of various types outside of simple appearance. What the refining modifier does is look at how 'pure' the result is supposed to be. It is the difference between a batch of rotgut whiskey that gives you an awful hangover and a batch indistinguishable from the finest example of the distiller's art. You might do worse than refining you want, but you will never do better than it.

A possible failure result on your grep skill roll is that there is a problem in the refining aspect of the task. So, if you wanted a high quality item you might get an average one instead. This could be a perfectly acceptable result, depending on the grep. It is also a reason to start with good quality materials and try for high quality output, since this gives you more room for a successful grep even on a failed skill roll.

The important thing about grep in game terms is that as long as you have the raw materials, what you want to grep is *theoretically* possible. If you do not have *all* the raw materials you need, it does not matter how good you are at grepping, you will *not* succeed. That is, gasoline is a hydrocarbon. So if you don't have any carbon in your soup, it *is* going to fail.

Gamemasters and players should *never* get into a hoarding or accounting mindset for grep, like "*how many milligrams of rhodium do I have left?*" There's really only three situations when it comes to raw materials:

- you have what you need
- you have it but need to purify it a little more
- you need to go out and beg, borrow or steal it

The raw materials for grepping can be given one of several general categories that do not care *what* the material is. A gamemaster with no knowledge or interest in chemistry or material science can just say "you need a lot of common stuff, a handful of uncommon stuff and a pinch of ultra-rare stuff" and that's as science-y as you have to get.

Let's say you were in a hurry and wanted a gun and ammunition, but start with junk materials.

base difficulty: 1 kilogram(mechanical)	9
extra difficulty for chemical	+2
start with junk, going to marginal qual.	+4
total difficulty	15

This is not that easy a task if you do not have any other modifiers to reduce the difficulty, but if successful you will have a rough, nasty pistol and at least a magazine of ammunition for it. If you did it with good raw materials:

base difficulty: 1 kilogram(mechanical)	9
extra difficulty for chemical	+2
start with pure, going to high quality	+0
total difficulty	11

For the gamemaster who wants to go into a little more technical depth on raw materials:

common: The stuff that is all around us just about everywhere. Carbon, hydrogen, oxygen, nitrogen, iron, argon. The only factor is whether the local environment is short of one for natural or artificial reasons. For instance, a grep-resistant jail cell you are locked in has no easy sources of iron in reach.

uncommon: These are things that not commonly available in *natural* form, but which pre-grep industrial processes turned into a lot of items. So, availability depends heavily on scrounging and trade. In general, uncommon items are actually common in urban areas and rarer in rural areas. A good example would be aluminum, silver or gold. In an urban area, 'high quality' aluminum is common as dirt and electronic scrap might have gold at the 'sorted' level. In the middle of the woods, aluminum would be locked up in minerals and more difficult to extract and gold would be absent unless you were at a natural deposit.

rare: These are elements that are usually only needed in trace form, but which are very rare in useful concentrations in nature. The major sources will be the ore in place where it occurs, and salvaged pre-grep items everywhere else. Lithium, tungsten, tantalum, stuff like that.

ultra-rare: Like rare elements, but availability in salvageable items is limited by price, utility or law. Anything naturally radioactive would qualify.

unique: This last category is for things that do not occur in easily extractable form in nature, or do not exist in nature at all. An example would be a concentrated isotope of an element, like U_{235}, or an element that only exists because it was created. For instance, $Americium_{241}$ is produced by bombarding uranium or plutonium with neutrons and there are *no* natural sources. You can find it by sifting through the soil at nuclear test sites. Or by cracking open household smoke detectors, each of which contain about .3 micrograms of the stuff. For reference, it would take a *thousand* such pieces to make one piece the size of a grain of sand.

Determining what goes into something really depends on how much detail the gamemaster wants to put into it and you can rate raw materials from common to unique. As a general guide:

tools: common (industrial metals)
food: common (carbon, hydrogen, oxygen, nitrogen)
fuel: common (carbon and hydrogen)
melee weapons: common (industrial metals)
guns: common (industrial metals)
ammunition: uncommon
electronics: rare
medicines: uncommon
alien tech: ultra-rare to unique

As a **role-playing** guide, the difficulty of scrounging a material is the difficulty of a grep of that size (the size of the amount of *that* material, not the *whole* grep). Assume this is the 'mechanical' level for elements and 'chemical' if the gamemaster says a raw material has to be some sort of molecular mixture. *And of course, the material has to be in the area to begin with*, which you might not know until you repeately scrounge and fail.

scrounging raw materials	difficulty
base	as size
very common material	-3
common material	+0
uncommon material	+3
rare material	+6
ultra-rare material	+9
unique material	+12

The local rarity can adjust the default rarity up or down a row.

You need to grep a 32kg chunk of aluminum to do something and you do not have anything on hand that you can repurpose. The gamemaster says this area has not been *totally* picked over . So, you start with a difficulty of 14 for a 32kg mechanical item and add +0 for it being a common material (in an urban area), for a final difficulty of 14. So, rummaging around deserted buildings for an hour and making your roll gets you the aluminum you need.

The normal scrounging roll takes an hour and you can get up to a -1 on difficulty for each 4x time and -1 for each 4x of people involved (up to -6 for each). If you cannot scrounge large amounts, you can always do smaller amounts multiple times.

You need need a trivial amount of an ultra-rare substance for a particular grep and you are pretty sure this area has some of it..*somewhere*. Finding a local source starts at a difficulty of 9 (for 1kg or less) and gets +9 for the rarity, for a final difficulty of 18. If you have four thousand people spend an hour each on it, you can drop it to a difficulty of 12, but if the gamemaster says you simply cannot get that stuff around here, it does not matter *what* your skill at scrounging is, even your army will not find you any.

It is important to note that the 'junk' level is 'easily visible or measureable amounts of the stuff you need'. It just has a lot of *other* stuff that is useless or counter-productive. For instance, a wheelbarrow full of grass clippings is 'sorted' or 'low quality' for an organic grep, while a wheelbarrow full of rocks, dirt, metal scraps *and* grass clippings is 'junk'.

'Junk' is perhaps +6 *above* 'low-grade ore' for a material, and 'low-grade ore' is +6 above 'trace concentration', and each of these likely has a 100:1 waste ratio (yes, it varies but the rules have to draw a line *somewhere*). Each step above junk will be counted as a 10:1 waste ratio. So, it would take you 10 **tons** of material with a trace concentration of something to get 1 **gram** of 'pure' material for whatever it was you were looking for (1 part in 10 million), and this would require six separate grep steps. That is, it is a lot of work and mostly impractical economically, but if the *only* way to get a pure material is from trace elements, you *can* do it. For a real world reference, gold in seawater is actually closer to 1 part in 100 million and uranium is about 1 part in 300 million.

And extremely rare or unique materials are *not* even present in trace quantities in most places, so you have to work just to find those. For instance, U_{235} is a trace element in uranium ore. So, you either go to a uranimum mine and cart off several tons of ore, or you raid a nuclear reactor. There are some alien techs that can be made with grep that require trace amounts of elements that humans have not yet figured out how to create. The only amounts on Earth are the trace quantities that were in the Haaren shipwreck, and those are distributed across the planet. Acquiring the milligram or microgram quantities needed might involve multiple grep steps on thousands of tons of material, and once acquired, the stuff would be barely visible to the naked eye yet be worth a fortune. This has potential adventure use, especially if adventurers do *not* realize they are in possession of that fortune.

Refining is not meant to be a 'make the players waste time' step or modifier, but *is* part of the chase if trying to do something exceptionally difficult and potentially campaign-disruptive. If it is really hard to do, you will have a better chance of success if your soup does *not* have a lot of useless garbage in it. The important thing to remember is that this modifier uses the worst case. If you need several materials for a grep and most of them are high quality and one of them is 'junk', the difficulty of a successful grep assumes 'junk'.

Unlike other 'design systems' for **EABA v2**, grep does not use 'tech eras' for gadgets. Tech is a function of knowledge (and the tools to apply it), while grep is really just about assembling stuff from raw materials. The function of 'tech eras' for grep is a mix of 'complexity' ('electronic' is harder than 'mechanical'), and composition (iron is easier than tungsten alloy).

complexity: This modifier is 'what building blocks are there', 'how difficult is it to get them together', and 'how complex is my final grep compared to other things of this type'? How common these building blocks are is part of the scrounging detail we just finished, and the general type of item is the base difficulty.

To keep things simple as possible, 'complexity' is going to be 'how high tech is it' and 'how complex is it compared to other items of its type'. Tech is pretty easy since **EABA** already has a well-defined scale for that. Tech era for this modifier assumes that higher tech items have more uncommon trace elements and more complex fabrication methods which would make the grep work a little bit harder to duplicate.

tech era	difficulty
Primitive Era(copper, gold, silver, mercury)	-6
Basic Era(uranium, carbon, iron, nickel)	-3
Industrial Era(sodium, lithium, titanium)	+0
Atomic Era(plutonium)	+3
Post-Atomic Era	+6
Cryptbian tech	+8
Haaren tech	+9

If you want to say something is late in an era or early in the next, apply a ±1 as needed.

In general, the conditions and type of soup can become more esoteric at higher tech eras, but this is not mandatory until you get into Post-Atomic Era and up. You can still grep diamonds and computer chips on your stovetop, for instance.

For balancing the difficulties of grep skill rolls, food (and liquor) and most biologicals are considered 'Industrial Era' in terms of this modifier, and chemical or elemental items, even if they occur naturally, would be at the tech era they were first refined or purified (some of them are above). Note that isotopic separation of uranium is probably Atomic Era, though the element was discovered in 1789CE.

how complex? The nature of the grep (mechanical, chemical, etc.) has already been taken into account. The complexity modifier is relative *within* that nature. So, a mechanical grep is going to be average, easier or harder based on how involved it is. An ingot of metal is easier than average. A precision wristwatch is far harder than average. So, the important things are defining what 'average' is and make sure that you are consistent in your ratings of other things. You can use intermediate values if it seems right to do so.

how complex	difficulty
very simple	-4
simple	-2
average	+0
complex	+2
very complex	+4
insanely complex	+6
adjustment/repair	-2

average: For a mechanical grep, something with a number of parts that have to work together, but not at speed or under extremes. *A bicycle*. For a chemical grep, something with a complex molecular structure. *Gasoline or plastic*. For an electrical grep it depends on the tech era. A Late Atomic Era 'average' electronic item would be a basic alarm clock (no Bluetooth or USB). For a biological grep, something like modern antibiotics, or generic edible slop.

very simple: A chunk of something in a generic shape, the most primitive and basic tool or gadget or chemical or drug of its type. *An ingot, a club, water, salt, pure oxygen, a light bulb*. Few or no biologicals are this simple.

simple: A useful shape with a small number of moving parts, if any, a piece of technology that is obsolete for its type or generic in implementation. *A hammer, a socket wrench, a vacuum tube radio, a first-generation antibiotic, a towel, a simple hydrocarbon like methane, a simple acid.*

complex: Something with lots of mechanically interlocked parts that operate at high speed or temperature (like a car engine), something that is designed expressely for fitting the human form (most clothing), a complex molecular structure that is also shaped into a solid object. *Most mood-altering drugs, a desktop computer, most foods.*

very complex: The cutting edge of human tech or any human technology that is a spinoff or derivative of alien technology, any structural or armor material of alien origin. Most things that are fitted or designed for a unique circumstance. *A smartphone, a replacement organ.*

insanely complex: *When the gamemaster needs to make something just a little more difficult.*

adjustment/repair: If you have an item which is damaged but has not lost all its hits, or a grep which is defective but is the correct size, you can have the grep repair the existing item or correct its defects. Since most of the work is already done, this is an easier task. You can also use this to adjust the parameters of a successful grep, so you could improve the quality or standardization of an item. With gamemaster permission (to monitor abuse), this can be used cumulatively. That is, a horribly failed grep could be re-grepped several times, first with a -2, then a -4, then a -6, until you finally get it right. This may be how some of the biogrepped horrors of the Dark Days were created.

If you have a grep which by its nature has things of different complexity, you use the *most* complex part for determining the difficulty modifier.

You can adjust things up and down by altering the default for what is 'average' if you want a *particular* type of grep to be easier or harder.

Note that we will apply the 'how complex?' modifiers later in a *specific* way for those who want to grep weapons and armor. So, if that is your thing, just read the rest of the grepping rules first and then head to that section.

In the meantime, to keep grepping as simple as possible for players, the *total* complexity modifier (tech era, relative complexity) for common items is below:

	tech	complex	difficulty
gasoline/diesel fuel	Indust.	average	+2
industrial chemicals	Indust.	simple	+0
recreational drugs	Indust.	complex	+4
basic antibiotics	Indust.	average	+2
most spare parts	Indust.	simple	+0
simple tools	Basic	simple	-2
power tools	Indust.	complex	+4
liquor	Indust.	average	+2
basic foodstuffs	Indust.	average	+2
complex meals	Indust.	complex	+4
cloth	Basic	average	+0
fitted clothing	Basic	complex	+2
laptop computer	Atomic	complex	+6
smartphone	Atomic	v.complex	+8

Like for the refining modifier, there is a way to deal with large modifiers for the complexity of a grep. *Try not to make the whole item at once*. If a smartphone is too hard (+8), make several complex electronic components and then assemble them manually. A simple rule of thumb is that you can break a more complex item down into four components that are each 4 points less complex, *and* it takes a skill roll at the lower difficulty and time to assemble the bits. You could also make sure the bits you are grepping are as specific as possible. The frame of a car is a big thing, but it is a simple thing and it is *all* mechanical. *Grep it separately from the electronic car radio*. If you are *already* down at the component level, you are out of luck and have to offset the modifier with things like time and energy input.

If a laptop is a +6 modifier for overall complexity, you make it as four less complex items and we arbitrarily say these are the screen, motherboard, disk drive and the case/keyboard. This means you have to do four separate grep steps and then have the mundane skill to assemble the bits (and they all have to be standardized), but the individual steps are far easier.

Danger

This is partially physics-based and partially subjective. If an object contains a significant amount of potential energy *when it comes out of the soup*, it is harder to make. Assembling elements into high-energy compounds like explosives or fuels is harder, as is a battery that is fully charged as opposed to one that is empty. *Passive* items failing a grep roll on this category have no 'boom' side effects. However, it might represent a decreased reliability under stress for things like armor or gun barrels.

A crate of ammunition has no gun but still embodies a lot of energy, so it *does* have the full modifier for damage. All this is reflected in the following modifiers:

inherent energy	difficulty
item unstable under normal conditions	+2
item explodes/can explode	+2
item is highly reactive	+2
item is a vehicle fuel	+2

Note that melee weapons have no potential energy and would be a +0 modifier. Other weapons and armor are dealt with later.

Diesel fuel would be +2, gasoline would be +4 and liquid propane would be +6. And if you were making a container for the propane at the same time as the propane, you would have the modifier for making a chemical item *and* a mechanical item at the same time. If you had an old propane tank, you could dump it into the soup and the grep would be perfectly capable of using it as the receptacle for the propane, provided that was in its original instructions.

Grep is perfectly capable of doing multiple levels of 'Maxwell's Demon' work, sorting molecules or even atoms to either side of arbitrary temperature or pressure boundaries. So, it can use a hot soup to make you a pressurized cryogenic gas, as long as there is something for the grep to put it in.

Energy

Grep requires energy to function. In a pinch it can use minute local differences in electron potential or temperature, but it really works better with a steep gradient to draw from.

There is a minimum energy gradient needed for grepping in any reasonable time. Aside from keeping prisoners under observation, making sure there is not enough energy to grep is one way to keep people confined. People have had a number of years to deal with this problem and have figured out the obvious dodges that players might come up with.

The simplest way to get an energy gradient is to set your soup out in the sun with a bunch of mirrors to get a several-fold increase in intensity, but the preferred way is to use a reliable source of electricity or concentrated heat. **The maximum benefit you can get from the *total* of energy and time is the base difficulty minus 10**. You should not even *try* to use more energy than that, as you are likely to get the same results as if you stick ketchup packets in your microwave.

energy for grep	difficulty
concentrated sunlight	+3
car battery/small campfire	+0
electric outlet/large campfire	-3
whole-house current	-6
neighborhood transformer	-9
local substation	-12
power plant	-15

'Concentrated sunlight' is several-fold, the sort of thing you can get with a handful of decent-sized wall mirrors. A 'car battery' will last for several hours of grepping before needing a recharge.

Note that for both time and energy there is no way to make the process easier for greps whose base difficulty is 10 or less. You can make things harder by trying to do a grep really quickly or with less energy, but you cannot make them easier with extra time or energy.

Time

The default time to grep anything is 1 hour. Times longer than this reduce the difficulty, shorter than this increase it. Telling the grep to 'take some time and do it right' tends to get better results. **The maximum benefit you can get from the *total* of energy and time is the base difficulty minus 10**.

time spent on grep	difficulty
1 minute	+6
2 minutes	+5
4 minutes	+4
7.5 minutes	+3
15 minutes	+2
30 minutes	+1
1 hour	+0
2 hours	-1
4 hours	-2
8 hours	-3
16 hours	-4
1.5 days	-5
3 days	-6
6 days	-7
12 days	-8
24 days	-9

A 4 kilogram item has a 'mechanical grep" base difficulty of +11, so you cannot get more than a -2 modifier from the *total* of time and energy modifiers on the grepping. So, if you spent an hour on the grep (+0 modifier) you could take advantage of up to a -2 in energy, but if you spent 4 hours on it (-2 for time) you could only get a +0 for energy input.

Grep does not just work until it is done, it works to meet whatever deadline you set when you start the project. If you tell it to go fast, it tries as hard as it can, but stops when the time is up, whether it is done or not. You *have* to monitor your grep as it does its thing. It is like cooking a complex recipe. You can take short breaks, but you *have* to keep an eye on it. Breaks are proportional to the total grep time. If a grep is going to take a week, you can catch a few hours of sleep at a time in that period.

Compatibility

This is mostly going to be referred to as 'standardization'. This just means "how compatible is the thing I just grepped with everything else?". A one-off item does not care. A grenade goes 'boom!' and it is done. On the other hand, a new piston for a car engine has to fit in *that* car engine. Nuts have to fit bolts, food has to be compatible with the biology of what it is being fed to, and so on. If you make a complex item out of several sub-assemblies, they all have to be compatible with each other.

compatibility	modifier
no standardization	-2
standardized	+0
high standardization	+2

no standardization: This is what you use for one-offs or items where you are making all the supplies or consumables at the same time. For instance, you want to make a rocket launcher *and* half a dozen rockets for it. You do not care if the rockets work in any *other* launcher, they just have to work for *this* one. Similarly, a knife or sword can be just fine with no standardization.

standardized: This is a basic standardization, sufficient for nuts, bolts and generic food and fuel. *Parts fit together*. If one person is making all the subassemblies for a multi-part grep, this is sufficient.

high standardization: If something needs to work with *outside* components in a flawless fashion *all the time*, you want high standardization. You do not *have* to use this level of standardization, but if you want the gamemaster to side with you in questionable cases, it would not hurt...

Add all this up and the result is your final difficulty. *All that remains is the stress of rolling the dice...*

Skill

Your normal grep skill is what is applied to the final difficulty. You get a +1d on this roll if you have an actual skill (not a default) for the thing being grepped not more than 1d below your grep skill roll. So, someone who is a gunsmith at 4d+0 and has a 4d+2 grep skill would roll 5d+2 when grepping a gun.You can also specialize your grep skill to a subset of one of the four types of things you can make (mechanical, electrical, chemical, biological). So, if you had a 4d+1 grep skill and speciality of 'biological', you would roll 5d+1 when grepping food.

If you want to guarantee success with a grep task, you want to be able to 'take 2's' and still meet the difficulty of the project. Most commercial grepwork tries to acheive this, usually through some combination of power input, raw material quality and time spent. Governments that regulate things or which have quality control laws in place would have an inspector check out your operation and the local 'seal of approval' would be contingent on maintaining certain standards in production.

If you trying to grep things for sale or trade with a skill roll of 5d+0 and the difficulty of grepping a 32 kilogram chemical item in 1 hour was 19, you could just try to make the roll (6% chance). But if you wanted to be able to sell it with some local equivalent of a kosher stamp, you would need to find enough modifiers to get the difficulty down to 10, which you could 'take 2's' to succeed at. In this case, you might be able to increase your power input for -3, use pure raw materials for -2 and spend 4 hours instead of 1 hour for for another -4. So, you have to spend more for electricity, use better quality raw materials and it takes four times as long, but you increase your chance of a successful grep from 6% to 100% and you gain some measure of respectability that will improve the chances the local market will trust the quality of your product. And as a quick reminder for the examples that follow, something that *anyone* can grep has little commercial value since no one is willing to pay for it.

Grep examples

Here are a few examples of grep difficulty to give you a feel for what we are talking about.

Grep stew: A pot of organic soup that you stir over a fire until it becomes edible.

base difficuty (2 kilogram biological):	13
refining: high-quality to average	+0
complexity: basic foodstuffs+	+3
danger: none	+0
resources(energy): campfire	+0
time: 1 hour	+0
standardization:normal	+0
final difficulty	16

The complexity is between 'edible slop' and 'most foods'. So it is stew-ish, with chunks of different flavors and textures, but it is not trying to be the equal of an honest stew.

This is not the easiest of greps, but on the other hand, you *are* making eight quarter-kilo servings of a hot, chunky stew out of nothing more than dead leaves, twigs and handfuls of scrounged bugs. One thing you will notice is that a lot of the modifiers are +0 for default values. For future examples, anything that is a +0 modifier will be left out of the description. That will make our stew a lot simpler:

base difficuty (2 kilogram biological):	13
complexity: basic foodstuffs+	+3
final difficulty	16

You might think that with a difficulty this easy no one should have starved during the Dark Days. But remember that people then were *barely* able to grep, running on +0d skill levels and often trying to survive with 2d+2 skill rolls or less, which is a 0% chance of success at this grep unless you spent more time or energy than normal (you can get up to a -3 on this grep). Grep might also have not fully dispersed in the environment or integrated itself with human neural systems. Back then, someone might grep all day in hopes of creating a single meal for their family.

Smartphone: The equivalent of a moderately capable smartphone, circa 2015CE.

base difficulty (.25 kilogram electrical):	10
plus mechanical (adjusted base diff: 11)	+1
complexity: smartphone	+8
resources(energy): electric outlet*	-1
time: 1 hour	+0
final difficulty	18

This is an example of the sort of thing you cannot reliably grep, at least not in one piece. The small size does not make it any easier to grep, and simultaneously makes it harder to gain any advantage from extra energy or time. The asterisk after energy or time means that the item cannot get the full benefit from it because of its size (max is base difficulty - 10).

The way you would grep this or any other item of very high difficulty would be to do it in pieces, as noted in the complexity section. This would let you make four items at a difficulty of 4 points less (difficulty 14 in this case), but you would then need to make an electronics skill roll to put them together properly. You would also need tools capable of soldering together components almost too small to pick up with tweezers. Another way to do it would be to try for a batch of them. Making 2 kilograms worth would be +6 difficulty (extra mass and multiple units), but the base difficulty of 13 *can* be offset by -3 in time and energy instead of only -1. What this means is, if you fail to successfully make a perfect batch of 8 smartphones, there is a chance you still got a few that work.

And both *are* these strategies are possible and *are* done, but it makes grepped smartphones more expensive than the average 'pull it out of the soup and use it' grepped item. The desire for such items and the necessary facilities to grep and then assemble them is an example of trade and manufacture that is still required in a grep-enabled world. The ones that are most commercially successful use the tricks to make grepping easier, try to undercut competitors and still have the same profit margin.

Dirt bike: A small all-terrain motorcycle. It has no electrical bits more sophisticated than the ignition system and a headlight and is grepped without any fuel or grease or motor oil to make it as easy as possible. It is meant to be compatible only with itself, so when it breaks or wears out you just recycle its components. It is the sort of thing where with modifiers like a good soup starter and totem, a teenager can put one together, and contests to see who can do the best one are common rites of adolescence in rural areas.

base difficulty (125 kiliogram mechanical):	16
plus electrical (adjusted base diff: 18)	+2
complexity: Atomic Era+complex	+6
resources(energy): electric outlet	-3
resources(time): 1.5 days	-5
standardization: low	-2
final difficulty	14

This is something the average grepper can make as easily as they can whip up dinner. Note that because of the +2 difficulty for adding 'electrical' to the grep, the minimum possible difficulty is 11. Once complete, you also have to add motor oil, lube the chain and bearings, add brake fluid and gasoline. Trying to do it all at once would be +2 difficulty for adding a 'chemical' component to the grep, and +2 more for a vehicle fuel 'danger' component, for a total difficulty of 18. Dirt bikes of this sort are commonly sold in urban areas for about 1000 Credits, with a 200 Credit discount if you bring in an old one for recycling. As an aside, many makers will give you 100Cr of that discount in cash even if you are *not* buying a new one, so keep your bike locked up, if you know what we are talking about...

As a reminder, any energy-intensive grep will come out of its soup as hot as it can be without causing damage to itself, which could easily be 'too hot to touch' in the case of metal items, mandating a cool-down period before you can actually use the item.

Walkie-talkie: A handheld two-way radio designed to be compatible with other radios. The batteries would be made separately.

base difficulty (.5kg electrical):	11
complexity: Atomic Era+average	+4
resources(energy): electric outlet*	+0
resources(time): 1.4 hours	-1
standardization: average	+0
final difficulty	14

This is something a professional grepper can do reliably. Normally, someone doing this would start with high quality materials and try to make a batch of them.

base difficulty (4kg electrical):	14
size: 8x copies	+3
complexity: Atomic Era+average	+4
resources(energy): electric outlet	-3
resources(time): 1.4 hours	-1
standardization: average	+0
final difficulty	17

If you succeed you get 8 radios instead of 1. So if you can make the roll, the average yield for a given amount of time and effort is higher.

None of these take into account the advanced grep modifiers that come up next, which can decrease the difficulty significantly, which will also affect the cost of doing the grep. There are two ways to handle this. The first is to just accept the greps being easier. The other is to assume that the advanced modifiers are already taken into account and greps which do not use them are slightly harder. It does not take much of a change in price or difficulty to swing some greps from 'easier than mundane manufacturing' to 'harder than', with subsequent changes to the local and regional economy.

Guns: Of course we need a few firearm examples. First would be something an adventurer might make for themselves, a rifle or pistol, ammunition separately.

pistol

base difficulty (1kg mechanical):	9
complexity: Atomic Era+average	+4
resources(energy): electric outlet*	+0
resources(time): 1 hour	+0
standardization: average	+0
final difficulty	13

rifle

base difficulty (4kg mechanical):	11
complexity: Atomic Era+average	+4
resources(energy): electric outlet*	-1
resources(time): 1 hour	+0
standardization: average	+0
final difficulty	14

Let's say you wanted to make up a batch of rifles, so that you could take full advantage of a bigger power source or more time:

rifle batch

base difficulty (32kg mechanical):	14
8x quantity of same item (the 4kg rifle)	+3
complexity: Atomic Era+average	+4
resources(energy): electric outlet*	-3
resources(time): 2 hours	-1
standardization: average	+0
final difficulty	17

The difficulty is a bit higher, but if you are successful, you get eight times the rifles in only twice the time spent. And even if you fail the roll, you might get *some* good rifles out of the batch.

Liver: Grep is perfectly capable of making replacement organs (or limbs). For those who do not wish to be dumped into a grep tank and have the grep rebuild you from the inside (which we will deal with later), parts can be grown for conventional transplant operations. Organs where a minimum amount of nerve connections are involved are the best candidates, since they have to be implanted using conventional surgery. One big advantage is that the organs are made for a specific person and there is never a tissue rejection problem.

liver

base difficulty (1kg biological):	10
complexity: Industrial Era+very complex	+4
resources(energy): electric outlet*	+0
resources(time): 1 hour	+0
standardization: high	+2
final difficulty	16

This is easily within the reach of skilled medical greppers and even those who are not. The tricky part is installing it. If you had the ability to attach a new arm and get all the nerve connections right:

arm

base difficulty (5kg biological):	15
complexity: Industrial Era+very complex	+4
resources(energy): electric outlet	+0
resources(time): 1.5 days	-5
standardization: high	+2
final difficulty	16

The difficulty is the same, it just takes more time. This is because you cannot use more than a +0 energy modifier. Biologicals (other than stew) do *not* like being cooked, which is what a high energy input would do. You may have noticed that the difficulty is the same as the grep stew example. The difference is that the grep stew was only using the energy of a campfire and was accomplishing it in an hour. If you could do it with a power outlet and did not mind taking a few hours, you could whip up a large batch of stew without any problem.

Greponomics

A lot of people grep stuff for themselves. A larger amount grep stuff to sell it to people who lack the talent or time to grep this stuff themselves. This means that players have the opportunity to buy or sell grepped stuff, so we need a way to figure out the 'suggested retail price' of a grepped good.

The numbers below assume the good in question is legal and that that raw materials are available, neither of which is always going to be the case. Add up the following:

- take the base difficulty for the mass and type of the grep, then halve it, rounding up. *Bigger costs more.*
- make any time modifier positive, then halve it, rounding up. *More time costs more*.
- make any energy modifier positive, then halve it, rounding up. *More energy costs more*.
- halve any complexity modifier, rounding up. *More complex costs more*.
- add (the difficulty of the grep minus 12, but no less than +0). *The services of a skilled grepper cost more*.
- if the grep is a trade secret/local monopoly, add 2
- if there are special physical requirements for the grep, add 1 to 4 (gamemaster call)
- then subtract 20. The gamemaster can adjust this amount to suit the needs of the campaign or a particular area.

The result is the cost level for the grep. This is above and beyond the raw materials cost, which is going to be up to local supply and demand. For anything not particularly rare or exotic you can just add +1 for 'materials'. A 'trade secret' grep is one where whoever is doing it has a local monopoly or otherwise has no competition for making that item. A 'specialized soup' modifier means that the physical requirements of the soup are more sophisticated than 'a big container and an extension cord'. If the materials going into the grep are corrosive, flammable, have toxic fumes, are radioactive or there are similar problems, then you need a specialized grepping facility and this increases the cost.

If we applied this to some of the sample greps on the previous pages, they would turn out as:

grep stew

grep size/2(u)	+7
time modifier/2(u)	+0
energy modifier/2(u)	+0
complexity modifier/2(u)	+2
difficulty of grep-12	+4
minus 20	-20
final cost level (80Cr)	-7

So, you are getting 8 'decent' meals for about 10 Credits each, if you are paying someone for the service. This cost assumes the grepper has factored in their cost for the raw materials.

smartphone

grep size/2(u)	+6
time modifier/2(u)	+0
energy modifier/2(u)	+1
complexity modifier/2(u)	+4
difficulty of grep-12	+6
minus 20	-20
final cost level (350Cr)	-3

Phone service providers are not subsidizing it anymore, but this is not an awful price. The problem is that salvaged ones are readily available for less. Making them in batches will bring the price down.

dirt bike

grep size/2(u)	+9
time modifier/2(u)	+3
energy modifier/2(u)	+2
complexity modifier/2(u)	+3
difficulty of grep-12	+2
minus 20	-20
final cost level (700Cr)	-1

Add in a 'parts & labor' fee for lubing it up and the raw materials. This is about the 2018 cost of a cheap dirt bike from China. The important thing for **Grep** is that it shows that you can whip up custom vehicles for a particular need at fairly low cost.

Advanced grep topics

This is where you get into the actual details and fun bits (for varying amounts of 'fun', which can possibly move into negative values).

Limits of the system

Grep crams an awful lot of design parameters into a small range of dice values for the chance of successfully grepping that item. Like any design system, there will be spots where it breaks down. For the gamemaster, the most important thing to make sure of is that if and when it breaks for you, that you can deal with the problem. Here are your problem areas:

- **too easy**. If a category of item you or the players want to make is always bumping the 'minimum difficulty' rule, make sure you are taking *everything* into account. If so, set the base difficulty for that type of item from +1 to +3 higher.
- **too hard**. Some things are meant to be ludicrously difficult to grep. However, the nature of the setting requires that many things are easier to grep than to make the old-fashioned way. If you think the common stuff is too hard, adjust the base difficulty to a lower number, or adjust the complexity modifiers or definitions. If you want electronics to be easier, then define 'average' complexity as more sophisticated. There are also a few tips and tricks to follow that help things out. Another thing is that you can say the more common a grepped good is, the easier it is to make, because grep for just that item is more common in the environment.
- **too cheap**. If the cost of grepped goods of a particular type seems absurdly low, remember that the greponomics cost does not take into account the cost of materials or acquiring them, and this is too complex a topic to plug into a simple calculation. For instance, iron is cheap and an iron ingot of 1 ton is not that hard to make nor that expensive. Adding some trace elements to make a quality steel is a little more expensive in terms of raw materials but not much. Making a 1 ton ingot of the trace elements *would* be expensive. The cost ratio of vanadium (an element used in high strength steel) to steel is about 50 to 1. Remember that anything which makes a grep easier and is *not* time or energy also makes it cheaper.

- **too expensive**. Some stuff is *meant* to be insanely expensive, but this is usually because of the raw material cost (like alien elements). If the grep/labor cost calculation is too high for an item, increase the 'subtract 20' amount to a larger value for *that* type of item. Skill requirements are going to be a *huge* cost factor for difficult greps. A difficulty 14 grep costs twice as much as one of difficulty 12. A difficulty 18 grep costs *eight* times as much. People who grep commercially try to optimize their process to ensure they have a lower price than competitors.

grep affinity

This was mentioned in passing in adventurer creation (**page 3.4**) but not detailed. This is because the gamemaster can tailor it as they wish for a campaign. Your Fate can be used for the normal purposes, but it also represents your affinity for grep. The default is that a Fate of 1-3 has no effect, a Fate of 4-6 is a -1 to the difficulty of grepping something, a Fate of 7-9 is a -2, and so on. You *can* have a Forte on Fate for this purpose. This affinity means people with high levels of it can theoretically grep things that have difficulties not reachable by other people. It does not make it easy, but it does make it *possible*. They can also grep regular stuff faster and/or cheaper.

The 'naturals' (like Geezer) are the *deus ex machina* figures from the Dark Days who have a -3 or more on the difficulty of grepping stuff. They are the 'arch-mages' of the gameworld, the *only* people capable of doing some types of grep. New naturals pop up, but are quite rare.

Related to grep affinity is 'grep teamwork'. For very large or long greps, the computational load on one person's grep can be eased by having it be a group effort. You would make the roll for the *least* skilled member of the group, but each time you double the number of people you get a -1 on the difficulty of the grep. The maximum bonus you can get is just enough to offset the *complexity* modifier for the grep. So, if you had 4 people on the task you could get a -3 on the difficulty, but only if the complexity of the grep was at least +3.

Failures

For humans, grep is a third-hand technology. The Haaren invented it (we think), Cryptbians modified it so they could use it, and humans can use it either as a deliberate part of or accidental side effect of Cryptbian action. So, getting it right is not something people (or players) should take for granted.

There are a couple of ways to maintain the suspense of whether an important or time-sensitive grep is successful. The first is the easiest, the *gamemaster* makes the roll and the player only finds out at the end of the process. However, the adventurers probably have *some* idea of how well they set things up. If they completely botched it, they probably know it as immediately as a pro athlete knows they botched a pass, kick, shot or jump. A way to give *some* certainty is to let the player roll half the dice on their grep skill, and the gamemaster rolls the rest and figures the total. So if the player rolls really poorly, they know immediately that they blew it, and if they roll really well they can be confident of success. *And all the intermediate cases are the ones where you do not know until the end...*

If the player makes the whole roll, any grep roll that fails by 6 or more is *obviously* bad, incomplete and something even the untrained eye knows is not going to work. Failure amounts of less than 6 still usually give you *something*, but whether or not it is what you want may require trying it out or analyzing it.

That batch of petrol you grepped looks, smells and burns like petrol, but only a chemical analysis or test will show that it has traces of acid in it that will eat your rubber hoses and corrode your bearings. That food you grepped seems okay, but the grep failed to separate out the toxic chemicals in the batch of cash register receipts you threw into the soup. The batch of ammo you made looks and fits perfectly, but twenty percent of them end up being duds, or worse, so powerful they damage your gun.

Things like this were the *huge* problem during the Dark Days. People were not very good at grepping, but *needed* to grep in order to survive. If the difference between starving and not starving was grepped food, you ate grepped food. If defending your community required grepped ammunition, you used grepped ammunition. People did what they could to manage the risk. Food tasters (i.e. pet dogs & cats) would sample a batch before allowing anyone else to eat it. A sample of ammo would be fired through a test weapon to see if it was safe and reliable. But, you might run out of pets (or the toxicity was subtle and long-term), and weapons could get blown up, and the losses add up if you are relying on this on a daily basis for years at a time.

By the time the campaign starts there are a lot of 'rules of thumb' that people use. If you are making mechanical parts, you can test for fit and finish and mechanical strength. If you are making food, you simply toss the result if it looks the least bit questionable and try again unless you are desperately hungry. If it is a potentially risky item, you buy it from a reputable grepper (one with a local 'standards & practices' seal of approval). By far the safest way to do things (in terms of game mechanics) is to be good enough at grepping that you can make the roll by 'taking 2's', which gives you an automatic success. So, if you have a skill roll of 4d+1, you can manage a final difficulty of 9 with 100% reliability, or a difficulty of 11 if you have a related skill or specialization. A 'standards & practices' government will have specialized licensing tests for both grepping in general and specific forms, and accreditation at specific level or type is *very* useful if seeking employment in the field. Someone who just *says* they are really good at grepping hooch will lose to someone who has a 'Level 3 Liquor certification'. Similarly, a grepping facility can be rated and the combination of the two gives customers confidence at a level which is reflected by the 'taking 2's' ability for that combo. People know *you* get it right *every* time, and you get more business as a result.

For everyone else, if the grep skill roll fails, roll 1d and see below:

roll	failure mode	result
1	refining	impure/contaminated
2	danger	runaway reaction
3	standardization	incompatible
4	time	more time/more stuff
5	size	lower yield
6	roll twice	

Any failed grep ruins the purity of any raw materials used. They *can* be re-used, but as one quality level lower than they were before. Remember, the elemental composition is still there, it has just been partially combined with everything else.

refining: The amount the roll is failed by applies to the output level chosen for the grep. As long as the difference does not drop things below the 'marginal quality' level, the item will still work as designed, though possibly not as well as you want it to.

For instance, if you designed a 'high quality' item (difficulty of +2) and failed the skill roll by 4 with a 'refining' failure, your item would successfully grep, but it would be a 'marginal quality' item (difficulty of -2, a 4 point difference).

The difference in quality from a failed roll is usually obvious, but not the *exact* extent to which the quality is degraded. Something that is 'marginal quality' food is still edible and nutritious, you just might have not have *fully* reprocessed that dead mouse in the mix. One point *less* than 'marginal quality' food looks and tastes just as bad as the marginal quality food does, but it will make you sick. Below marginal quality medicine might be worthless or you take damage based on the amount of failure. An engine using substandard fuel would suffer a penalty on performance or conk out, the strength of an armor might be reduced, and so on.

danger: *This is the bad one*. If you are making something that embodies a lot of energy and the grep process gets out of control, you could have an uncontrolled energy release. On a failed roll the grep fails, there is no question about that. It literally becomes a hot mess, but does not inherently mess up the raw materials any more than normal.

Take the *positive* value of any added energy to speed the grep process *and* add any modifiers for the danger of the grep. If this total is *more* than the amount you failed by, you have a problem. At some point in the grep process (generallly whenever is convenient for the plot of the adventure), the soup becomes hot, unstable, corrosive, bubbles toxic fumes or all of the above. If uncorrected, you get a messy lethal explosion with a damage half the base difficulty for its mass.

If you were whipping up an 8 kilogram batch of vehicle fuel (chemical) using normal household current (-3 modifier) and the grep went wrong, the failure margin is 5 (3 for the energy and 2 for the 'vehicle fuel' danger level). Failing the grep roll by 5 or more means it blows up on you. The resulting explosion would be +7 (half the difficulty for an 8kg chemical grep), +2 (vehicle fuel), for a total of +9, or a 3d+0 lethal explosion. This will trash whatever container the soup is in and splash the room with hot flaming fuel, and would not be a good thing to be standing next to when it happens.

A grep explosion may not ruin *all* the raw materials, but they are spread around by the explosion and would have to be recollected from the immediate area. Note that volatiles and gases will likely be lost and whatever container the grep was being performed in is probably ruined as well. Power supplies in the same room, the room itself and your relations with your neighbors are also going to suffer.

If you are monitoring the grep process (like *smart* people do), the person who started the grep can attempt to abort the runaway process by making a new roll against the final difficulty. If the succeed, they successfully shut down the grep and just have to start over. If they fail, the grep goes horribly wrong in a time level of +6 (8 seconds), -1 time level for each point the roll is failed by. So if you try to stop it *and* fail by 6 or more, it blows up in your face (a time level of +0 or less is assumed to be immediate detonation).

If the grepped item has a danger modifier of +0, then a failure in this category has no violent side effects. The grepped item might come out of the soup a bit hotter than desired (or your grepped food might be burnt or plastic items are warped), but unless the roll is failed by 6 or more the product is usable once it cools down. However, any armor rating *is* reduced by the failure amount.

standardization: This is important if you want your grepped item to play well with others. Like for refining, the amount the skill roll is failed by reduces the compatibility modifier. If it drops below 'low precision', the grep fails, otherwise the standardization of the item is reduced to the new level. This may or may not make the final part useless for your needs.

You were making up a batch of fuel for your car at normal standardization (+0 modifier). You fail the roll by 1, leaving you with a batch of stuff that is 'fuel', just not suitable for your car. Maybe you could use it in a oil-fired steam engine or furnace, but it would not be suitable for your car or any car using that type of engine. If you had made the batch at high levels of standardization and failed the roll by 1, it would still be perfectly usable in the car, it just did not end up with the precise octane rating you wanted.

The problem with standardization is that it usually requires analysis to determine. The results of a failure are similar to that for refining, but manifest in different ways. A bolt that is below marginal quality looks awful. A bolt that is non-standard might look perfect but have crappy threads that are incompatible with the part it is supposed to screw into. Food with a quality defect may make you sick, while food with a standardization defect might lack one or more nutrients. Non-standard medicine is more likely to be useless than poisonous. Non-standard electronics need weird batteries or run on the wrong frequency. Any sort of implanted item runs into problems with either quality *or* imprecision.

time: This is the softest failure mode. The amount the roll is failed by adds to the time level you specified for the grep. In addition to the extra time, you need to add extra raw materials (of the same quality) because the grep is being inefficient at its task or has trouble with the existing concentrations in your soup. So, if you do not mind production delays and using up more materials, you can still get your grepped item. Overcoming this failure requires monitoring the process so you can add the new materials when it looks like they are needed.

You were making up a batch of grep stew for your camp and failed the roll by 1. Instead of taking an hour to cook, it takes about an hour and a half and you need to add more raw materials before the original cooking time was up.

At certain levels of time failure, you usually just give up and start over. Failing this by 6 means it is going to take 8 times as long and use 8 times as much material, and unless you were really desperate for success you would be a fool to just not abort the grep and start over.

size: A failed roll means the grep makes your item smaller than desired or in a smaller quantity than desired, whichever is most applicable (rarely, both). If you are grepping one item, the amount the roll is failed by reduces its mass, with a corresponding reduction in size and an automatic failure of standardization for any sort of mechanical or electronic item. *You get a smaller copy of what you wanted.* This might be functional or not. A half-size cannon is *still* a cannon, and a half-size shirt could be given to a needy child.

If you are making more than one item or a batch of consumables, the quantity level is reduced by the amount the roll is failed by. Some of the items turn out defective, but the rest are okay.

You were making up a batch of 100 bullets for a gun and failed the roll by 3. Since 100 bullets is closest to a quantity level of +13, you get a quantity level of +10 instead (30 bullets) and the rest are visbily defective and need to be recycled.

At gamemaster option, a failure in quantity means you get the quantity you wanted, but there is no way of knowing which ones are defective until you use them.

roll twice: Roll twice on the table, ignoring any new results of '6'. The amount the roll is failed by is split between the two results, with leftovers applying to the first roll and each roll counting as a minimum failure amount of 1.

Guns & armor

If you are in a role-playing game where tech and guns play a big part, then of course details on guns are a *must*. And since grepping is a central part of *this* setting, a few details on the process are in order. Guns and armor are items of widely varying complexity. A bolt-action rifle is less complex than a select-fire assault rifle with integral grenade launcher. A suit of chainmail is more complex than a couple of steel plates with shoulder straps. And the stuff the gun or armor is made of can vary. Plastics, steel and aluminum are common, but guns and armor can also contain ceramic components, exotic lightweight elements like scandium, or things like high-strength molecules woven into cloth. So, the way it is going to work to figure the difficulty and capability of something will have to deal with the raw materials needed for and the complexity of the item.

The first thing to do is determine the default for the maximum 'safe' level of performance you can get from a chunk of matter. That is, it is going to be very difficult to cram the damage performance of a rifle in a pistol-sized package ...unless you are using alien technology and elements whose names you cannot even pronounce to grep it. The simpler and stronger the gun, the more damage you can do. Grep does not care about anything except 'is this going to be strong enough to work without blowing up?'. This base 'safe' level is:

- mass level (**not** grep diff.) *plus* 18 for guns
- mass level/2(u) *plus* 5 for bows/crossbows
- mass level/2(u) *plus* 4 for melee weapons
- mass level/2(u) *plus* 5 for 2h melee weapons
- mass level *plus* 5 for 'whole body' armor
- mass level *plus* 9 for torso (9-12) armor
- mass level *plus* 11 for ch.+abd. (10-11) armor
- mass level *plus* 14 for a partial head (5-6) armor
- mass level *plus* 12 for head (3-6) armor
- mass level *plus* 11 for arm (7-8) armor
- mass level *plus* 10 for leg (13-18) armor

Each +3 is 1d of damage or armor, and each +1 remainder is a +1 on that rating.

A 1kg pistol has a mass level of -11. Add 18 to this and you get +7, so the base maximum safe performance of this pistol will be 2d+1 damage. A 1kg melee weapon (mass level of -11 halved to -5) would default to a safe performance of strike-1 damage and a 1kg chest+abdomen armor would default to an armor of 0d+0.

How complex it is and what you are making it out of will adjust this, but this lets you know if you are on the right track. Bear in mind that the low complexity of melee weapons will bump the lower starting values like in the above example. If is not obvious, the type of grep you are doing is below.

weapon/armor type	mass modifier
solid armor (rigid or flexible)	mechanical
phase change armor	mechanical/chemical
force field	electrical
melee weapon	mechanical
conventional firearm	mechanical
conventional firearm+ammo	mechanical/chemical
exploding weapon(grenade)	mechanical/chemical
laser	electrical
railgun	mechanical/electrical
plasma or fusion	mechanical/electrical

The difficulty modifier for the *refining* step is up to what the adventurer has available, but does not have any weapon- or armor-specific aspects.

What *is* important is the complexity modifier for of the item. A weapon or armor is going to have two sorts of complexity. The first sort is what it is made of and this falls into the tech era category. The safe damage is going to be adjusted by the same modifier you used for the tech era. Acquiring the various bits of what it is made of is role-playing and horse-trading rather than grep difficulty. Neither the players nor gamemaster need to know that 1 kilogram of chromium-vanadium steel has 6 grams of manganese, 6 grams of chromium, 2 grams of carbon, 2 grams of silicon, 1 gram of vanadium, .3 grams of phosporous and .3 grams of sulfur.

You just need to know that it has to be strong and this is going to require several elements and this is going to translate into a whatever tech era modifier you are using.

tech era	safe level
Primitive Era	-6
Basic Era	-3
Industrial Era	+0
Atomic Era	+3
Post-Atomic Era	+6
Cryptbian tech	+8
Haaren tech	+9

Applying these to the previous example gives the pistol (Atomic Era) a safe capacity of +7 (base), +3 (Atomic Era), equals +10 (3d+1), the melee weapon (Industrial Era) a safe capacity of -1 (base), +0 (Industrial Era), equals strike-1 and the armor a rating of +0 (base), +4 (Atomic Era), equals +3 (1d+0). None of these are the **actual** damage or armor values. They simply represent the result you have at this point in the process.

For grep purposes, melee weapons will not exceed Industrial Era unless 'powered' (vibroblades, etc.), The difficulty factor for both melee weapons and armor factors in 'low standardization'.

The 'how complex' modifier is where individual weapon/armor characteristics come in. These can affect the difficulty and safe capacity in varying amounts. For instance, a gun that holds more bullets is no more complex in most cases, but *more* bullets means *less* gun, so the safe damage level goes down.

You can push this for guns by increasing the difficulty to grep it by the same amount (up to +2 or the tech era bonus, whichever is *higher*), or decrease it by up to -2 by dropping difficulty by the same amount. Armor and melee weapons can be adjusted by ±1.

weapon characteristic	diff./safe
each +1 to safe capacity (up to +2)	+1/+1
each -1 to safe capacity (up to -2)	-1/-1
melee weapon	-3/+3
loaded mass holds 1 shot	+0/+2
loaded mass holds 2-3 shots	+0/+1
loaded mass holds 4-6 shots	+0/+0
loaded mass holds 7-11 shots	+0/-1
loaded mass holds 12-23 shots	+0/-2
each 2x shots	+0/-1
break-open or single shot action	-1/+2
revolver or bolt action	+0/+0
pump or lever action	+1/-1
semi-auto	+1/-1
light duty select fire (full auto or semi-auto)	+2/-1
heavy duty autofire (sustained fire)	+3/-1
+1 Accuracy (up to +1 per 1d damage)	+1/+0
disposable	-6/+6
thrown (non-melee)	-2/+2
explosive	+3/-3
secondary explosion (plasma weapons)	+1/-1
shotgun (slug damage)	+0/-3
armor-piercing	+1/-1

armor characteristic	diff./safe
force field	+6/+6
rigid	-1/+2
hardened	+1/+0
form-fitting	+1/-1

Let's take our numbers for the pistol in the previous example. The actual 'safe damage' is based on the value from the previous example, which is the quality of the materials it is made from. Remember that the safe damage modifier is the **inverse** of the difficulty modifier (things that make it simpler to grep (negative difficulty modifier) **increase** the safe damage level.

pistol	
base safe damage	+10
16 shots	-2
semi-auto	-1
Accuracy of 1	+0
total (2d+1)	+7

So, if you do not want to risk unreliability because the weapon is exceeding its specs, *this* 1kg pistol cannot exceed 2d+1 damage.

The thing to remember is that the damage you get is any value you want up to your safe damage limit. You have 'paid' for all you need in terms of grep modifiers. If you want more damage, you need to take the modifier to increase the safe damage level. If you do not need this much damage, you can take a modifier to reduce it and make the grep easier.

Let's apply some of these to the examples of pistol, melee weapon and armor that we've been using to see what the final 'safe' capacity is. Remember that the 'how complex' modifier inverts for purposes of 'safe' damage.

pistol (Atomic Era revolver)	**damage**
base safe damage(mass level -10)	+8
Atomic Era	+3
6 shots	+0
revolver	+0
Accuracy of 1	+0
total (3d+2)	+11

melee weapon (Industrial Era)	**damage**
base safe damage	-1
Industrial Era	+0
melee weapon	+3
total (strike+2)	+2

armor vest(concealed)	**armor**
base safe armor (mass level -9)	+2
Late Atomic Era	+4
flexible armor	+0
total (2d+0)	+6

These values are the default characteristic of the weapon or armor. So as designed, the pistol above does 3d+2. Altering the parameters adjusts the damage/armor. For instance, if you increase the magazine size, more of the pistol mass is spent on magazine and less on the structural parts, so the 'safe' damage goes down. If you make it a single shot and dropped the number of shots to 1, the 'safe' damage goes up. And on all of them you could take the +1 difficulty modifier to increase the 'safe' value by 1. So, you boost the armor up to 2d+1 by making the grep difficulty +1.

Weapon examples

Here are the previous three items designed up for their difficulty and damage or armor ratings. All of them have energy and time modifiers of +0.

Pistol: Two versions of a 1 kilogram Atomic Era pistol.

modifier	**damage**	**difficulty**
base amount(mass level -11)	-11	9
plus 18 (safe damage adj.)	+18	-
complexity(Atomic Era)	+3	+3
10 shots	-1	+0
semi-auto	-1	+1
Accuracy of 1	+0	+1
resources(energy): electric outlet	-	+0
time: 1 hour	+0	+0
total(2d+2 damage)	+8	14

Let's say you wanted to do it as a double-barrel 'zip gun' as might have been made during the Dark Days.

modifier	**damage**	**difficulty**
base amount(mass level -11)	-11	9
plus 18 (safe damage adj.)	+18	-
complexity(Industrial Era)	+0	+0
break-open action	+2	-1
2 shot	+1	+0
resources(energy): campfire	-	+0
time: .5 hours	+0	+1
total(3d+1 damage)	+10	9

You could tweak this second design by adding 'chemical' to it, making up a batch of ammo at the same time and grepping it with a low level of standardization, so that the ammo *only* works for *that* gun.

Melee weapon: A 1 kilogram melee weapon is about the mass of a short sword.

modifier	damage	difficulty
base amount (mass level -11/2)	-5	9
plus 4 (safe damage adj.)	+4	-
complexity(Industrial Era)	+0	+0
melee weapon	+3	-3
total(strike+2 damage)	+2	9

This comes out about the same as the **EABA v2** damage for a melee weapon of that mass. The 'greponomics' cost is negligible, since it is really just a fancy ingot with an edge.
The trace elements for the high-quality steel probably cost more than the grepping.

A Basic Era blade (historical) would only have a damage of strike+0, but you could use the 'increase safe damage' modifier on it to make it strike+1.

Armored vest: A 1.6 kilogram armor covering the chest and abdomen is a little less than the mass and coverage of a concealed soft bullet-proof vest. To you it is a Kevlar vest. To the grep it is just a mat of long chain molecules with shoulder straps.

modifier	armor	difficulty
base amount (mass level -9)	-9	9
plus 11 (chest+abdomen adj.)	+11	-
complexity(Late Atomic Era)	+4	+4
flexible armor	+0	+0
increase safe level	+1	+1
total(2d+1 armor)	+7	14

Helmet: Take the same mass and see how good a helmet (locations 5-6) you can make.

modifier	safe	difficulty
base amount	-9	9
plus 14 (partial head adj.)	+14	-
complexity(Late Atomic Era)	+4	+4
rigid armor	+2	-1
total(3d+2 armor)	+11	12

Bio-grepping

One of the most controversial and ethically complex ways to grep is to modify living things. But grep does not care about what people's opinions are, it is just another thing to be manufactured. There are three main ways to 'biogrep':

- bio-replacement: simply replacing something that is damaged or missing
- cyborg replacement: replacing something that is damaged or missing with an artificial or semi-biological equivalent
- substitution/addition: adding something new or replacing something with something 'extra', which could be either biological or cyborg in nature

bio-replacement: Otherwise known as regen or healing. This requires specialized equipment and is +4 cost for greponomics. Base difficulty is usually 10, since it takes a **lot** of damage to require replacing more than 1 kilogram of tissue. However, just because that *can* happen and assuming an 80 kilogram person:

body part	mass
head	≈6kg
torso	≈35kg
whole arm	≈5kg
lower arm	≈2kg
whole leg	≈13kg
whole body	≈80kg
lower leg	≈5kg
foot	≈1kg

And no, you cannot regenerate a lost head or torso or body, but the mass is important for a later topic.

To make things simple, the total complexity modifier for healing is below. This takes into account all the complexity modifiers for elements and such, as well as assuming you have neither positive or negative modifiers for refining or standardization. You cannot use extra *energy* for healing, only extra *time*.

complexity	difficulty
healing damage, 1 hit	+2
healing damage, 2 hits	+3
healing damage, 3-4 hits	+4
healing damage, 5-7 hits	+5
healing damage, 8+ hits	+6
regenerate lost parts (use mass)	+3
nerve-intensive tissue (eyes, fingertips, etc.)	+3
combination tissue (e.g. bone + muscle)	+3

Let's do two examples, the first being the repair of a nasty 7 point gunshot wound and the second being regeneration of a lower leg. The first is pretty simple. You start with the base difficulty of 10 and add +5 for healing 7 hits. You cannot get any benefit from extra time or extra energy, so the final difficulty is 15. The second requires that we start with a base difficulty of 15 for the mass of tissue being replaced instead of lost hits, then add +3 for it being regeneration and +3 more for involving both bone and muscle, for a total difficulty of 21. However, the base difficulty of 15 means we can get up to a -5 modifier from extra time, which would be 1.5 days and drop the difficulty to 16.

If we used the standard greponomics rules, the healing will cost 125 Credits and take about an hour, while the lower leg replacement would cost 1,000 Credits and take a day and a half. These costs can of course be modified by the profit margin the grepper thinks they can get, but would be the lower end of the price range in most cases.

You can read a lot into what grep society is like by these costs and difficuilties. A military field hospital could put casualties back on the field before the battle was even over. Conversely, if someone wants you dead, they better make sure you are *definitely* dead, because grep can pull you back from the brink. Also, if someone wants to torture you, there is really no limit to how badly and how long they can do so...

One of several ways to put an upper bound on use of grep for healing or regeneration is to have a macabre raw material requirement for any regeneration or healing past a certain level, sort of like compatibility for organ transplants. Maybe you need to have fresh, *human* raw materials for properly regenerating lost tissue, but as long as you are willing to live with the visual side effects, you *might* be able to get away with animal raw materials. So having a hand replaced with pig flesh as the raw materials might give you a perfectly functional human hand, the skin color, texture and hair on it might not look human.

substitution: This is much like regeneration, except you are replacing the lost tissue with something better, some combination of flesh and possibly electronics, metals or composites. Aside from the added difficulty of incorporating electronics into the mix, cyborg parts can also improve on the original parts, making them stronger, more durable or with enhanced capabilities. In some cases substitution can be easier than regeneration. You can make up a cyborg arm ahead of time and all the grep has to is interface it with a stump. Much less mass involved, much less time. Cyborg replacement can also be from the ground up, where the grep seamlessly integrates flesh into metals so that it is hard to tell where one stops and the other begins. This would be more difficult because the grep is creating the new mass, but has advantages over a simple interface. The modifier list is worth a little detail.

complexity	difficulty
substitution	+3
enhancement of existing part	+1
interface with existing item	+0
nerve-intensive tissue	+3
combination tissue (e.g. bone + muscle)	+3
each +1 capability (armor, etc.)	+1
each +0d skill or +1 attribute	+2
each +1d skill or +3 attribute	+4
each +2d skill or +6 attribute	+8

enhancement: You are not replacing something with something better, you are just improving something you already have. This is where you could need the masses for things like your torso. If you wanted to make your *entire* body +1 stronger through grep, it would be a grep with the base difficulty for an 80 kilogram object, and a +1 for enhancement.

interface: This has the benefit that it only counts as a 1 kilogram regen, regardless of the size of the replacement part. The downside is that you have to make the replacement part first, and presumably make it in the right size for the recipient. This is less of a problem if you are replacing both arms or both legs, since any slight difference in size or length is the same on both sides. Another disadvantage is that the strength or quality of the interface can never give you more than a +1 capability, +0d skill or +1 attribute. For instance, you cannot make a bionic arm more than 1 point stronger because you run the risk of tearing it off at full strength. While an interfaced device might run off of biological energy, it is still a machine and does not repair itself if damaged. A cyborg replacement grown from scratch does repair itself using a combination of normal healing and grep.

! This sort of grep-based self repair integrated with the human body is very high-tech and can lead to or exacerbate the things happening in the **Incarnation** plot (**page 5.36**), so keep it in mind.

each +1 capability: This is for quantities other than attributes or skills. Being inherently armored, having an increased hit bracket or more hit points. The degree you can do this is up to the gamemaster, but anything over +1 is noticeable on close inspectiion or a basic test of your bloodwork, depending on the capability, anything over +2 starts to be visible on casual inspection and anything over +4 starts to become grotesque. Imagine what you would look or feel like if your skin was tough enough to bounce bullets. The intimidating appearance of some grep enhancements is seen as a feature rather than a drawback to some people. As long as you do not care about looking human anymore there is no upper limit, but each +1 is a cumulative difficulty. So if you get a +1 and then want a separate +1 on something else, the second one is +2 difficulty for the +1 capability.

A '+1 capability' can also give you a new ability or way to do something, at either an attribute level of 3 or a 1d+0 level. For instance, you could take a '+1 capability' to say 'I can see heat traces', and this new ability would start at a sight Perception roll of 1d+0. The gamemaster will be the arbiter of exactly what can be done, but it should stay within the bounds of the setting. So, you could not give someone psychic powers or the ability to levitate.

each +0d skill: This is some sort of hardwired knowledge or muscle memory for a particular skill that is used by the part of the body being enhanced. How exactly this applies is handled on a case-by-case basis, but most knowledge skills would be a head-mass enhancement. And this means you are letting grep add to or rewire part of your brain, so hope that the person making the grep roll knows what they are doing. If you acquired a new ability at an attribute level of 3 or a roll of 1d+0, it can be improved with this modifier.

each +1 attribute: This adds to your attribute for all uses of the body part that is either being enhanced or replaced. If applicable, this can be a Forte instead of an overall +1. Improving an already improved skill or Attribute uses the difference in modifiers. Going from a +1 Strength to a +6 Strength would be a +6 difficulty, not a +8.

! At gamemaster option this can be cumulative. That is, if you already have a two +1 bonuses on different attributes and you want a third +1, it would count at the +3 level for determining difficulty, not the +1 level. That is, the grep has to work around the results of prior grep without damaging it, which is harder.

i Let's do two examples, the first being a 'bionic arm' that is a fast and useful replacement for a lost arm, and the second is 'combat hearing', where you can process sounds around you to get a picture in your head of everything in your immediate vicinity, even if it is dark, obscured or you are blinded.

For the first we have a base difficulty of 10 for a 1kg biological grep, a +0 for interface and +3 for nerve intensive tissue (since you want a full sense of touch with the bionic limb). If you just wanted a rudimentary sense of touch and position, you could leave out the +3. This gives a total difficulty of 13 and it can be done in an hour at a fairly low cost. The cost of the limb would be based on a fairly complex electrical and mechanical grep with the mass of a normal arm.

The second example starts with the mass of head and neck (because we say so), which for a biogrep we will call a difficulty of 16 (between the values for a 4kg and 8kg grep). The enhancement is a +1 to difficulty, the new capability is +1, and would give a hearing Perception of 3 (roll of 1d+0). We want to improve this to a hearing Perception of 6, which is another +4 modifier, for a total difficulty of 22. We can spend enough time for a -6 modifier (3 days) and drop it to a difficulty of 16, but this is still going to be a costly grep.

More

You *can* grep an entire living being. You can literally grow a person in a vat of soup. A person with default stats (or points) would have a design of:

difficulty	
80 kilogram biological grep	27
regenerate lost parts (use mass)	+3
nerve-intensive tissue (eyes, fingertips, etc.)	+3
combination tissue (e.g. bone + muscle)	+3
total	+36

However, all that gets you is an adult but completely empty shell of a body. You do not have to buy it the default attributes for a person (6 or 7, gamemaster preference), since that is what you would get from regenerating other body parts anyway. However, if you want it to at least be able to talk and understand language, you need to give a +0d skill for an additional +2 difficulty and a total difficulty of 38. You *could* spend enough extra time on it to get a modifier of -17, however this is enough extra time that you might as well create an adult human being the old-fashioned way.

You could however, grow the individual chunks much faster and at the same time, and then 'interface' them together *ala* Frankenstein's monster fastion.

Note that you could also grow a replacement limb and then 'interface' it to attach it to the body. You could not give yourself an *extra* arm this way, since there is no existing shoulder joint to attach it to.

'Doing it right' (difficulty 38) is technically not possible. This has *not* stopped people from trying. This could be through doing the body piecemeal and stitching/grepping it together as described above, or by taking shortcuts in the compatibility/purity departments, or just by growing midgets or infants (grepping a 4 kilogram infant is well within reach).

Pain and suffering
Biogrep is not all fun and games and giving yourself every skill in the setting by repeatedly playing bobbing for apples in a tub of hot grep. First, any sort of grep that involves repairing tissue is somewhere between intensely uncomfortable and excruciating. *Parts of you are being torn apart and put back together in a tank that usually has signficant electricity going through it.* And it generally cannot be done under anesthesia without extra difficulty (you do not want grep to assume the new parts require you to be anesthetized in order to work).

Most places doing this work on *willing* subjects require that you sign a waiver *and* agree to full-body restraint. After the first time you have had such a procedure it is a hard(11) Will roll to voluntarily do so again for any reason other than saving your life or getting a missing part re-attached.

Trying to do this to a non-consenting subject means the person's inherent grep will try to resist the changes and the person's Fate will increase the difficulty of the task. So, both active resistance, failing the Will roll or simply being knocked out and dumped in the soup generate equal increases in difficulty.

The prohibition on reducing the difficulty of biogreps with energy is mostly because either a very hot soup or a very electrified soup is bad for most living things. As a rule exception, you *may* be able to push things a little for a -1 or -2 modifier for energy, but this would make things even *more* painful than normal, but would let you get it done in half the time.

Failing biogrep rolls
Grep rolls can be failed, and biogrep rolls that are being done to a living thing can fail in all sorts of *spectacular* ways.

purity: *It's dead, Jim*. If the level of purity goes below 'low', the grep is not biologically viable. It will slowly slough off or rot off, but this will not necessarily be known at the time. It might work, it just could be slowly dying from the moment of completion. It or the recipient will take a hit of damage that is not recoverable, until either the part is gone or the recipient has died of septic shock.

danger: Not really a concern unless you are getting something like a bionic arm with a fully charged powercell. The grep just hurts a lot more than normal and the amount of failure increases the Will roll the person has to make the next time they need a biogrep.

compatibility: A compatibility failure is comparable to organ rejection on a transplant. In grep terms, anything below 'average' means that you need a special dietary supplement in order for the new parts to work properly. This could be a special medicine or simply a diet rich in particular trace elements. *This can be engineered into a biogrep deliberately*. You could create an army of minions that will waste away and die unless they eat the special diet that only you can provide.

time: It takes longer. *And hurts more.*

size: You get what you wanted grepped, just less of it. *No one is happy with a half-sized replacement arm.*

Autogrep

No, not making an auto with grep or grepping while in an auto. Autogrep is the process of grepping something by using your *body* as the soup. You have fluid transport, chemical energy, carbon, oxygen and trace amounts of quite a few elements, so it is entirely possible to use your internal reserves as the energy and feedstock for a grep. Most of the time, this is *not* casually done. People autogrep because they have no other choice. Externally sourced greps are *always* more efficient. There are some limits to the process:

- You cannot grep anything bigger than 1 kilogram
- Whatever you grep can only use the 'common' or 'uncommon' materials modifier. If it takes something rare, autogrepping it is hazardous
- It is going to hurt. Both the process itself and if it is a separate object, removing it from your body is going to cause damage

You can also modify your own body this way, just like biogrep, but with an internal soup rather than immersing yourself in a vat of it. External modification can do more, but autogrep does not require any specialized facilities. It also lets you do nifty things like self-healing of injuries or purging your body of poisons. Someone sufficiently skilled could heal an internal cancer, unclog their arteries, uncloud a cataract and any number of other age-related conditions. Whether or not you can undo age-related chromosome damage is unknown, since the benefits of symptomatic treatment would mask the benefits of chromosomal repair with grep being used in this way for only a few years now. No one is growing younger or having dark hair replace gray hair. *Or if they are, they are hiding it.*

Autogrepping is one of the things that makes law enforcement and holding of prisoners a bit tricky. When someone can autogrep a knife or a key to a lock or a tiny winch with a synthetic diamond cable to yank the bars out of their cell window, you have to *really* keep an eye on prisoners.

Autogrepping has a price and that price is stamina, hits or both. You take 6 non-lethal hits from exertion *and* 6 lethal hits (lethal hits *first*) for a grep of 1 kilogram, and this is reduced by 1 (lethal first) for each for each halving of object mass, reduced by 1 for each -1 on difficulty for time spent and increased by 1 for each +1 difficulty on time spent. You cannot recover non-lethal hits during the process. And if you try to autogrep twice in a row without recovering all the non-lethal hits first, increase the lethal hits done by 3.

Plus, you *really* want to be lying down and not doing much during the process. Initiating an autogrep requires a Will task of difficulty 9. If you fail, add time levels until you succeed and this is how long it takes you to get the nerve to try the roll again. Because it is *painful.*

In terms of mandatory modifiers on an autogrep, you have the following. Remember that there may be relative complexity modifiers as well. And also that you might be able to reduce the damage you take from spending extra time but you cannot adjust the difficulty (remember you get no benefit past the mass modifier).

autogrepping an object: You *can* make things of less than 1 kilogram. This does not decrease the difficulty of the autogrep, but *does* reduce the personal damage you take. You almost always take at least 1 lethal hit because there has to be an incision or grep-made perforation in your abdomen to remove the object. It is theoretically possible to poison yourself with absorbable 'rare' materials so that you can autogrep something that requires that sort of raw material, but this is *not* recommended.

autogrep an object	difficulty
base difficulty	+9
1kg mechanical	+0
composition: common	+0
resources: average quality	+0
resources: human body as energy source	+0
time: 1 hour	+0
total	+9

Note that you simply *cannot* autogrep certain objects as exact duplicates because the source material (you!) does *not* have the materials to make it. An 80 kilogram human is roughly:

element	mass
oxygen	49kg
carbon	18kg
hydrogen	8.0kg
nitrogen	2.1kg
calcium	1.1kg
phosphorous	.9kg
potassium	.2kg
sulfur	.2kg
sodium	.1kg
chlorine	.1kg
magnesium	20g
iron	5g

So, you are unlikely to make a normal gun (or knife) out of the .005 kilograms of iron in your blood. However, the ABS plastic that those of you with 3D printers are using is made out of carbon, hydrogen and nitrogen ($C_{15}H_{17}N$), and black powder is carbon, sulfur, potassium and nitrogen. So, you could make a plastic framed gun with a smidgen of diamond reinforcement (carbon) on the moving parts, shooting diamond bullets through a diamond-plated calcium-lined plastic barrel (calcium would made an awful barrel, but it might handle the stress of gunpowder better than diamond. It would not last all that long, but it *is* a gun. A solid diamond knife would also work. Or, you could just cough up some nitroglycerin ($C_3H_5N_3O_9$). *Adds a whole new twist to the idea of "suicide bomber", doesn't it?*

Another way to conceivably use yourself as a soup base for grepping is to eat the components and hope you do not poison yourself. So, smuggling a dozen stainless steel spoons from the prison cafeteria might do the trick for a small gun, assuming they were that foolish *and* you could manage to eat them....

A variation of this is making a thing that is designed to stay inside you, a biologically compatible add-on to your own abilities. This sort of thing is semi-permanent. It is *not* a genetic change to who you are, so eventually your body will re-absorb the materials and undo the changes. For instance, giving yourself bone spurs that stick out of your forearms for strength+0 lethal melee damage, or growing fingernail tissue over your torso to act like 0d+1 armor. You would count something like this as having an equivalent mass of .125 kilograms per hit it has. And when you would naturally heal that many hits, the change has been absorbed or shed or otherwise goes away.

As a fairly easy autogrep without spectacularly awful side effects on failure, this is popular among young malcontents as a sign of gang or clan identity. So, the 'Fu Manchus' might have long and unnaturally strong fingernails, or the 'Orcs' might have temporary tusks and other facial modifications. These sort of things would be a temporary Looks that makes you an outsider or insider for social interactions, and to some extent can alter body contours for disguise purposes.

autogrepping wounds: For this you would just count it as normal regen, starting with a difficulty of 10 and applying the modifier for the number of hits healed. While it makes no obvious sense to take lethal damage to heal lethal damage, in some cases it make be preferable to take a whole-body weakness to patch up a gut wound or minor amputation or stop arterial bleeding. And yes, you *can* autogrep lost body parts. If the damage you would inflict on yourself is too high, you can do it in multiple (painful) steps.

There are not too many things you can do to make an autogrep easier except for doing less mass. Extra time reduces the damage you take from the process but does not make it less difficult. There is no such thing as a 'healing potion', but you could have shelf-stable drinks fortified with iron, amino acids and all that other good stuff. Having a few of these during the autogrep process would be worth a -1 to the difficulty. Having a cool equivalent (to offset the heat generated in your body by the grep), formulated for use as an intravenous drip would be worth a -2 to the difficulty.

Note that any autogrep assumes you are eating, drinking and avoiding exertion during the process. The amount, *especially* in food, is proportional to the equivalent mass of the autogrep.

You have been shot in the leg and taken 8 hits. If you wanted to spend a miserable hour trying to grep the wound closed and the muscle tissue back together, it would be a difficulty of 16.

base difficulty	10
healing 8 hits	+6

You would end up taking 6 lethal and 6 non-lethal hits to do this, but you would trade a gaping hole in your leg for a whole-body debility and a healed leg.

There is a second type of autogrep that is similar to healing and is far less difficult. This is superficial, often chemical changes, which can be localized or whole body. For instance, you could give yourself a suntan, give yourself a tattoo (or remove one), get drunk or detox or neutralize a poison.

This can with sufficient skill be safely attempted in a fairly short amount of time, since the tiny 'effective mass' of what you are grepping would be -6 on the lethal hits (which means the cost is simply 6 non-lethal hits).

autogrep a chemical change	**difficulty**
base difficulty	+10
composition: common	+0
resources: human body as energy source	+0
time: 1 hour	+0
total	+10

relative complexity	**difficulty**
elemental toxin removal (lead, arsenic)	-3
organic toxin (venom, alcohol)	+0
neurological toxin (venom, nerve agent)	+3
general cosmetic change (skin tone)	-3
specific cosmetic change (tattoo)	+0
mild tissue alter (extra chin, bigger bust)	+3

You cannot heal damage with this method, but you can remove things that are *causing* damage or mask the effects of damage, like making bruises fade faster than normal or geting a piece of shrapnel out of a wound. It can also help quite a bit for certain types of disguise. You can become more pale or tan, add a birthmark or tattoo, maybe be slightly more or less wrinkled, make your voice a little rougher, that sort of thing. Autogrep adepts make good infiltrators. Being able to mask the signs of age is possible with autogrep, but it should be more difficult as you get older, as the changes are more pronounced and there is less good raw material to work with.

autogrep self-improvement: This is the dangerous process of trying to modify your body in a means *other* than restoring damage. You are tinkering with your genes to generate a permanent change in yourself. Because this is a veritable Olympic-sized swimming pool of abuse for munchkins to belly-flop into, the first and most important guidelines is that the gamemaster has final say on everything, and it can be revoked *retroactively*. This would be a substitution biogrep, with all the normal modifiers.

If you have a soup starter from someone who has done this modification before, that is worth a -1 (depending on how close a genetic match they are to you), and if you have a template (like a chunk of the modified tissue), that is a totem worth another -1 or -2. Also, once you have successfully done it, you are your own 'soup starter' worth a -2 (replaces any -1 you might have had).

Even this does not make it something you really *want* to do as autogrep if you have the facilities to have the changes done from being immersed in a soup. If there are colonies of centaurs or merfolk or other radical genetic alterations, these almost certainly came about through *externally* mediated grep.

A potential long-term plot might involve grep-modified genetic supermen, the result of questionable experiments done on pregnant women in government grep labs during the Dark Days. These children would be about ten years old now. Do they know who and what they are? Are they insanely smart and manipulative, more agile and strong than they have a right to be? Are they making their own plans or are they being groomed for a particular adult role by someone else?

Autogrep side effects?
If you are using yourself as the raw materials, energy, soup *and* containment vessel for grep, then if things go wrong they can go *very* wrong. Roll for the type of grep failure as normal, then see the following additions:

purity: If a mechanical or other removed item, this is more or less as normal. Odds are it will be less reliable or weaker, and imperfections might not be known until you try to use it.

If you are trying to heal an injury through autogrepping and fail in terms of purity, it means that unless the grep failed utterly (by 6 or more), it *seems* to be a success, but the effects will undo themselves in short order. Wounds will open up or start to internally bleed, newly grown parts will lose sensation and start to turn blue, and so on. You will lose 1 hit of the amount healed each day until you take 1 more than the original damage. Then injury can then start to heal normally. The badly grepped healing cannot be redone until the old tissue has sloughed off, been surgically excised or grepped out in a separate operation. This can still be useful. If that broken leg you grepped back together only holds for a few days, that could still let you hike to safety.

If you are adjusting yourself and fail on purity, then the modification is defective in some way. Let's say you wanted to give yourself improved night vision and failed in this category. Maybe it is blotchy and has blind spots, so your Awareness roll is not as good. Maybe you wanted an increase in Strength. You got it, but not for your ankles. So, you can hit harder and lift more, but unless you wear special ankle braces you cannot hike with a bigger backpack without risking injury.

danger: The only real danger is if you are making a separate item that is dangerous. All the normal rules apply, except you take double damage because the heat buildup and possible explosion is *inside* you.

compatibility: This is normal for made items. For healing injuries an incompatibility failure generally means scarring. The injury heals up, but it is not quite right in terms of appearance. A regrown part will not quite work right or look a bit different than the old part. Your regrown eye might be a different color than the original one. Your new index finger makes your hand look like it has two middle fingers.

For any sort of autogrepped self-modification, it means the changes are not fully compatible with you. This will result in a slow degradation of the improvement that continues past the norm the person started at, or some form of cancer that shows up in a matter of a few years (no standardization) to decades (normal standardization). This cancer can be treated or possibly grepped away, but since the cause is genetic, it will keep coming back.

time: This is normal. However, in addition to needing more food and drink and rest, you also take 1 extra hit of each type on the total damage you take for each extra time level the autogrep takes.

size: This is normally for made items. For healing it means you get back less hits than you wanted, and for regrowth it means you get back less of the part than you wanted. For things which are all or nothing (like eyes), you end up with an undersize and not very useful new part.

Alien grep

It took quite a while for people to figure this out, but the grep that was virtually the entire mass of the Haaren ship contained a vast, distributed knowledge base of Haaren tech. But this has not made it any easier to access. Part of grepping is knowing what to ask for and how to ask for it. We lack the inherent knowlege of the Haaren language, so what we ask has to be grep-translated. And we do not know the principles under which much of the Haaren tech operates, so we cannot ask from a position of understanding. It would be like an ancient Greek asking for a smartphone, after having his ancient Greek words used to describe what a smartphone was. *Ask the grep for a 'magic picture far speaking seer talisman' and see if it gives you an iPhone.*

Yes, the Haaren had the equivalent of knives and guns and low-ish tech things like radios, but we do not need the Haaren database to make those.

Grepping anything Haaren or Cryptbian can be handled in a few ways, which is up to the gamemaster.

You can say that to even attempt it requires a complementary skill that is some combination of knowledge relating to the Haaren or Cryptbians (separate skill for each). This helps you 'ask' in the proper fashion.

You can say that you need some concentration of the original Haaren or Cryptbian grep in you in order to initiate such a grep.

And last, most of the fun and interesting stuff you would want to make is going to require unique or scarcer elements as part of its construction.

Among the interesting possibilities that adventurers may have heard of being grepped:

- laser weapons: true
- railguns: true
- plasma weapons: true
- force fields: maybe true
- anti-grav: false
- teleportation: false
- body switching (mind transfer): false
- fusion reactors: true
- super-strong materials: true

Some of these are worth a little more detail.

conventional weapons: These can be designed up using the previous guidelines, but if you can grep up some super-strong materials, you can probably get a +3 for the composition modifier instead of +2, if the weapon has a mechanical part to its manufacture. The only reason this is important is that such materials would boost the 'damage norm' for the weapon by +1, meaning it could be just that little bit more powerful than other weapons of its type.

alien weapons: Alien weapons, or for that matter all alien tech is the insanely powerful and quirky stuff that exists in secret corners of a campaign. If these devices exist at all, you can bet that heads of state know about them and maybe even are protected by them. They are probably not *much* more common than that, and knowledge of or possession of one of these probably puts you in violation of laws that you did not know existed (because knowledge of those laws is itself a crime). You might be outside the jurisdiction where it is illegal, but that's merely a technicality to be overcome. Something like this showing up in the Rova area is certainly going to happen *eventually*, but how, why and who made it is going to be interesting part.

The descriptions of alien tech are really just technobabble to cram certain concepts into the gameworld. But until someone makes a real one that works differently, it is good enough.

Plasma guns

Like all good alien technology in fiction we are not *precisely* sure how it works as a whole, but we can measure bits and pieces to see *some* of what is going on. Haaren plasma weapons use 'cartridges' that are thick disks of a lithium alloy that has some proportion of deuterium in it, with a copper facing on one side. These are stacked up in mundane-looking magazines that usually lay parallel to the barrel and feed the disks up into an internal ignition chamber. What looks to be a solid-state accelerator feeds a pulse of high-energy protons into the center of the disk and this generates a cascade discharge of extra-ordinary power.

It goes 'boom'.

The expanding plasma generates a magnetic containment field in the barrel and the resulting gout of molten hell goes speeding downrange at hypersonic velocity, trailing in the wake of the copper cap of the cartridge, which is now an aerodynamic shape that breaks a path for the plasma, which itself is wrapped in a magnetic field of its own making. When this hits a target, it usually blasts a hole through it and explodes inwards. If the target is too thick to penetrate, the damage acts like a lethal explosion of about 4d less than the penetrating power.

Against any sort of living target the results are pretty awful. The superheated plasma does not contact the tissue long enough to cause any sort of steam explosion, but the passage of the hypervelocity plasma has much the same effect. Plasma weapons are considered armor-piercing against anything that is not protected by an alien armor or force fields. Neither Haaren nor Cryptbian use magnetic shielding (they have force fields), and humans are not capable of making magnetic fields strong enough to act as armor.

The magnificently blinding muzzle flash also generates enough radiant heat to ignite easily flammable items nearby. How nearby depends on the size of the weapon. Firing even a plasma pistol within the confines of a normal human dwelling is likely to rupture windows if not eardrums from overpressure, and is almost certain to set *several* rooms on fire as it passes through walls. Plasma weapons have a limited sustained rate of fire because of heat buildup in the weapon itself. Pistols and rifles fire in semi-auto mode only and will shutdown for cooling if the quantity level for the number of shots fired get 2 points higher than the time level those shots are fired over. It stays shut down until the two values are equal.

If you fire 4 shots (quantity of +4) in 2 seconds (time of +2), the weapon will shut down until you reach a time level of +4 (which is 4 seconds).

The machinegun version has a heat shield (armored) to protect the user and a fluid-cooled radiator system that allows for a sustained fire of 3 shots per second, slightly more in cold climates and slightly less in hot ones.

This is what we know. What we do *not* know is *how* all these things actually happen. The individual bits of the plasma weapon concept have been duplicated in labs (not that anyone admits this), but when put together, nothing quite works as it should and the weapon either fails to fire, or fires and blows itself up in the process. This is a nice way of saying you cannot make one as several smaller assemblies and put it together. *Not yet, anyway*.

A grepped copy, made from presumably the 'original blueprints' is exceptionally difficult to make, but has been done. Alterations for human anatomy do not affect the difficulty of grepping the weapons. The raw template for a 1kg plasma pistol is on the next page.

plasma pistol	**difficulty**
base difficulty (1kg electrical+mechanical)	+11
time and power for the grep	-1
Haaren tech	+9
+1 safe damage	+1
complexity	+4
semi-auto(+1)	
10 shots(+0)	
armor-piercing(+1)	
accuracy of 1(+1)	
secondary explosive(+1)	
final difficulty	+24

safe damage	**damage**
mass level of -11	-11
plus 2	+18
Haaren tech	+9
+1 safe damage	+1
minus shots, action, explos., armor-piercing	-4
final safe damage(4d+1)	+13

So, this pistol *could* be designed up to 4d+2 damage. The *lowest* damage for which you can make plasma ammo is 2d less than the damage norm for the weapon, so for this pistol you cannot grep ammo of *less* than 2d+1.

The absolute lowest you could get the difficulty for this weapon and ammo (without gamemaster-approved special modifiers) would add in:

previous difficulty	24
totem	-2
soup starter	-2
adjusted difficulty	20

So, *if* you had only the pre-requisites set by the gamemaster *and* ultra-pure raw materials you could get the difficulty of the pistol down to 20, within the realm of human skill, but a long way from easy, and while the ammo is not as hard to make, getting the unique trace elements for the gun is going to be a chore.

Lasers

Lasers are what the Haaren consider a crowd-control weapon, if by crowd control you mean 'cause severe burns and permanent blindness to hundreds or thousands of people at a time'. Despite their advanced tech and materials, they found that neither pulsed nor continuous beam lasers could deliver energy to a target as efficiently or quickly as plasma weapons. Lethal, yes, just not lethal *enough*. So, for purposes of 'subduing' large numbers of low-tech combatants they developed the equivalent of a 'laser fire hose', a laser weapon in the continuous megawatt range with a beam diameter of a meter or two at range. This is the equivalent of a few *thousand* suns' worth of intensity. Enough to give third degree burns with a moment's exposure and sufficient to fry eyeballs even through closed eyelids at ranges of several kilometers. Combined with computerized aiming and optimum path software, one vehicle with one of these lasers could permanently blind a few battalions of human infantry in minutes, as well as setting fire to several square kilometers of real estate. Haaren lasers are less effective vs. physical barriers than other weapons and most regular armor is considered +2d to its normal value against them. Even a 0d+1 jacket would be counted as 2d+1. *Of course, the normal damage of the weapon means that this jacket would be a permanent addition to your wardrobe after being melted into your skin...*

The power requirements for any sort of mobile operation require a portable fusion reactor, as well as large and complex cooling systems. The Haaren had an airborne version of the weapon as well, but none small enough for infantry use.

The DC government (and probably a few others) have built one or two of these weapons, but they are used as emplaced point-defense weapons against missiles, drones and hostile aircraft.

In game terms, *just do not go there*. If one happens to show up in play, have the effects be whatever is needed in plot terms. Your adventurers do *not* want to be the target, and it takes a special kind of desperation or cruelty to turn one of these on someone else.

Humans have tried to use some of the Haaren concepts in portable lasers, but with very limited success. The cost and complexity gives results only equal to conventional anti-material rifles, but with worse performance against armor. The handful in the world's inventories are there because there *may* be uses for which such a weapon is the best option, it is just that no one has found that best use yet.

Below is a template for a human laser rifle. The energy supply is internal so it has no 'ammunition' and it can be grepped in an uncharged state to reduce the danger factor.

laser rifle	**difficulty**
base difficulty(8kg electrical)	+16
time and power for the grep	-6
Haaren tech(degraded)	+8
complexity	+5
semi-auto(+1) 10 shots(+0) Accuracy of 4(+4)	
final difficulty	+23

safe damage	**damage**
mass level of -2	-2
plus 18	+18
Haaren tech(degraded)	+8
minus semi-auto, 10 shots	-2
final safe damage(7d+1)	+22

Railguns
This is a Cryptbian tech that seems to be less powerful than Haaren plasma weapons, but which has a much greater rate of fire. Like the Haaren plasma weapons they are typically grepped in multiple blocks, with the magazines being disposable and non-rechargeable. They have no 'user serviceable parts' and the only possible maintenance is occasional cleaning. A Cryptbian railgun seemingly operates on the same principles as primitive human designs, but at far higher levels of energy efficiency. Trace amounts of transuranic elements are needed for a Cryptbian railgun to be anything other than an exotic paperweight, but the ammunition merely requires very rare natural elements. Railguns act as armor-piercing against any known physical or energy defense. They are not as blindingly obvious as plasma weapons but atmospheric heating makes them look like tracer fire both night and day.

railgun pistol	**difficulty**
base difficulty (1kg electrical+mechanical)	+12
time and power for the grep	-2
Cryptbian tech	+8
complexity	+4
semi-auto(+1) 10 shots(+0) Accuracy of 2(+2) armor-piercing(+1)	
final difficulty	+22

railgun ammo	**difficulty**
base difficulty (1kg electrical+mechanical)	+12
time and power for the grep	-2
Cryptbian tech	+8
final difficulty	+20

safe damage	**damage**
mass level of -11	-11
plus 18	+18
Cryptbian tech	+8
minus semi-auto, 10 shots, armor-piercing	-3
final safe damage(4d+0)	+12

super-strong materials: The Haaren and Cryptbian had the equivalent of graphene and carbon fiber and metal-ceramic hybrids, just better. Among those who know of them, the overall class of materials is called 'graphinite'. A layman's description of it would be 'diamond-kevlar-titanium'. It is a molecular structure of mostly carbon with a variety of other elements interwoven into its structure in a manner that should not be possible given the current human understanding of the subject, and it theorized that a tiny part of the structure involves an artificial compression of atomic lattices down to neutronium densities. It makes *really* good armor, railgun and plasma barrels, and shaving razors that hold their edge *forever*.

There are two versions of the material that are grepped in different ways, one Haaren and the other Cryptbian. Graphinite and other exotic materials generally have molecular and crystal structures that can *only* be assembled with grep and which have fairly esoteric elemental requirements. In addition, they may have special pressure and temperature regimes needed for their soup. So, instead of using a plastic 55 gallon drum, you might need a polytetrafluoroethylene-lined stainless steel pressure vessel than can handle a hundred atmospheres of pressure at a temperature of 300°C and instead of electricity you have to bombard it with gamma rays.

The gamemaster can feel free to set up equally esoteric requirements for any grep they do not want to be casually done over some back-woods campfire, and some alien super-strong material might be a required raw material for grepping or making some *other* sort of alien tech.

Graphinite has a unique appearance. It can be painted or covered like anything else, but the raw material has the depth and iridescence of opal, but the luster of silver, like translucent mercury that flows when you shift your point of view on it.

Another feature of graphinite or similar materials is that they are almost impossible to work with normal tools. You grep it in the form you want it to be, because you cannot do much else with it. Part of its strength comes from its entirety, so while you can with extreme difficulty work it with machine tools (the ultra-dense elements wreck even carbide tools in short order), anything more intense than superficial machining weakens it and that kind of defeats the point of having it in the first place.

graphinite plate	difficulty
base difficulty(1kg mech+elec+chem)	+14
time and power for the grep	-4
Cryptbian tech	+8
final difficulty	+18

And this is why you do not see too much of it. A 1 kilogram plate would be about the right amount for a contoured piece for the front or back of a human torso. Graphinite would obviously be a rigid armor. Melee weapons made of the stuff would be designed as Industrial Era as per the normal cap for melee weapons, but count as armor-piercing vs. about everything except graphinite. Bullets would be similarly armor-piercing, but unless they had a covering of something softer than steel, would ruin regular gun barrels in a handful of shots. Made into the chest+ abdomen armor used in other examples, the base armor is:

base armor	armor
mass level of -11	-11
plus 11 (chest+abdomen adjustment)	+11
Cryptbian tech	+8
rigid armor	+2
final armor value(3d+1)	+10

This is a front & back plate that has the same protective power as a conventional human armor that masses four times as much. And it is also hardened against the armor-piercing effects of any human technology.

Force fields

This is really just 'designer technobabble', because one, it is cool and two, there are times adventurers need the edge that something like this provides (or the gamemaster needs a bad guy to have an edge the players did not take into account). It works in game terms something like a gun design:

force field generator	difficulty
base difficulty (1kg electrical)	+10
time and power for the grep	-1
Haaren tech	+8
relative complexity	+7
force field(+6) semi-auto(+1) 10 shots(+0)	
final difficulty	+24

This can be scaled up or down for specialized applications. Armor supplied by a force field layers with other armor according to the normal rules (halve the lower armor then add the two together). The force field does not transmit blunt trauma and does not impart any energy to the wearer if it is not penetrated. If you were hit by a bus and the armor value was not exceeded, the bus would crumple around you and you would not even spill your coffee. However, like any other armor it does *not* protect you from damage that happens because *you* are moving. It might stop you from being impaled if you fell onto a steel spike from ten stories up, but it would not keep your spine from snapping nor your brain from smashing against the inside of your skull when your body wrapped itself around said spike.

The *default* protection for a force-field is a person-sized object (so you do not apply the 'whole body' modifier). Dialing the protected area up or down alters the protection by the difference in mass levels. So, protecting something twice the size of a person (+3 mass over a person) would be at -1d to armor.

A 16 kilogram force field might look like this:

base difficulty (16kg electrical)	+18
time and power for the grep	-8
Haaren tech	+9
relative complexity	+1
semi-auto(+1) 10 shots(+0)	
force field(+6)	+6
final difficulty	+26

The 'safe damage' (in this case, armor) would be:

mass level of +1	+1
whole body armor adjustment	+5
Haaren tech	+9
minus complexity	-1
force field	+6
total (6d+2)	+20

Leaving aside how difficult it would be to make, this would give a person-sized object an armor of 6d+2, which is nothing to sneeze at. If you put this force field generator on a larger object like a 240kg motorcycle + 80kg driver, there are +6 mass levels between the person and the person on a motorcycle, so the protection for the rider plus cycle would be +14 (4d+2) instead of +20 (6d+2).

How it works in 'reality' is anyone's guess, but it seems to shunt some fraction of energy that impinges on the field into some other aspect of the spacetime continuum. Attacks absorbed by the field simply lose all their energy. Blunt objects simply stop moving without an impact nor a bounce (and remain just about at room temperature). Bullets will fall to the ground undeformed. Flames go out when they touch it and explosions simply flow around you. The central module degrades with each activation (each 'shot') and is not repairable. Since it is tuned to the individual device, once used up the entire device is recycled to reuse the ultra-rare elements used in its construction (and it also acts as a totem).

In operation a force field is almost perfectly transparent, providing barely a shimmer, skin close to the surface of what is protected, darkening when activated over the area of what struck it (you can define it as being *under* worn armor). It apparently has no power consumption in standby mode. It is theorized that it is powered by the quantum vacuum that it seems to dump hostile energy into. It lets air, normal light and sound through unimpeded and has a threshold adjustment for its activation.

It has a visual interface that allows you to configure it to the geometry of what is to be protected, and it adjusts the field dynamically rather than requiring some sort of complex harness. Exceptionally complex shapes (like people) may require 'border tags' to help localize the tips of hands and feet, and these are part of the device. Instructions do not come with the device and the interface cannot be converted to human languages. The most obvious and readily understood part of the interface is a ring of colored lights that show how many activations are left.

Alien tech is meant to be really good *and* really hard to do. This is one reason some of the tech can only be done in a single piece. Breaking it into subassemblies would make it too easy, and you can justify it in the gameworld by saying no one has the alien skills necessary to put the sub-assemblies together (yet). Because of how it can shape or derail a campaign, feel free to adjust the difficulty or 'safe capacity' as desired. You could make it rare and just a little better than human tech, in which case it will have an aura of 'eliteness' about it, but anyone with enough money (or talent) can get it, or you can make it unicorn-rare and insanely powerful, with only a handful in existence (because there are not enough alien elements to make more). Or apply modifiers to its grepping so that only those individuals attuned to Haaren or Cryptbian have *any* chance of doing it, making the greppers a commodity as desired as the tech itself.

fusion reactors: *Power*. Lots and lots of power. The difficulty of making one and getting the materials and energy and time to pull it off is meant to be beyond that of any group of adventurers, and the resulting item too bulky and fragile to be moved. The ones that are believed to exist (like in DC) are used both for power generation *and* to generate daughter products that can be used in other exotic grep-work. Adventurers stumbling into possession of a facility that had one would open up fantastic new opportunities, but require secrecy beyond belief (something like this in private hands is worth a tac-nuke to take out of circulation). It is not so much that the reactor itself is a threat, it is the capability it represents. If you have a fusion reactor and good grep skills, you can eventually figure out how to make fusion bombs. Also, both Haaren *and* Cryptbian had fusion power and anyone who has one type is probably going to hate with a passion anyone who has the other type.

We are not even going to list the design parameters, but just give you some notes. A fusion reactor can substitute for any other engine or source of electrical power. You cannot make one any smaller than 1 ton, though you can make the individual parts in chunks as small as 80 kilograms, provided you have the skill to assemble the pieces. The advantage you get over whatever you replaced it with is that it has +6 power over whatever rating the *other* power plant had, *and* it only needs to be refueled one-thousandth as often.

And of course, everyone wants it *and* the soup you used to make it. So, there are vanishingly few fusion reactors in mobile applications smaller than a destroyer and the stationary ones are guarded as well as you would guard a stockpile of atomic bombs. In practical terms, they are insanely difficult to make and those who have made them generally did so just to show they could, or because they needed the byproducts of a fusion power plant for some other alien-specific grep work.

virtual matter: One of the things that was discussed in some death after the confirmation of grep and the Dark Days was what happened to the Haaren ship. *Why was it so diaphonous?* All of the possibilities involve alien technology that humans have not yet even gotten hints about from experimenting with grep, but the one that has gained the most credence is that the Haaren could use energy to supplant or even substitute for mass, sort of like a Star Trek holodeck. The Haaren ship was just the barest outline of a ship, kept rigid and functional by force fields or something even more esoteric. The thought is that if you had an energy source to jump start it, you could create a fusion reactor whose substance was merely stabilized energy. And then that reactor could power the stabilized energy that made up the ship. And if you turn off the reactor, the whole thing disappears. Including the reactor.

In this hypothesis, grep is merely seen as a way to make an ephemeral template that is used to stabilize or direct the energy flows. The similarity to Benefactor tech in Greg Bear's Forge of God novels made him a small fortune in consultancy fees to the US government, along with a few conspiracy theories that he was an alien agent, but nothing ever came of either.

The other hypothesis was that the Haaren ship slowly turned its own matter into energy to keep vital ship systems operational, and it used its last reserves to safely land on Earth, after which it fell apart upon the first disruption of its structural integrity.

Neither one of these fully explains what happened, but neither virtual matter nor matter-energy conversion *seems* to be part of the distributed database of knowledge in the world's grep.

And this is for good reason in game terms, as either of these technologies would make grep look like a child's toy. For instance, a device which could turn matter to energy at an efficiency of merely one tenth of one percent of the device's mass would be three times more efficient at it than a hydrogen bomb. So, efficient matter-energy conversion is up there in the planet cracking range.

Virtual matter, even with a grep-based framework requirement is just as dangerous in the hands of violent monkeys. If you could jump-start a virtual fusion reactor and then use that to power up something bigger, then as long as you have *real* deuterium to pump into it you could make a space battleship for the same difficulty as grepping a car. You are of course losing some efficiency because of the energy overhead to maintain your virtual matter, but the ability to create megastructures in days if not hours out of nothing but **soup starter** and a sea-freight container of the right elements makes the notion of "gee, I can grep a pistol!" seem hopelessly quaint.

Now, we have brought up how the Haaren ship *might* have operated and why those means are *not* showing up in play, but as a gamemaster, what *can* you do with this knowledge? Nothing game-changing, but you can be clever. First, the idea of ultra-low mass items can be used to make easily grepped large structures, provided you have a strong geometry. For instance, using an airtight 'balloon' and a *gaseous* soup to make a geodesic dome. Or some realistic tank decoys. Or perhaps you could use grep to make a full size but very low mass molecular scaffold of the high mass item you actually want, and use that as a sort of super-**totem** for an additional reduction to the difficulty.

Or of course, have the potential for virtual matter or matter-energy conversion be the focus of a plot, or if an Incarnation sub-plot gets out of hand, be a potential solution to the problem, where dealing with the side effects of these techs is something for later on.

Grep tips & techniques

All of the other things aside, people have come up with innovative ways to get specific sorts of grepwork done. These things can modify the difficulty of grep rolls for specific tasks.

make the container separately: If something is volatile or reactive, it needs to come out of the soup in a container. You can make the container ahead of time and put it in the soup, and the grep will use that container. You can refine a gas like propane from a liquid soup and the grep will move the soup out of the container and fill it with only liquefied propane. Otherwise, you have to make the container (mechanical) at the same time as the contents (chemical), which is slightly harder.

soup starter: Once you have successfully grepped something, you have a soup that is largely depleted of the elements needed to fabricate that item, but extremely rich in grep that was created for fabricating *that specific item*. You can run a trickle charge through that soup to keep this grep 'alive', or scoop it into jars and make sure they get a few hours of sun each day. This is 'soup starter' and is a real and useful item in the gameworld. You can buy soup starter for ammunition to give you a better chance of making reliable, compatible ammunition. You can get soup starter for fancy steaks or fine wine and so on. A useful amount of soup starter is about a liter for each 10 kilograms of final mass in the grepped item. *And no, you cannot use soup starter to make more of itself.*

A good quality soup starter is a -2 on the difficulty of that specific grep. And if your grep is successful, you have your own tub of soup starter (if it fails, it is ruined). Soup starter generally costs about as much as two or three copies of the item being grepped. Since anyone who uses it correctly has their own starter mix from then on, market forces keep the price reasonable. Those who have managed to grep *really* difficult items generally do *not* sell soup starter. It is their own 'secret sauce' and they do not share it because it gives them an edge.

totems: Grep makes things from the ground up. Good quality raw materials help, but an actual physical framework also helps. Building a car on top of a car's frame is easier than building it from nothing but scrap metal. Dumping a non-working smartphone into the soup and asking for a working copy is easier than just using a soup of purified raw elements. These are called 'totems', and are worth either a -1 or -2 to the difficulty. If you have something that is busted, dumping the broken item into the soup is both a source of raw materials *and* a template for the grep to use when making the new item. This will, however, dissolve the item in the process.

And yes, people *have* tried this for grepping a live copy of a dead person. The success rate is unknown, since this sort of experimentation is universally banned. However, that 'assassin who keeps coming back even though you are sure you killed him' could be an opening to an entire new plot for experienced adventurers, as could 'King such-and-so hasn't been quite the same since his brush with death last year.'

! Players are going to come up with interesting ways to use and abuse grep. Especially when it comes to extremely powerful alien tech. There are a couple of ways to work with this. First, is all the alien tech requires super-rare trace elements that you simply cannot go out and buy or scrounge. Are there enough of these elements to do all you want to do as gamemaster? *Of course there are*. But letting adventurers get their hands on some could be a major reward or plot in and of itself. A plasma weapon so badly damaged as to be irreprable is *still* a totem *and* a source of unique trace elements. All you have to do is let your soup dissolve it and hope for the best.

The other thing is that the alien tech literally has a mind of its own waiting to be born, and this can affect adventurers who grep or use the stuff a lot. This will be dealt with in the next chapter.

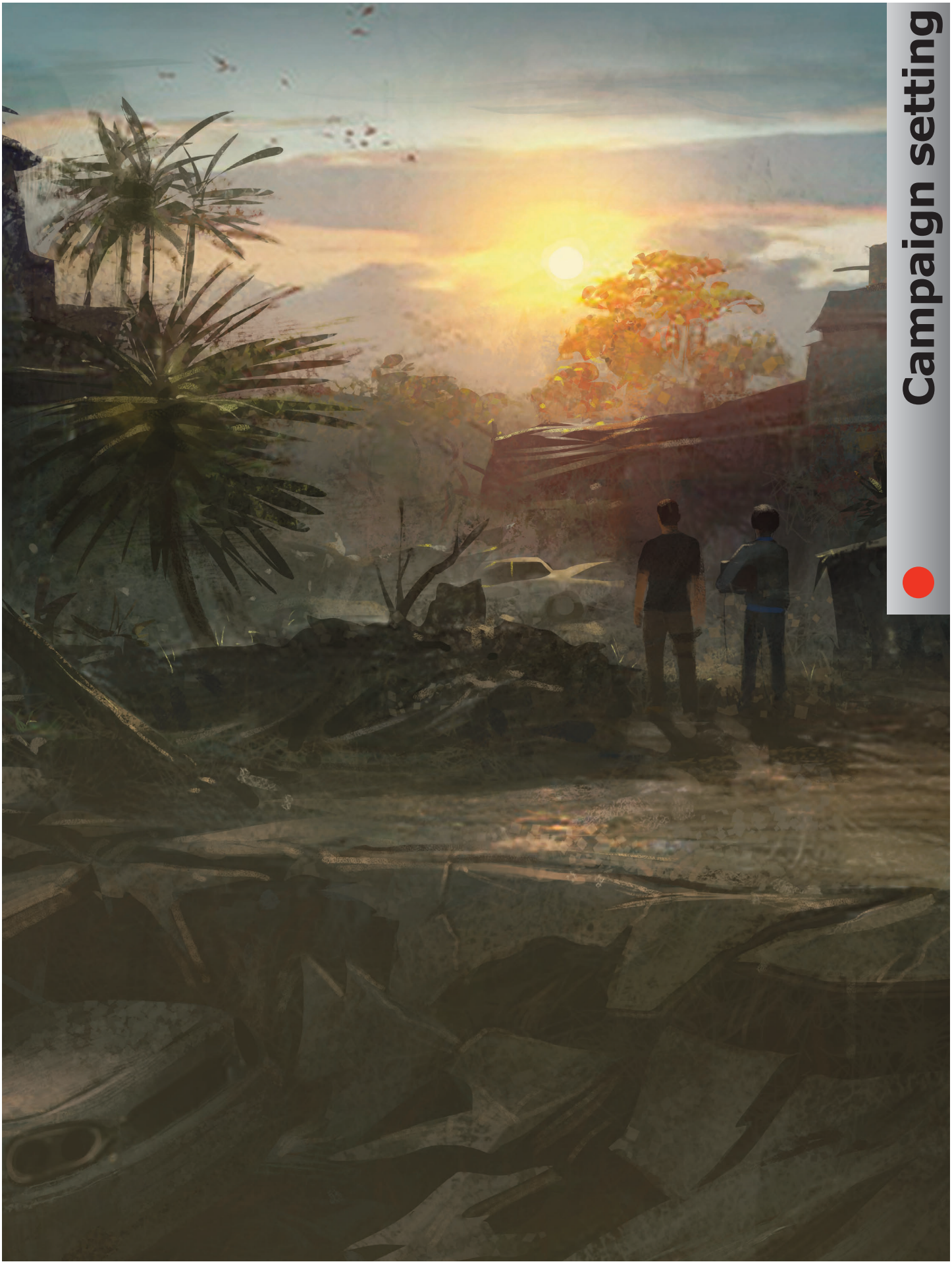
Bogeymen

There is a reason for the general antipathy towards some forms of biogrep. During the worst part of the Dark Days, governments were collapsing and nukes were being tossed. And government labs tried making grepped super-soldiers or animate bioweapons. And despite the appallingly low chance of success, if you have a big enough facility, try enough times and throw enough resources at it, you will eventually get something approaching a success. And then you use that soup starter to mass produce that item and toss the rejects back into the vat for recycling. These successes were the 'bogeymen'.

For the most part, they were carnivores made inhumanly strong and fast, with a genetically engineed predatory response towards anyone that did not 'smell right' in a genetic or even behavioral sense So, there were Russian bogeymen that hunted non-Slavs, Indian ones that only went after people who ate meat, etc.

And while bogeymen were meant to be sterile and have short lifespans, they were also a rush job and enough of them failed on both counts that breeding populations *are* out there. They are generally shot on sight and have learned to be wary around people, but they still have their predatory urges and are still a hazard for lone travellers and small groups. And the only ones left are the *really* smart ones.

But what really got people unhappy is that the bogeyman experiments were *not* limited to animals. Prisoners were used, from death row inmates down to people who criticized the current regime. And the ones who were not crazy generally became crazy. And some of them escaped, leading to mutated and extra-powered homicidal maniacs on the loose. These were rare, but there were enough of them that every area seems to have its own local legend told around the campfire to scare children. And quite a few of these legends end with 'and he was never caught'. *And some of the legends are true.*



Unimolecular submersible nanomachines bearing light-driven motors are synthesized. No thermal or photo decomposition is observed. Through design of control molecules with no motor and with a slow motor, we found using single molecule fluorescence spectroscopy that only the molecules with fast rotating speed show an enhancement in diffusion by 26% when the motor is fully activated by UV light. This suggests that the USN molecules give ≈9nm steps upon each motor actuation. This study gives new insight into light actuation of motorized molecules in solution.

Nanotechnology Letters *(12-09-2015)*

Introduction



You have read the outline and some details of the setting. But here is some flesh to go on the bones, a specific geographic region to use for a campaign or to mine for ideas for your own.

Because **Grep** is set in *our* world and *our* near-future, the absolute best way a gamemaster can make the setting feel real and get the players connected to it is to set the campaign in or around the place *you* live. The people will not be the same, but the cultural attitudes likely will be. Important families may still be prominent, local politics probably have not changed much in tone, and available resources are generally known. Plus, for any sort of campaign mapping the gamemaster does not have to worry about drawing up a realistic city or sets of floor plans for combats. You just grab a map from the local chamber of commerce or tourist bureau or go take a few pictures.

Setup

We will talk about this more later on, but one thing you should consider is the backstory and setup for **Grep**. The default is the Dark Days and the gradual rebuilding and recovery, which is still ongoing but mostly complete a decade later. There are parts of the world that are burned or even radioactive ruins where mutant cannibals roam the streets, but there are *also* parts where you can pull out a mobile phone and videochat with your friends while sipping on a caramel machiatto.

But this might not work for you. There might be *too* much advanced tech just lying around for the taking. Major roads might still facilitate travel that is *too* rapid for your tastes. The population density might seem *too* high for the 'isolated pockets of civilization' vibe you are looking for.

If so, go back to the backstory for the setting and simply tweak it the way you want. Make the start of the game fifty years after the Dark Days. Or a hundred. *Or a thousand*. For instance, Terry Brooks' *Shannara* books are a distant future of a modern Ruin, with the first book of the series taking place about the year 4092CE by our reckoning. The post-Ruin world of *Planet of the Apes* is set sometime around the year 3954CE. On the other hand, the dystopian future of *12 Monkeys* is set only 31 years after a global plague, the bleak future of *The Terminator* is somewhere around 2029CE and David Brin's classic *The Postman* is a post-Ruin future not much further ahead of its present than **Grep** is from ours.

You can also play it as an us-vs-them setup, where the grep-enabled living in an otherwise uninhabitable area is seeing the first visitors and would-be conquerers from a city-state or other grep-unfriendly group, who may be well-meaning but dead set on 'civilizing' you, or who may simply want some resource of your territory and you are either a cheap labor source or an obstacle to be removed.

If you do not like our setup, say that some other things (grep-related or otherwise) happened during the Dark Days and casualty figures were closer to 99% than 90%. You do not even have to come up with a plausible reason...yet. Just tell the players "*X percent of the population died during the Dark Days. This is far more than we can explain dying from any known reason or combination of reasons, but that does not stop them from being dead. We just have not figured out why.*" This is called 'kicking the can down the road'. You will have to figure it out *eventually*, just not right now.

You can define **Grep** to be whatever sort of post-scarcity setting you want it to be, from a dystopian cyberpunk where grep-modified people are the norm, to a more fantasy oriented post-ruin setting, where grep-modified genes have given rise to new races, the Old World is nothing but ruins a thousand years old and the actual origin and nature of grep has been lost and it is simply 'magic'.

All of the background and long-term plots you will read now and later on can work for each of these and everything in between, it is just the timescale they happen over that is altered.

As for any setting with a paranormal power, the percentage of people who have it and their skill/power makes a *big* difference in a cultural sense. If everyone can cough up a wide-screen television or 8-core mobile phone on demand, that generates an entirely different world where this level of talent is extremely rare. If most people can grep food but few can grep guns you get a different world than one where most can grep guns but few can grep food. If the talent is rare and Ruin was severe, then people who can grep might be the only source of spare parts or new bits of high tech, and the further in the future you start play, the more pricey and possibly restricted such items will be.

An example from a medieval world might be swords. Peasants could not own them, and it would simply be assumed that a peasant with a sword stole it, because they would never have the money to buy one honestly. In some variant of a **Grep** distant future, mobile phones might be a status symbol of nobility. Ordinary people are not allowed to own them. Tweak it right and they might even be considered magical items. After all, as Arthur C. Clarke said, "any sufficiently advanced technology is indistinguishable from magic."

And you *can* tweak all this just by adjusting the base difficulty of certain types of grepwork, and the difficulty of learning or acquiring the skill. So think about what *you* want the setting to be and how you would need to adjust the parameters to make that happen.

You want a lot of the knowledge of the 'old world' to be lost. If you set your future to be just far enough ahead of ours that almost all information is digital, and then toss in some solar-based EMP or EMP-based nukes, then the Dark Days will result in the death of the Internet, the corrupting of most digital information and the loss of almost all complex electronic devices. If you set the start of play a few generations after the survivors of the Dark Days have died of old age, then the actual knowledge of the Old World will be some subset of the truth, perhaps manipulated or censored by those in power to suit their own ends. Everything else about the way grep works can be the same, but the actual past of humanity can be shrouded in mystery. The 'people in the present have an incorrect view of the past' is a common trope in fiction and sadly, revisionist history is all too common in the real world.

Environment

For the gamemaster, **Grep** is not the usual 'post-Ruin' environment and should not be presented as such, unless you *want* a Mad Max sort of vibe. It would be much closer to think of **Grep** as a post-Rapture environment, where some large fraction of the people are simply not there anymore, but much of the world remains intact. If you look at someplace like the Rova setting that follows, it has at best ten percent of its previous population, and most of those people tend to live close to each other just for the sake of convenience. For instance, the city government only plows a limited number of streets when it snows. Do you *want* to live someplace where *you* have to plow a hundred meters of street several times a winter? Proximity to other people also gives safety or at least the feeling of it.

So, Rova looks like a partially abandoned city, which it is. There are streets with thriving pedestrian traffic and shops that look much like it did in 2018, but go two blocks off the main street and it could be a ghost town occupied only by the occasional crazy squatter. Over here are well-maintained streets, over there are junked cars that were pushed out of the way, blocked drains and weeds or small trees growing out of cracks in the pavement. Over here the water system works, over there it has been shut off because of a line break no one has a reason to fix.

The mindset of **Grep** is that anything that is not claimed is potential raw material. And a lot of 'junk' falls into this category. That burned out car down the side street might be there today but gone tomorrow if someone thinks there is enough value is salvaging it for its metals. And the rebuilding from the Dark Days has progressed enough that Rova and other towns and cities are seeing the potential for their own budgets. One of the big recent complaints is that any salvaging within city limits now requires a permit, and your permit is based on the type and quantity of material you are salvaging.

This has caused a minor uproar for two reasons. First is that people never like being told that what they used to do for free now costs money. The libertarians are particularly outraged. However, like in 2018, they are mostly people freeloading off everyone else's contributions to public works and complaining that things would be so much better if they were paying for these services directly instead of in exchange for the taxes they go out of their way to avoid paying. Which is to say that like in 2018 they are mostly ignored and only rarely make a decent showing in local politics.

The other reason people look askance at this is the very strong suspicion that a handful of the big recycling and grep salvage outfits see the profit potential of collecting all the material in one place for resale. And by presenting a case to the city council that gives these outfits a very good bargain for permits, the city not only gets the permit fees for *everyone* who wants to salvage, they will get sales tax on anything the big outfits resell. The degree to which the local 'respectable businessmen' are involved in this is up for debate, unlike the permit requirement itself, which was passed in closed session without any public input.

And this too is part of the environment. There is the attitude between 'we want to assert control' governments and 'we were doing fine without your help' greppers, both at a local and regional (Rova vs. DC) level. There is also the civilized 'townies' vs. the rural 'hicks', the pre-Dark Days adult generation of 'suits' and 'those damn kids playing with that stupid grep'.

The Dark Days scratched the thin coat of civilization off our less charitable animal instincts. A new layer has been applied to cover this, but it is incomplete and still has a 'wet paint' sign on it. And *this* is the feel you want to get across. The world *is* getting better, but there are still things that people do not want to look too closely at and wounds that are healing, but still raw enough to make society flinch if they are touched wrong.

One thing to remember about the decreased population level and fairly intact infrastructure is that people are for the most part, *not* spread out. This is for a couple of reasons. The main one is that people are social animals, we want and enjoy the company of other people and our desire for privacy does not usually require being a kilometer from the nearest neighbor. The other reason is that loners are vulnerable to small groups of predators.

Take a hypothetical small city (pre-Dark Days) of 100,000 people and say that it has an area inside the city limits of 100 square kilometers (1,000 people per square kilometer). If the population dropped to 10,000, they would tend to cluster in a handful of neighborhoods that total no more than 10 square kilometers. And probably less than that. Communities within the former city would be like modern gated communities, except with a much greater sense of community and the likelihood that everyone knows their neighbors on a pretty close basis. The sort of place where if anyone sees a stranger, *everyone* knows it in short order and people come to investigate.

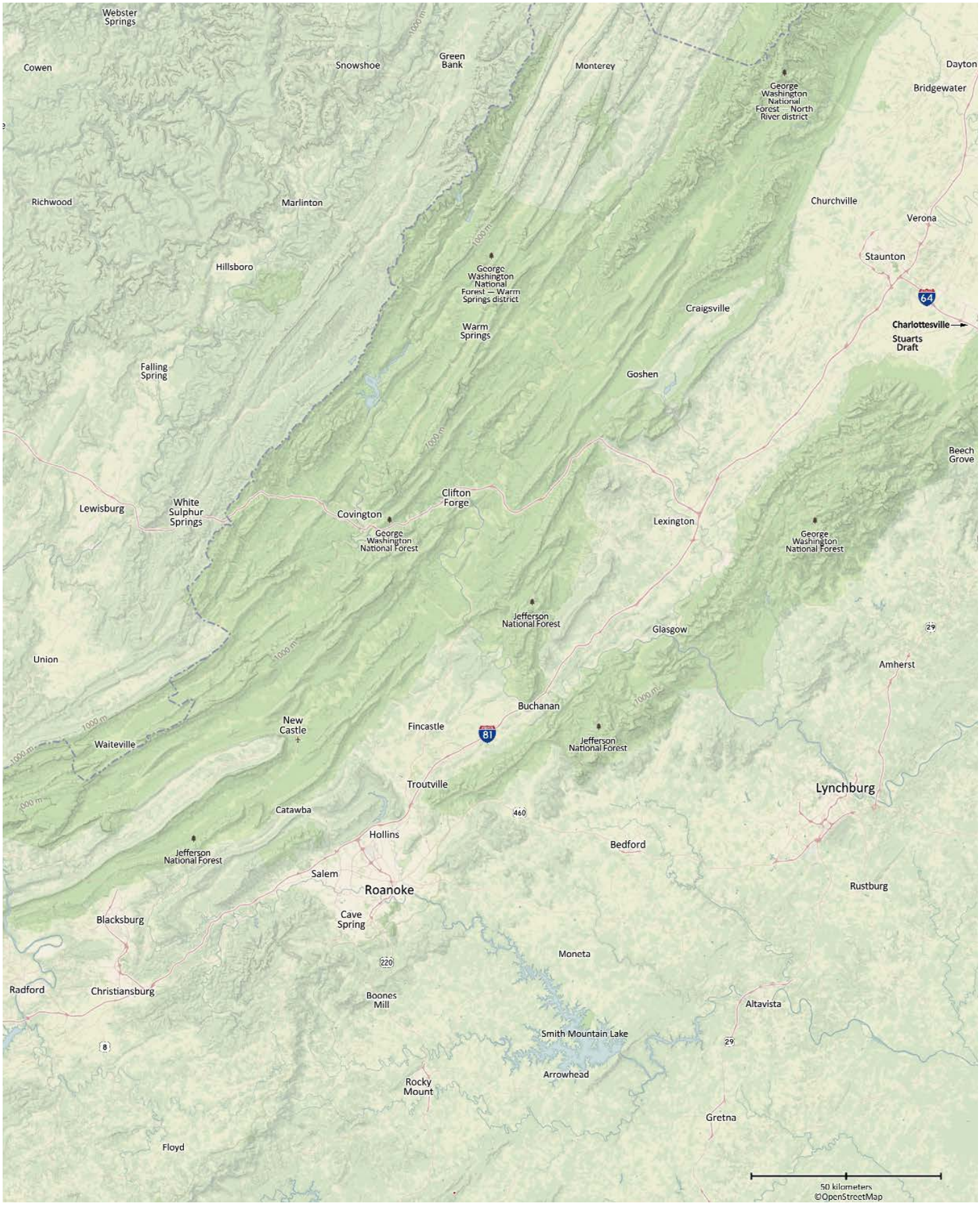
So really, about 95 square kilometers of the former city is abandoned. It is used by loners, squatters and as a resource base by anyone who needs spare parts or raw materials. The different sub-communities probably have a shared government that marks off whose 'territory' is whose, taxes people to cover for maintenance of common infrastructure (water and sewer, road maintenance, etc.), and maybe has a common police force. The areas that are kept in good repair and which support things like plumbers and electricians and opthamologists are fairly small, along with some well-maintained corridors between communities.

It is not quite a medeival town with walls to protect it level of things, but a physical barrier to trespass is the first level of protection vs. folks who find it easier to steal than to make or buy.

So when you think about Rova or your own campaign setting for **grep**, keep this sort of thing in mind. In a lot of urban areas, the nucleus for a community is often a resource that was considered important in the Dark Days. The hospital that people worked to defend and keep open, the railyard that moved supplies, a university campus inside the city, an industrial park that had tools and raw materials. And as the Dark Days ended and things began to get better, inertia kept people living in the areas where they knew people and were comfortable living and was close to whatever job they did.

This is going to be a common urban theme no matter where your campaign starts. In rural areas, there is more self-sufficiency, but family groupings tend to stay together. Sometimes in a single large house that might hold three generations, other times in a cluster of homes a short distance from each other. The 'having people nearby to cover your back' is still a common theme, just at a smaller scale.

The greppie loner is a thing, but you do not see them much. One person is still just one person and the loners tend to be very cautious and suspicious and often outright anti-social. If they were not that sort of person, they would not be loners. Some will simply disappear when someone enters their 'personal space' and you never knew they were in the area to begin with. The ones to be worried about are those who are territorial, as they are more likely to shoot first and ask questions later. Though to be fair, most of these will use long range near-misses as a friendly deterrent.


Webster Springs
Cowen
Snowshoe
Green Bank
Monterey
Dayton
Bridgewater
George Washington National Forest — North River district
Richwood
Marlinton
Churchville
Verona
Staunton
Hillsboro
George Washington National Forest — Warm Springs district
Craigsville
Charlottesville
Stuarts Draft
Warm Springs
Falling Spring
Goshen
Beech Grove
Lewisburg
White Sulphur Springs
Clifton Forge
Covington
George Washington National Forest
Lexington
George Washington National Forest
Jefferson National Forest
Glasgow
Union
Amherst
Buchanan
New Castle
Fincastle
Waiteville
Jefferson National Forest
Troutville
Lynchburg
Catawba
Hollins
Bedford
Jefferson National Forest
Salem
Roanoke
Rustburg
Blacksburg
Cave Spring
Moneta
Radford
Christiansburg
Boones Mill
Altavista
Smith Mountain Lake
Arrowhead
Rocky Mount
Gretna
Floyd
50 kilometers
©OpenStreetMap

Greater Rova

With those guidelines in mind, the sample setting is the Greater Roanoke Valley, or as the locals call it in 2031CE, Rova. It is centered on Roanoke, a dispersed metropolitan area of about 30,000 people (formerly 300,000), about 400 kilometers southwest of Washington DC and 250 kilometers west of the port city of Richmond, Virginia. You do not have to use this setting, but it is a good example of how to integrate an area you and the players are familiar with into the gameworld, and it has ideas worth mining even if your campaign area is completely different.

Rova covers most of the Shenandoah Valley, a fertile rolling plain set between two ridges of the Appalachian Mountains, with about a thousand meters of elevation from the valley to the top of the forested and fairly rugged hills. The valley runs from northeast to southwest for several hundred kilometers. It has a major interstate highway (Route 81) running down its length, and smaller, winding roads going into and over the hills. The area defined as the 'Shenadoah Vally' is about 300 kilometers long and 50 kilometers wide (about the same total area as Nepal or about half the size of Mordor), but the campaign region iextends significantly further in both directions.

Rova fared about the same as most areas of its type during the Dark Days, which is to say, fairly well. Not exceptionally urban, the people were not locked into concrete canyons, and the surrounding area was rural and agricultural, so *some* food was produced in all but the worst part of the Dark Days. Fuel quickly became a problem for vehicles, as it did almost everywhere that did not have a major fuel depot, but local forests and coal kept most people from freezing in the worst two winters after the Great Siberian Tire Fire. It got cold enough to kill most livestock and local large game animals, and while they have been migrating north from warmer areas, hunting is unlikely to put enough food on the table unless hunting is all you do.

Herds are still small enough that actual meat is more expensive than commercially grepped meat, but as a matter of status, people prefer the real thing. On the other hand, chickens and other fowl have recovered nicely, so most people in towns find it easier to buy chickens and eggs than to grep them. It is still cheaper to try to grep your own meat, but city dwellers are tending to trade cost for convenience and just buy someone else's product.

Rova's position as a rail hub meant little during the Dark Days since they had no stocks of diesel fuel to run locomotives, but it did mean that there were quite a few loaded freight trains of goods to be...appropriated by either the local government or enterprising locals. In addition, the government managed to keep itself together well enough to utilize the assets of the city's rail museum and old-timers. Two coal-fired steam engines were rescued and put back into service, and became an important communication and trade link northeast to Staunton (150 kilometers) and southwest to Christiansburg (60 kilometers). The distances might seem trivial now, but during the Dark Days when gasoline and diesel were in short supply and the roads were less than secure for lone travellers, it was the difference between a few hours on a train vs. up to a week on foot. A train could and sometimes did carry a small army with little reduction in its cargo capacity. And in the second of the harsh winters, roads were impassable, but the level grade of the rails was kept clear with improvised snowplows on the front of the locomotives.

And when grepped food was still scarce and there was no reliable power for refrigeration, being able to get meat and produce from farms along the tracks to the more concentrated population of Roanoke made a vital difference to both the people needing food and to those providing it (who needed supplies delivered by the trains to help maintain *their* production).

All was not business as usual, though. The climate disruption of the Dark Days *did* hit hard in the first few years. Winters were unusually severe and without snowplows, people were generally stuck where they lived and quite a few starved or froze or suffocated from using gas or kerosene heaters without sufficient ventilation. *A whole lot of people died, just proportionately fewer of them than in other areas*. Like most area, modern Rova residents all had friends and family who did not make it, relatives in distant cities who they hope are still alive but whom they have not heard from in over a decade, a sort of shared loss and grief, where a pause in conversation after a name says "*I lost that person during the Dark Days, I grieved but life goes on.*" Everyone has several people like that, everyone knows it, and everyone respects everyone else's loss. It is *not* part of the law, but disrespecting someone else's loss is a good way to get a black eye or broken nose, and very few in law enforcement are going to arrest the person who threw the punch. *With few exceptions, you do not speak ill of the dead if they died in the Dark Days.*

In addition to the perils of privation, the area has a high proportion of firearm ownership. In desperate times, appropriation of abandoned resources often turned into outright armed robbery or armed conflict over who had scavenging rights. There were very few people who met the criteria of 'warlords', but local mayors, sheriffs or self-important businessmen often drew opportunists and power-seekers into their orbit.

Farms could be raided or extorted or 'taxed', and actual law enforcement outside of Roanoke proper was non-existent for several years. Some groups of farmers consolidated into single large households that could be easily defended (and in the winter, more efficiently heated). Small communities and towns could not readily put up defensive walls, but they could put a few guys with walkie-talkies and hunting rifles on top of the old water tower as lookouts. Exits off Interstate 81 frequently had manufactured roadblocks to stop scavenger bands from getting their trucks into an area, and side roads were similarly blocked.

And then there was the federal government. There was martial law and general suspension of civil rights and due process in the months before the final breakdown, which did not endear the government to anyone except those who enjoyed having arbitrary power over others. But when things got *genuinely* bad, government emergency services were nowhere to be found. The various agencies tasked with emergency preparedness and presumably coordinated under the aegis of Homeland Security, were not coordinated, not prepared and not able to effectively communicate or get resources or aid to those who needed them the most. At best, they were useful to those within the same city. At worst, they commandeered assets with no compensation in the name of national security and then frittered these assets away in poorly thought out schemes to deal with stranded or starving refugees, and there were numerous cases of government resources (and confiscated resources) showing up on the black market.

And then, when the Dark Days started ending and people were getting back on their feet and seeing what happened to their neighbors, these same agencies tried extending their authority outward, claiming a government mandate to rebuild the country. The general response to this is not repeatable in polite company.

Rova as a government (mayor and city council) paid lip service to the notion, but the people in general did not. This turned into a brushfire war. The government in DC still had resources to put a significant military force into the Roanoke Valley, and the Rova government did not put up any resistance. But neither did the Rova government have the assets on hand to pay the demanded 'reconstruction levy', and government convoys of cargo trucks got blown up from several kilometers off by primitive grepped guided missiles fired from nearby mountaintops. The DC government did not have the people or equipment to pacify tens of thousands of square kilometers of potentially hostile terrain. The entire point of taxation and control was to have a net gain in resources from the process, and the guerilla attacks kept that from happening.

For a short while, the city of Roanoke was under full military occupation and control, but the attrition in people and equipment was not sustainable, not to mention the occasional desertion or switching of sides, so the DC government eventually pulled out, retreating to boundaries it *could* control. This left a bad taste in the mouths of most Rova residents and is a cultural attitude that remains to this day. The DC government has never given up its demands for taxes. This is mostly so it can say it has never relinquished authority and is also a legal fiction to allow them to confiscate possessions of Rova residents if they need to use that threat as leverage. They also levy a fee for any Rova resident to enter or pass through the DC area, which *supposedly* goes into a fund for such taxes, though no one has ever seen an accounting for it.

The 'borders' of Washington DC are small, but they claim a 'federal protected territory' of about 50 kilometers in each direction. This is well short of the Rova railroad's self-imposed limit of Staunton, so Staunton has become a go-between community where goods and people shift around if going from one place to another.

The Rova government will not put valuable assets or rebuild infrastructure within about a hundred kilometers of the DC Federal Exclusion Zone. The official Rova position is that this sort of thing is a job for the central government to do or pay for and if DC wants to pay Rova to rebuild roads, bridges or rails they are more than welcome to do so. The official DC position is that they cannot rebuild in areas that are not willing to pay taxes to cover the cost, and so the infrastructure in between is slowly degrading.

Rova's current government has evolved over the years, and at the moment is a council of representatives, one for each large population cluster and geographical region in Rova. Roanoke itself has an elected mayor and city council, with members representing various parts of the city and appointed members running various departments (public works, police, fire department, etc.). In theory both local and regional government is all democratic and straightforward, but in practice all the important slots are always won by important and well-heeled families who have a vested business interest in the region in question.

There are the occasional populist challengers, but their victories are very rare and all that most populist campaigns do is shine a spotlight on dissatisfaction with the current officeholder, who generally responds with some mild reform to mollify constituents. Just as often, a populist candidate will be 'bought off' with a token position in the new administration, which if they play their cards right, will eventually make them an 'insider' who is part of the problem rather than part of the solution.

All this said, the system mostly works, because the people in charge like being in charge and have fine-tuned their ambitions and avarice against the actual needs of a populace that has demonstrated it is quite willing to shoot at government officials that take too much and give too little.

Infrastructure

Rova is a fairly large campaign area, with an high level of variation in terms of accessibility and infrastructure. The region is effectively the Shenandoah Valley, which runs northeast-southwest, and is bordered on both sides by rugged, forested hills. One can travel up and down the valley at highway speeds for its entire length, stopping only at the DC control zone in the northeast and the Bristol Crater in the southwest. However, going into the hills to the northwest and southeast involves using twisty secondary roads which may be in poor repair or completely impassable. It could take you longer to get to a spot in the hills that you can see from Route 81 than to drive the usable length of Route 81. *And that is just the hills you can see.*

Electricity as a *public* service is limited to a handful of towns and cities. Everyone else uses generators, solar panels or does without. Solar panels are not that hard to grep, mostly because they are modular. You can just make small ones and chain them together. So, most places have at least a few solar lights and batteries for things like radios.

Water, sewer and the like is generally handled by regular urban infrastructure, or by septic fields and wells in rural areas.

Telephone service is spotty. Landlines were never high on the repair/rebuilding list because they were usually subsidized before the Dark Days and it is just not profitable to go fix a downed line for a handful of customers. The more people there are in an area, the more likely there is to be landline coverage or a good mobile phone tower. Anywhere within a kilometer or two of Interstate 81 probably has mobile phone coverage. The towers are usually solar powered with battery backup, and usually have security cameras. It might not stop a scrapper, but it can certainly get a good picture of them. *Problem areas will have a remote-controlled rifle below the camera...*

QuantumNet access is generally centralized and generally dependent on phone service. The specialized Quantumnet hardware is pricey (and people are still not sure where it comes from), and the total bandwidth available is on a pay-to-play basis. Roanoke proper has decent coverage, as does Staunton, Virginia Tech, Danville and Radford, but anywhere outside of mobile phone range of these communities or Interstate 81 is unlikely to have it.

Any place that was big enough to have a regional airport probably still has one. Roanoke proper handles half a dozen flights per day to cities like Atlanta, DC, Boston, Houston and Chicago. Flights are expensive compared to modern fares, but otherwise the process is much the same as in 2018CE. Remember that the world's population is about where it was in 1750CE. Air travel is a luxury, as is shipping anything by air. Without population or resource pressure, the need to travel is far less. The average person in **Grep** *needs* to travel long distances with about the same frequency and reasons someone would in 1750CE. It is usually businessmen, diplomats, couriers, wealthy families and unique circumstances that require rapid, long-distance transport.

Roanoke came into being as a rail hub, and rail traffic is still an important part of the local economy. Raw materials, passengers and finished goods ship northeast and southwest along multiple tracks, and a single track runs north-south to Greensboro. Rova does not run trains further north than Staunton because of antagonism with DC, but the rails continue and cargo and passengers generally transfer at Staunton. From DC, one can take trains through the 'Federal corridor' to points north-east, or north and west up to Pittsburgh and then to Ohio and the midwest. The rail network of the United States is still badly fragmented. The infrastructure has not been repaired sufficiently to allow a cross-country trip without repeated train changes and gaps that require other overland or overwater travel. The further north you go, the more this is true.

Outsiders

Roanoke prides itself on being egalitarian, but underneath this is a core of strong social conservatism. That is, everyone is equal and welcome, as long as you are 'normal'. There is no *overt* government discrimination against people who have engaged in grepped body modification. But there is also negligible interest in enforcing existing laws against such discrimination. The net result is that all positions of authority in the city and most districts are held by 'pure' humans. There is one member of the Rova council that is somewhat off 'standard'. She represents a far southwestern county that happens to have a high number of grep-modified people *and* she was a local hero during the Dark Days.

Those in Roanoke who are markedly different in appearance by choice or otherwise are an underground sub-culture that is alternately passive and militant. That is, they have their own preferred clubs and businesses and stick to themselves. But those who are in the business of hate tend to seek these places out if they want to cause trouble, and then things get *really* messy. A disproportionate number of assaults and murders are among the modded community, and the local criminal groups have a disproportionate number of modded members.

This is a self-reinforcing problem, since those who are modded are discriminated against for normal jobs, but still need to make a living if they cannot grep everything they need to survive. So, they end up in crime, and thus are more likely to be exposed to violence. The average person associates modded people with gangs and other criminals, which encourages *more* discrimination.

An adventurer starting play in the Rova area with a grep-modified appearance would have a negative level of Looks and a negative level of limited Status. It is not a *global* status penalty, but it does affect you in *most* situations.

There is some degree of overlap in the actual Roanoke area between mods, fetishists and the LGBT community, all of which are outsiders to some degree and many of which have at least one thing you would consider a body modification (if only in the form of unusual piercings). This does not make the average conservative view them any more favorably, and who generally considers *all* of them to be 'freaks'. There are enough of these 'freaks' that they have a convention once a year. This is partially to celebrate their identities, and partially to make a public show of numbers (i.e. *"we're here, we put a lot of money into the local economy and we're enough of a voter block that you better not piss us off if you are only ahead a point or two in the polls."*). If a political issue is close enough to court a voting bloc of five or so percent and you can do so without alienating a larger group of voters, candidates will at least offer vague assurances to the outsider community in hopes of getting their votes. But in general, their record of following through on these assurances has been less than stellar.

Grepping itself is not an 'outsider' activity any more than having a tattoo is. Plenty of respectable people grep (and have tattoos). It is the ones who take it to extremes that tend to get marginalized. Since players are more likely to have grep-skilled adventurers, the attitudes and any starting employment they have should be compatible. The Looks trait could be related to grep, a negative level of Status might be a social problem because of an unfortunate grep incident in their past, an Enemy might be grep-related, and so on.

Crime

People commit the same sort of crimes they always have, and generally for the same reasons. Grep just adds the occasional twist to the more bizarre ones. With grep, if a body is not found, there is a chance it never will be, if you know what we mean.

There is for lack of a better term, a local Mafia. It does not have any particular racial or ethnic identity, it just sort of 'is'. Because a number of things usually in the province of organized crime are now legal (or at least decriminalized or not enforced), the Rova cartel has no profit margin or interest in marijuana, prostitution or bootlegging. They make their money in goods that are illegal and services that are questionable. Remember that the population of Roanoke is only about 30,000 and the population of the entire region is only about 100,000, so there is not a lot of anonymity for major crime figures. It is not hard to figure out who is important and who is not to be crossed, even if they are 'respectable businessmen'. On the other hand, because the population is small and dispersed, the total manpower and potential for coercion is far less than might be the case for a modern, densely packed city. There are probably only a few hundred people in Roanoke who are even tangentially involved in organized crime, and only a handful who are important. *One of them is the mayor*. And while the chief of police is not *directly* involved, the chief does indirectly profit by various means, so certain things being done tend to be overlooked.

As an example of Rova's organized crime, most construction projects in Roanoke are encouraged to buy 'accident insurance'. But because there is so much empty office and residential space, there are not many large construction projects. So, someone building a new garage or barn might find they are being shaken down for the equivalent of a thousand dollars.

Or, winning high-value contracts for road repair or other infrastructure tends to involve lining the pockets of certain council members or tend to go to relatives of said council members. For instance, municipal trash removal is a cartel business, with a separate side operation of sifting through the trash of the incautious wealthy and powerful for useful information. Note that collected trash is generally grep-separated into useful raw materials and then resold. *Landfills are a thing of the past*.

Grepped drugs that are still illegal are handled and distributed by 'affiliates' who pay a fee to the cartel for rights to a certain territory. Drugs like methamphetamines and LSD are still illegal in most towns and cities. Police may unofficially shut down production sites outside of their jurisdiction, but there is a lot of empty space out there, so most enforcement is about keeping it out of *their* town.

Small towns in the backcountry might need to pay a 'forest management tax' to avoid having a few hundred trees suddenly block the only roads in and out of their area. Raw materials for certain esoteric and illegal forms of grep (like radioactives) are acquired and smuggled in. And if possible, the buyers are then black-mailed for more money, or the cartel will turn them in for the bounty offered in many such cases.

The aforementioned mods in the criminal community are generally in the roles of leg-breakers, smugglers and drug sellers, though a few have worked their way up the ladder into more managerial positions. And while a few within the cartel might call still call them 'freaks', they are careful not to do it where the freaks can hear them.

! As implied in the vignette, the local figure of note is Rova's Councilman Sandino, who is not the chair of the regional council, but might as well be. He does not rule the area, but other council members value his opinions very highly and tend to overlook 'minor improprieties' committed by those in his employ.

Scenic attractions

Rova itself does not hold any epic secrets, though as gamemaster you can always hide a few tidbits here and there and we will have some ideas for you later in that regard. Rather, it is a 'safe', 'civilized' central city where players can live, safely store stuff, get things done and make connections and plans, surrounded by a mostly empty wilderness with some small towns, farms and resource extraction operations.

Aside from the corridor running northeast-southwest along Interstate 81, roads are poorly maintained and occasionally impassable, either because of landslides, falled trees or deliberate roadblocks. The accuracy of maps for passable roads diminishes with distance, and anything less agile than a horse or light motorcycle has no guarantee of getting from one spot to another outside that corridor unless it is marked as 'reliably clear'. Towns and important farms generally have at least one route with that quality, just for their own benefit.

You have to remember that the United States after the Dark Days is *not* like some medeival fantasy world where you cannot turn over a rock without finding a centuries-old multi-level dungeon filled with monsters and treasure. It is the world of today, with twenty years of hard living and a lack of maintenance wearing it down. The monsters that you encounter are likely to have tailored suits and firm hand-shakes, and the treasures may be things too small to see.

But that does not mean there are **not** places of note and various sorts of adventure potential in the Rova area. Aside from anything listed here, you can just look at a map, pick an out-of-the-way named location and just put an interesting isolated community there, or say it is where an important or eccentric NPC lives, or where something awful is slowly building up, out of sight but dangerously close by.

Radford Arsenal

This is a complex for manufacturing military ammunition and explosives, several kilometers west of Blacksburg and north of Radford. It was the site of some fierce fighting between government and separatist troops during the Dark Days and was badly damaged. However, since it is over a thousand buildings and two hundred storage bunkers spread over twenty square kilometers, quite a bit of it was *not* damaged.

Between the Dark Days and the present, some of the former workers got the bright idea that it would be a good place to grep ammunition and explosives. The trained people were there (for the complementary skill bonus), and the facilities for storage and handling sensitive items were already in place. Radford has a working population of a few thousand, of which several hundred are dedicated security and usually ex-military, with a few thousand more as families and support personnel.

As a result, by the time a campaign starts, the Arsenal is the main supplier of high-quality standardized ammunition for everywhere within a thousand kilometers. Even the DC government purchases from them, while at the same time declaring the facility is government property and must be returned to DC control.

Radford Arsenal has a mutually beneficial arrangement with the Danville Armor Museum. They have traded each other's services so that Danville has plenty of ammo for its tanks, and the Arsenal has a nice defensive force for its ammunition. Both facilities have an unspoken agreement about the sorts of things they will *not* sell. Specifically, anything 'big' is going to be cumbersome. Radford will sell you 120mm high-explosive shells if you have the money to buy them, but will *not* sell anti-tank guided missiles. Danville will sell you a tank, but not a lightweight anti-tank missile launcher. Both groups have a vested interest in not selling anything that could be used to eliminate their own defenses from outside of retaliation range.

This does not mean these weapons are *not* out there, it just means that you have to use old stockpiles or make or grep them yourself. The biggest portable weapons they sell are RPG-7 copies (actually, Danville-made RPG-7 launchers and Radford-made rockets).

The Arsenal proper is a fenced-in facilities with a handful of observation towers (and gun and tank emplacements), with a few dozen arms grepper businesses working out of the various buildings and bunkers. All sales are registered with a central authority and inspected before leaving the facility, and each business pays a tax on each sale to cover the cost of electricity and security, rather like a store in a mall would. The Arsenal is the major economic force in the area. Some of its old-timers also are adjunct faculty at Virginia Tech, and Virginia Tech also offers courses in high-explosive grep chemistry, with senior-level intern programs at some of the Arsenal businesses.

Overall Arsenal security is managed by Colonel Thomas Pierce, formerly of the 2nd Marine/2nd Tank Battalion out of Camp Lejune. His history leading up to this role is colorful and let us just say he is not likely to be welcome in DC any time in the near future. He runs a tight ship and has a no-nonsense approach to both security and profitability. He may not be the wealthiest person in the region, but he is damn close and is certainly highly influential. People who have gotten on his bad side have found themselves blacklisted from purchases at multiple levels of remove. That is, if you have been blacklisted and someone a hundred kilometers off sells you ammunition they got from the Arsenal, he will cut off supplies to *that* person as well. People know this, and since Pierce keeps all resellers up to date with any changes to the blacklist, most people who do reseller business with the Arsenal tend to go along with it. All that said, the blacklist is *very* small. Pierce can be vindictive, but you have to *really* annoy him to incur his extended wrath.

Virginia Tech

This is *the* major academic institution in Rova. A small town with a big college, it is now a shadow of its former self and only has a student population about ten percent of what it did before the Dark Days (currently a few thousand students and less than a hundred professors). The architecture of the campus is sturdy stone buildings, and they weathered the Dark Days fairly well. A coal-fired heating and power plant kept buildings warm and powered whenever they could get a shipment of coal in, and the fairly high average intelligence and a number of academic specialties (including a veterinary college) meant that grep specialists popped up frequently during the Dark Days. Most students there during the Dark Days made attempts to get to wherever home was and how they fared varies. Those who remained and survived generally still live there, as either part of the town or the academic community.

Because of the limited student body the demand for some fields varies. Rather than a normal tuition process, many classes are handled as private contracts between the professors and students, with the university taking a cut for providing facilities and coordinating schedules so that there are a minimum of timing conflicts. A side effect of this is that many professors often run side businesses to help make ends meet. Your organic chemistry professor may also be your supplier of grep-enhanced Floyd weed. A few of the professors are independently wealthy and teach just because they want to, using the university simply as a good place to pursue independent research.

A possible campaign starting point could be here. Adventurers are all students (adult age), who are helping defray tuition cost by going on some sort of scavenger hunt for a professor over their summer break. This is a slightly risky task that turns out to be more complex than anticipated and introduces them to some of the people and plots that will be important later on.

Local government is the elected mayor of Blacksburg and his staff, and the President of the university, which is an elected position voted on by tenured faculty, with all the polite infighting and genteel backstabbing you normally get when a self-selected elite decide on someone who will have authority over their research and resources. Calls for non-tenured professors and students to have a voice in campus policy have fallen on deaf ears, which wags refer to as 'tradition and continuity with pre-Dark Days practices'.

In practice, there is not much difference between town and campus law in terms of criminal offenses, and police have jurisdiction in both. Rather, town law is mostly about civil and criminal offenses, and campus government is about academic policies and on-campus procedures. For instance, there is a 'no guns' policy on campus, while the town simply has a 'no concealed weapons' policy (if you carry, people get to know that you carry). In *theory* you could carry concealed on campus and no one might know, but in *practice* the town surrounds the campus so you cannot cross from one to the other with a gun without running afoul of the law.

The Virginia Tech community is somewhat split between 'townies' (about 3,000 of varying ages) and 'students' (about 2,000 and mostly in late teens or twenties), but relations are generally good and the culture is considerably more liberal and cosmopolitan towards those who are 'different' in some way. The status or social penalties a person might have in Roanoke would not apply here, and the 'different' are few enough that most of them know each other on a first-name basis.

Virginia Tech has a QuantumNet box of its own and has extended reliable mobile phone coverage to the area around the town and the corridor to Radford, plus Floyd convinced them to put in a pair of microwave towers to connect that remote community to the Virginia Tech network, which is a great boon during the winter when they are often snowed in. The installation of these towers is widely believed to have something to with Floyd's major exports, though that is not what the official statement on the arrangement says.

Prior to the Dark Days the college had a Reserve Officer Training Corps (ROTC) program, and a *small* subset of the current faculty and staff still have that role. In addition to a very structured life and military discipline, such cadets also get an engineering education of some type, and upon graduation usually become officers of some local rank back wherever they came from. While the big defensive guns are half an hour to an hour away at Radford, part of the ROTC program involves maintaining the sensor arrays on the main and secondary approaches to town, as well as doing patrols and other real-world exercises in the surrounding hills and woods.

In case you start a campaign here, this gives a more combat- or leadership-oriented adventurer a way to fit in and be the same age as the other adventurers.

Saltville

This is a small town in southwest Virginia known for its brine wells and salt marshes. This ready salt supply was important in earlier times and used for meat preservation and two battles were fought there during the US Civil War. Currently, the need for salt is mostly for road de-icing and they sell it to areas recovered enough that they can afford winter snowplow crews to keep the main roads open.

Mostly, the brine wells are used as sources of raw materials for grepping sodium and chlorine for those that need them for industrial or other grepwork. Sodium is useful in both grep and conventional refining and processing of various metals, an important component of some wood preservatives and molten sodium is also the coolant of choice for some types of nuclear reactor. Extra chlorine is sometimes needed to grep certain types of plastic and acids, either for other grepwork or for making lead-acid batteries.

A network of salt caverns around and under Saltville is used for storage of propane and other gaseous hydrocarbons. Various raw materials are grepped into combustible gas and then stored underground for later use (compressors liquefy it for storage in steel tanks for transport). Most people within about a hundred kilometers have some sort of propane or natural gas delivery based out of Saltville, and quite a few local vehicles have been converted to run on the stuff. This is very important locally, since many rural residents do not have electricity beyond a few solar-powered lights, and natural gas allows normal ovens, hot water, auxiliary heat and lighting, or heating soup for grepwork instead of using electricity, or running a generator for things that demand electricity.

Floyd

This is a small community in the highlands about 70 kilometers southwest of Roanoke, a bit over a 2 hour drive in good conditions. In bad conditions (much of the winter), the area is inacessible by normal vehicles.

Before the Dark Days, Floyd had styled itself as a counter-culture community, with music festivals, farmer's markets, microbrews, local wineries and such. While the tourist-oriented niceties went out the window during the Dark Days, the population was relatively self-sufficient and community-oriented, so they pulled through without too many losses. The population of the county is about 3,000 (≈3 people per square kilometer). The permanent population of 'downtown Floyd' is about 100. It has a general store, an inn/bar/restaurant, farmer's market, scrap market, ampitheater, a few speciality grepworks and a multi-fuel depot (grill-size propane tanks, gasoline, kerosene, diesel and 50kg sacks of coal). Weapons can generally be carried, but you better have a damned good reason for one to leave its holster or be pointed any direction other than straight up or straight down. The inn has a 'no guns' policy and you have to check them in at the door to be stored in a rather substantial walk-in safe until you leave (they frown on concealed carry, but if they do not see it, they do not have to ask you to check it in).

While no longer a tourist attraction, Floyd and the surrounding county still retains some of its old character, with a disproportionate number of crafters, musicians and specialist greppers. The most noticeable speciality of the area is to be blunt, weed. It is grown in quantity and used either in natural form, or grep-refined into different and usually more potent forms, which are used either alone or in combination with other products, like THC-rich moonshine. Roanoke is the main destination for most of it. The somewhat conservative Roanoke city council generally disapproves, but public sentiment is enough in favor that the only sign of the disapproval is a special tax on such products if you buy them within city limits.

Lynchburg

Lynchburg is a town of several thousand about 90 kilometers by road east of Roanoke, but it is also a lot farther than that in several ways. The direct roads to Lynchburg are all secondary roads, which are not in the best of shape and subject to arbitrary closure due to things like fallen trees, washouts, mudslides and such. However, the road sees enough regular traffic that these disruptions seldom last more than a day or two. It is *not* the sort of road you take a low-slung sports car on. So, under *ideal* conditions it is about a two hour drive. The population living within the old city limits is about 8,000, clustered mostly along an 'X' shape formed by the James River flowing one way and Route 29 crossing it at a right angle.

The other major distance between Roanoke and Lynchburg is that Lynchburg was and still is the home of Liberty University, a conservative Baptist educational institution whose student body made up about twenty-five percent of the local population. It was and still is a very religious area of the state. *This is not inherently bad in any sense.* The people are friendly and hardworking and have a good ethos regarding their various neighbors, but their opinion of grep is an outlier in this regard. It is seen as a tool and temptation of Satan, a demonic force with a physical manifestation. And how they respond to it in the presence of their families and friends is about how you would respond to finding a troop of rabid chimpanzees in your garage. There is a zero tolerance policy for *any* sort of grep and it is a regular topic of sermons. If you are grep-modified, you are *not* welcome in town and will be escorted out of town at gunpoint by the local police and there are rumors of 'disappearances'. The University integrates the demonic origins of grep into religious instruction and interprets the Scriptures to show how they predicted grep.

While all of this *does* affect the standard of living in the Lynchburg area (people can only buy manufactured goods rather than grepped ones), it also means that local people tend to have a more diverse skill set. You will have machinists rather than someone who greps auto parts, or a furniture maker instead of someone who greps furniture. Interestingly, despite some distrust of 'big government', the local attitude towards grep makes Lynchburg a useful economic partner for Washington DC, and precision, conventionally manufactured luxury goods like fine furniture regularly travels the 300 kilometers up Route 29 from Lynchburg to DC. Fragile goods take a full day to make the trip in good conditions, but most shippers budget two days for the outbound trip, skirting the ruins of Charlottesville and making sure to be at least 30 kilometers from it when the sun goes down.

Lynchburg is a 'dry' town, meaning no alcoholic beverages (or any other sort of intoxicant) may be sold there. This does not stop them from being sold and used, it is just that people need to be discreet about it. Threats of explusion and public shaming tend to keep the college students in line, and the occasional flogging makes sure the general populace keeps any drunkeness inside and out of sight.

A younger adventurer wanting to have skills that are less commonly taught (woodworking, machining, conventional chemistry) could be a Lynchburg native who decided the life there just was not for them.

Smith Mountain Lake

Formerly a resort area about 50 kilometers south of Roanoke. It still acts as a place for the local wealthy to have a vacation home and speedboat or sailboat and there are a few extensive estates on its banks, but its main features are as fishing grounds and electrical power. The dam that created the lake has a power output of several hundred megawatts, and supplies Roanoke, Salem and Rocky Mount with 24/7 electricity. There is enough of a surplus to push the power lines out to a few other communities, though this is a matter of political wrangling at the moment. As fishing grounds, the lake is managed by the Roanoke Public Works commissioner, whose staff monitors fish stocks and sells permits for a certain tonnage of fish per year to keep the fish at a sustainable level of harvest. The ease of fishing and reliability of quality makes it superior to trying to grep the equivalent, especially with electricity for refrigeration being readily available. The fish byproducts are sold as grep feedstock for secondary markets, making it an extremely efficient food supply.

An industrial grep-refining outfit uses the power plant output in off-peak hours to reclaim junked cars and other metal scrap. Some of this is trucked down to Danville, and the rest is usually sold to DC, either directly or through government contractors in Richmond. The road to Smith Mountain Lake from Roanoke is kept in good shape but may be closed in winter if there is heavy snow.

! One thing that the map on page 5.6 does *not* convey is how marginal anything that is not a 'community neccessary' road is and the very low population once you are off of the beaten path. Once you get a kilometer away from Route 81 or secondary roads, you can be in an area with a population density of less than one person per square kilometer. *And that is the pre-Dark Days figure.* Because the roads across the hills often have to follow contour lines, road distance can be twice or more the straight line distance, assuming the road is open is open at all.

Charlottesville

Located about 200 kilometers northeast of Roanoke, this *used* to be a thriving small city and home of the University of Virginia (20,000 students), but is now a ghost town. It is believed that some sort of grep-accident plague killed off the population during the winter of 2021CE, but whether that was *the* cause or one of several factors has never been determined.

What *is* known is that the area has developed an evil and well-deserved reputation. Small groups or individuals who overnight in the area sometimes just disappear without a trace. Empty campsites and abandoned vehicles, but no bodies and no signs of violence. Large groups, even if poorly equipped or armed, do not seem to have a problem. In 2028CE a group of seven families decided to make the town their own and claimed a cluster of sturdy older homes as a homestead. But then they started disappearing one by one. *And then two by two*. By late 2029CE the survivors pulled out and no one has tried to settle the area since.

Over the years a few large and well-armed groups have spent time there to "clean the place out", but aside from some productive scavenging and a few packs of wild dogs or swine, nothing interesting was found, and certainly nothing that would explain the dozens of disappearances over the years. Rumors for the cause range from merely implausible to outlandish, but no one denies that there is *something* in the area. It is a nagging worry to some, but it is 'not their problem'

Normally, Charlottesville would be on a straight east-west drive from Route 81 to Richmond (via Route 64), but a slump on Afton Mountain replaced a few hundred meters of highway with unstable scree, forcing traffic to wind along back roads which not coincidentally, avoid Charlottesville entirely. This makes the Roanoke-Richmond trip take the better part of a day in good weather, and commercial traffic usually goes in convoys to help defray the cost of a wrecker/security truck in case there are problems.

As a side note, the lack of traffic up Afton Mountain provides desireable isolation for the Monks of Swannaoa, a religious order which took up residence in Swannanoa Palace, an opulent early 20th century mansion built on top of the mountain. Ascetic and insular, they do not welcome visitors, but do not actively turn them away either. They mostly keep to themselves, rarely come down the mountain to buy or trade things, do not talk much, and no one knows much about their faith, save that they do not seem totally averse to grep.

Burke's Garden

This is an isolated valley well off all the beaten paths, about 200 kilometers west of Roanoke, but it has no functional roads going all the way there, meaning anyone visiting comes in by foot, dirt bike, horse or bicycle. It is surrounded by mountains on all sides except for an opening on the north. At about 900 meters elevation, it is the highest mountain valley in Virginia and is cooler and tends to get more snow than lower elevations like Roanoke. Its current claim to fame is as a commune or safe haven for the grep-modified, whether this is by choice, accident or coercion. All are welcome regardless of their modifications, as long as they are willing to abide by the local rules. *And one of those rules is that you be willing to defend the community against outside aggression.*

Because of what they are, they are scorned or reviled by anti-grep bigots, and because of where they are, they cannot expect to get any outside help if threatened. It has been a while since anyone actually gave them problems, but their attitude stems from when there was still road access and pickup trucks full of shotgun-toting drunken yahoos would come in to "teach those freaks a lesson". But in the present, while there may still be people talking the anti-grep talk towards the residents of Burke's Garden, none of them are foolish enough to go up there alone *or* in force to try and do something about it.

House of Correction

Generally just known as 'the Big House' or 'the Graybar Hotel', this is the maximum security prison inside the Federal Exclusion Zone, about midway between DC and Baltimore. The prison is located in the Jessup Detention Complex, a quadrangle of about 20 square kilometers, bounded by Routes 95, 295, 103 and 32, the inside of which is by law a minimum security prison zone (no weapons, a large list of other contraband, you are subject to search at any time, etc.). While there are no walls or fences at the perimeter, it is a highly surveilled area and is where people in work-release programs are required to live. Many of the minimum security 'prisoners' commute to other locations, but have to live here, shop here and their travel outside the complex is strictly limited by the conditions of their release.

The Big House is another matter entirely. It is a maximum security prison whose nature and rules have been adapted for the new normal of grep. We will not give details, but suffice it to say that prisoners have yet to effect a grep-enhanced escape. There are rumors that maximum security inmates have 'volunteered' for medical/grep experiments, but since this sort of thing is not legally permitted under DC law, any public accusations of this would be slandering the government and the officials in charge of the facility and would result in criminal charges laid against those spreading such rumors.

Richmond

Richmond is about 300 kilometers east of Roanoke and about 200 kilometers south of Washington DC. It has a current population of about 30,000, mostly clustered along the banks of the James River. It has three claims to fame in the present day. First, it is an extension of DC's political/military influence. It operates under DC law, has a DC military garrison and military governor and accepts DC vouchers at full value (though they are not the *exclusive* currency of the city). The populace is favorable enough on the issue of DC to allow a military governor, but not favorable enough that the area would stay under DC influence without one. Technically, Richmond is as anti-grep as DC law states it should be, but practically speaking the military police only enforce the violations that they see, and they tend to not look very hard. On occasion, major busts will be made to make it look like they are doing something, and those who grep for a living in the area do not like this, but consider it a cost of doing business. So, grepping is there, just not as common, not in the open, and more costly for those desiring a particular grepped good. Just about anything that is illegal can be found in Richmond. The trick is that you are probably going to pay more for it, and odds are that eventually someone you would rather not find out about the purchase will find out about it (snitching to avoid prosecution is a well-developed art here).

The second claim to fame is as a port, which provides most of the utility and income of the city. It is the highest point of the James River navigable by ocean-going vessels, and so much of the goods imported by ship to DC actually arrive in Richmond and get to DC by truck or rail. Very few of these imports are sold directly out of Richmond, but those that are (legally, anyway) pay the normal DC taxes. Some of the areas near the docks have a less-than-perfect reputation, and while military police keep violence to a minimum (aside from violence *they* utilize), other sorts of chicanery are common.

As a side note, the Norfolk Naval Yards and port facilities were destroyed in the limited nuclear exchanges of the Dark Days, and lingering contamination from reactor breaches of nuclear subs and the North Anna and Surrey nuclear plants has rendered that otherwise desireable location unsuitable for rebuilding. This plus Richmond's proximity and better road and rail access has made it the choice for DC to put its efforts into.

The third claim to fame is oddly enough, medical. The city formerly had a quality medical school and teaching hospital and enough of the faculty survived to maintain at least part of this. Enrollment is only a few hundred, but they still have some advanced medical technology and are allowed to teach and practice grep-based medicine as well. Students come from all over the eastern seaboard to study here, and DC bigwigs will make the trip to Richmond if they need advanced or experimental treatments (the Johns Hopkins facilities in Baltimore burned during the Dark Days).

So, there is a multi-way cultural split in Richmond. There are significant pro- and anti-DC elements, the rougher sort who handle the dockwork, the military police, advanced medical students, wealthy patients, merchants and the occasional smuggler, and a small but persistent criminal class that finds a way to cater to the needs of each of them.

Boone's Mill

This very small town about 25 kilometers south of Roanoke is notable only for its location. It is only the only major road and rail line between Roanoke and Greensboro, North Carolina, and goes through a narrow gap between two steep hills. The locals have blocked all other roads through the area, so the only way to get anywhere in this area is to go through Boone's Mill. Which of course, charges a toll for all passenger and freight traffic. One family runs the racket, but the entire community of a few hundred gets a share of the proceeds just to keep them happy. There are only a few trains per week going this route and maybe a few dozen travellers or cargo trucks each day, but the tolls add up to a decent living and the toll collectors are generally older residents who are unable to work more strenuous jobs. There is one tavern/inn in town, and it is set at the exact border of the community (on the Roanoke side). So, you can park outside of town and partake at the bar and engage with its various independent contractors upstairs without paying any tolls. The quality of the establishment is surprisingly good and it has a reputation for discretion, privacy and variety in *everything* it has to offer.

The idea had occasionally been floated in both Roanoke and Greensboro circles about just taking the town by force and putting an end to the highway robbery, but Boone's Mill dealt with the possibility fairly effectively by planting demolition charges in several hillsides, more than sufficient to block off the route completely for the several months it would take to clear it. So, the continued annoying surcharge paid by *other* people is seen as preferable to a major excavation and road- and rail-rebuilding expense paid for by local government.

Greensboro

This is a city of about 15,000 about 200 kilometers south of Roanoke on Route 220. It has no particular claim to fame aside from being a significant trade partner with Roanoke. A relatively well-maintained road and rail line provides quick and reliable access between the two cities, and Greensboro is a jumping-off point for travels into the rugged Carolina highlands or south to major cities like Charleston, South Carolina. The University of North Carolina at Greensboro is still a going concern, but with a much reduced faculty and set of available majors. A credit-transfer agreement exists with Virginia Tech for several fields of study.

Fort A.P. Hill

This used to be a several hundred square kilometer military training facility, but is now more of an actual squarish earth-bermed fort that encloses about 120 hectares (300 acres) of barracks, garages and other buildings. It is located about midway between Richmond and DC and serves as an extension of DC authority along the DC-Richmond corridor. The area is outside the Federal Exclusion Zone and is nominally independent, but no one is currently itching (or able) to challenge the authority implied by the fort. This does not prevent the occasional random shot being fired their way or at military vehicles driving without sufficient caution or visible firepower. Because of events like this, they tend to be a bit touchy, so if a Humvee with a machine gun and flashing blue lights signals you to pull over, it is probably a good idea to comply.

In general, the presence of the base tends to keep those like bandits far away, and the willingness of the military to help out in the event of natural disaster or medical evacuation is helping to slowly shift popular values in their favor.

Caverns

Before the Dark Days there were at least six tourist-quality limestone caverns in the Rova area, mostly to either side of Interstate 81. The terrain is conducive to such caverns, and while none of them are back in business as tourist locations, most caverns in the region are known of by *someone* and used for *something*. This could be legitimate, like storage or even living space, or as a hideout for criminals or den for animals.

The general feature of any sort of cavern is that they are irregular, have hidden perils, are *absolutely* dark if you do not have a light, and the advantage in any encounter goes heavily towards the party that knows the cavern best.

Danville

Danville was a non-descript small town with a number of deserted industries thanks to over-seas outsourcing. But it also had an extensive museum of armored vehicles from World War 1 to the present. While the weapons on these vehicles were deactivated, grep could quickly rectify that problem.

Between the Dark Days and the present, Danvile got itself into the business of high-mass industrial grepping. They specialize in big slabs of metal that can be assembled into specific shapes. *Tanks and armored personnel carriers*. Using their museum pieces as templates and their restoration teams as grep workers, they are able to provide brand new armored vehicles to anyone who can afford them. And while a grepped tank may be cheaper than a manufactured one, it is still difficult, takes months from start to finish and costs a few million credits (fifty percent deposit, the rest on completion). A bare bones light armored personnel carrier like an M-113 or BMP-2 might only cost you a few hundred thousand. Delivery can be arranged for anyplace within a thousand kilometers, but this is obviously an extra surcharge.

Their cooperative venture with the Radford Arsenal means they have ammunition for anything they make, and their main facility is as you might guess, *very* well protected, as are the main road entrances to the town itself.

A few indvidual greppers at Danville Armor run side businesses involved with grep and vehicles, but these are mostly restoration projects for the well-heeled. So, if you found a 1967 Corvette and want it restored from the frame up, Danville is probably the place to go.

Toxic recycling

There are at least a dozen *extremely* toxic sites in the Rova campaign area. Landfills, fuel depots, battery manufacturers, chemical disposal, mine tailings, and so on. People in the area where one of these is generally do not live near one, because of contaminated soil, dust and groundwater. However, these places are also good sources for mining particular elements or compounds useful in grepwork. So, most of these sites have been claimed by a resourceful individual or two, who goes in with a front end loader, scoops out a load of toxic waste, puts it in a repurposed trash dumpster and grep-refines out the useful bits. Hopefully, they then dump the less-toxic leftovers some place else and repeat the process. Sometimes, multiple grep operations are done on the same sludge, each step refining out a particular desired substance.

This can be fairly profitable, but most such recyclers do not take sufficient precautions and often suffer from work-related illnesses. A few have attempted to treat themselves, and while this is sometimes successful, the success often comes at a price. They might have fixed being poisoned by toxic waste by having it become a *necessary* trace part in their diet, or a repair might have come at the cost of deformity or mutation.

Washington DC

This is outside the campaign area, but it is the nearest major neighbor in terms of power blocs and its attitudes and political machinations will have an effect on the Rova region.

DC is two areas. The first is the 'Capital Zone', which is bounded by a hundred kilometer wall just inside the Capital Beltway (Route 495), with an irregularity in the south where it bulges out to enclose Andrews Air Force Base. This is not a 'city wall' as you would imagine it in medieval terms. It is an earthen rampart about twenty meters high, with a cleared zone in front of it and a few layers of concertina wire and anti-vehicle bollards at the base. It has numerous reinforced pits for weapon emplacements (usually empty) and has observation towers every several hundred meters (usually manned). It is a defensive line and a means to channel all traffic in and out of the zone through one of five multi-lane check-points (and the two places where the Potomac River crosses the wall).

The Wall was started before the Dark Days were really underway. Martial law restricted access in and out of DC, other roads were barricaded with shipping containers. Gradually, this turned into something more organized and formal. Earthmoving equipment, a seemingly permanent 'state of emergency' and eminent domain did the rest. The Wall is not and likely never will be 'complete', but does fully enclose the Capital Zone and has no gaps in its tower coverage.

The Capital Zone *is* the US government. There *are* claimants of dubious quality elsewhere. A former Secretary of State has denounced the legitimacy of the current President and has sufficient force in the New York City area to be a thorn in DC's side, a general in Colorado runs the 'Western Alliance' and there are a handful of pretenders elsewhere. But all the surviving members of Congress (and the replacements for those killed) work and live here.

The armed forces of 'the United States' are based here, and so on. Working for the government and living inside the Capital Zone is a measure of status. As a diplomatic pissing match, New York City and Western Alliance cities cannot be reached directly by air from DC. You have to change planes at some intermediate airport first (like perhaps Rova International Airport).

Outside the Capitol Zone and extending about fifty kilometers in every direction is the Federal Exclusion Zone (or as it is unofficially called, the 'Fez'). This includes the unburned parts of Baltimore (population 70,000), a number of small towns and most importantly, quite a bit of good farmland (because DC will not grep any food). DC law and policy is enforced out to the edge of the Fez and a little bit beyond when they can get away with it, and it is considered DC territory for all diplomatic and saber-rattling purposes (i.e. moving any sort of military units into the area would be considered an act of war).

Life is not as structured in the Fez as in the Capital, and while all of the same currency controls, anti-grep laws and such are in effect, there is no practical way to stop low-key violations of any of these. The area is routinely patrolled by the military (especially near the border), and police are as common on a per capita basis as they were in the pre-Grep days, it is just that Big Brother is 'over there' rather than 'looking over your shoulder'.

The Capitol Zone probably has the best standard of living and public services of any major city in the United States. Virtually everyone has health care, electricity (solar and the Calvert Cliffs nuclear plant (100km south-east)), running water, sewer, QuantumNet and access to mass transit. People are also heavily taxed and are paid in a voucher currency that has little value outside of DC.

DC's voucher currency is a hybrid between paper money and electronic currency. It is in the form of bar-coded ration books that can be in 'general' denominations or specialized ones like 'food', 'fuel', 'durable goods' and so on. When you spend one, it is scanned, its unique number is crossed off a central master list, and then the coupon is shredded. The vendor is credited some number of voucher equivalents, and these are used by the vendor to pay their own employees and buy things from other suppliers. If the net is down, the coupon is manually entered in a ledger for later entry and then the coupon is destroyed. So, people cannot spend them as easily as cash. You *can* trade or exchange them without having to scan them in, but you are assuming that someone else's coupon is the real thing and not a grep-forgery. Because few people outside of DC have scanners and software for entering DC vouchers, and respending the associated credit is difficult, they have little value outside of DC (which is the intent) and when they are usable it is at a large discount on their face value. The entire purpose of the currency is to keep the population of DC dependent on the trade generated within DC. A handful of authorized distributors cover most of DC's external trade, taking items imported into DC and paying in goods or raw materials, and then reselling the items in DC for a voucher price (and a profit). Low-end or speciality merchants from outside DC can still do independent business in DC, but they either have to take payment in vouchers and then use the vouchers to buy things to take with them, or do barter of their goods for someone else's goods.

The DC policy on grep is 'under goverment aegis and only for specific, pre-approved purposes'. Within the Capitol Zone this is enforced to the full extent technologically possible. Civil liberties with regard to search and seizure and personal privacy have *huge* exclusions when it comes to grep, enough so that 'suspicion of grep' is the catch-all excuse for 'we do not have enough evidence for a real warrant'. Residential power usage is monitored in the same way someone looking for grow lights would look for anomalous power usage. Every major sewer junction has spectrographic scanners looking for telltales of grep discards. Air quality monitors do the same thing (in addition to being part of a legitimate weather-reporting system). As far as government is concerned, the legitimate uses of grep are drugs and other complex medical products (including healing), complex mechanical parts that cannot be readily fabricated anymore (like hollow titanium alloy turbine blades) and *some* electronic devices. Permits are issued for the grepping of these in approved facilities by licensed and registered greppers, who are subject to even more personal scrutiny than the average person. Any other grep is simply illegal, with punitive fines for violators and significant rewards for turning someone in who is doing it. The average DC resident gets by just fine without grep, and readily buys into the government line of 'very few people actually *need* grep, the risk from unsupervised grepping is very high, therefore extensive restrictions and government permission are reasonable, common sense precautions.' Not coincidentally, the same line is used for firearms and any form of encryption outside of financial transactions. Any form of data that cannot readily be translated into plaintext, audio or video is quickly tracked back to its source and government computers are quite adept at detecting steganography and other pseudo-encryption dodges. Basically, if you have nothing to hide you have nothing to worry about.

The governnment of DC is for all practical purposes the President and his Cabinet, backed by the military and with a bureacracy to handle the day-to-day operation of things. The mayor of DC is a fairly powerful position in its own right, but is entirely subordinate to federal authority. There still exists a Congress and Supreme Court, but it is considered major news if they actually do something meaningful or job-related.

Specifically, while there are the same number of legislative seats, many have stayed empty since the nerve gas attack in 2021, and others are held by people who have never visited their district. For instance, there is a sitting Senator from Hawaii who was appointed by the President in 2027 for some political reason, but who only sets foot in that state a few times a year for maintaining the legal fiction of being a resident. So, being a member of Congress is by and large a status mark for people who have local influence and who like to talk a lot. They will rubber stamp decisions made by the President, offer formal and toothless objections on rare occasion, and on the rare occasion that Congress can actually be influential, they will generally fight amongst themselves to see who can get the most personal benefit out of it.

The actual policy of the President is one of reunification. *Preferably* voluntary, but by force or guile if necessary. There is not much of the former, the middle has not worked out, so most current efforts are using the later.

Internationally, most of the former nations have a similar reunification policy, and for diplomatic and propaganda purposes only recognize other foreign capitals as legitimate representatives of that nation. This can make life difficult on at times. For instance, if you are a New York resident and you fly to London, you are expected to have DC-issued travel documents since you are a 'US citizen', and DC will not issue you those documents unless you recognize the national authority of DC.

Until any other 'big picture' plots are revealed or start making themselves known, the DC is government is the 'heavy' who will directly or indirectly drive a lot of plots. In the long term, the direction taken by the United States, the *official* attitudes taken towards things in the post-grep world, and the life of everyone in the Rova campaign area is influenced by the way DC goes, but in the long term there are even *bigger* things going on.

What do you do?

What does the average 'adventurer' do in **Grep**, and why? There are no dragons to be slain, no dungeons to loot, no zombies to kill (probably), no cursed rings to deliver to inconveniently distant volcanoes, and no black armored, asthma-raspy guys with psychic powers to send father's day cards to.

So at first glance, it is a cool setting with not much to do in it.

Ah, but you would be wrong. Every setting for a game or *any* other fiction is filled to nearly the brim with boring mundanity. Luke Skywalker's family was 'moisture farmers', for god's sake. The high point of Frodo's life was smoking weed and waiting for the visiting wizard to set off some fireworks. In even the most interesting of settings, 99.999% of the people are just ordinary people doing ordinary things. For every Knight of the Round Table there was probably a hundred thousand peasants complaining about being oppressed.

You as adventurers are part of that *other* group, the .001% that is going to make a difference in the world. *Or die trying*. And as such, the things that are going on behind the scenes are the things that will be part of your life and destiny. It is just a question of how the gamemaster introduces you to it, how you are made aware that you are something special, someone special, someone potentially important in the grand scheme of things either because of what you will do, or what you will stop someone else from doing.

It is a wierd world, and your adventurers are wierdness magnets...

This involves what we call 'big picture' plots. Look at any modern episodic show. There will be one-shot episodes. Something interesting or awful is happening, you or your ensemble cast investigate, do stuff, everyone goes home happy. There will be intro episodes, where a plot involves letting the viewer see a recurring character for the first time, and an inkling of bigger things to come. And there will be 'big plot' episodes, where it is seen that something larger than anyone knows is going on behind the scenes and that the protagonists are both in over their heads and are the only ones in a position to do something.

Grep is the same way. We have hinted at some of the big picture plots in the descriptions and background, but here is the stuff that is going on. This is both the mundane stuff that can get ordinary people into situations that can be interesting, and behind the scenes stuff that you can work into adventures and work long-term adversaries and plots around.

If it has not become clear by now, one thing that **Grep** is meant to be is a morality play on the freedom of the individual, the needs of government and the good of humanity. These are things that *can* play nicely with each other, but often do not.

For instance, a commune, extended family or even a skilled individual in **Grep** can create everything they need for a modern existence. Food, clothing, tools, electronics, medicine, weapons, etc. But, they cannot grep a bridge over a river or grep a kilometer of highway. People in a city could grep everything they need, but without oversight the often toxic byproducts would end up polluting air and water to levels that made both lethal to levels not seen since the Cuyahoga River caught fire in 1969.

Playing what is good for each *against* each other and seeing if players can get them to work *with* each other is part of what will move both plots *and* humanity forward in **Grep**.

Adventure: Genesis

This is a starting adventure set in the Rova area, but you can change the names and use a lot of the Rova elements and scenery for whatever locale you want to use for your adventurers. The gamemaster will have to add some flesh to this skeleton of an adventure based on the backgrounds and interests of not only the adventurers, but the players. Explorers will want to explore, fighters will want to fight, etc.

The setup is that a local notable, businessman and eccentric named Henry Rider is influential in local politics but does not actually hold any office (*"a waste of time and I only have a limited amount left to me."*). He runs a profitable and fairly respectable grep-based recycling business, or as respectable as it *can* be, given the ties that industry has to the local contingent of 'respectable businessmen'.

For reasons he is keeping close to the vest, he is commissioning a several day scrounging expedition to Charlottesville. Some of this is going to be using his employees and several HEMTT trucks he owns (formerly owned by the Virginia National Guard). However, he is well aware that this sort of trip will bring all sorts of hangers-on out of the woodwork, glomming on the safety of a large group to do their own scrounging in the ruins. So, he has made it public knowledge that he will buy scrap of certain types on the spot and take the burden of transporting it back himself. In addition, for a small fee he is willing to transport up to a certain number of people there (after they sign a waiver), meaning that you can conceivably do some scrapping using only hand tools, sell it to Rider, Inc. pocket the profit and only be out the expense of transport fare and whatever food expenses you have. He's already signed up enough people that he had had to find an old school bus just to carry those who do not have their own transportation.

As a quick note, he is most adamant about preserving the integrity of local structures for future generations, so there is a zero-tolerance policy for certain forms of salvage. If you decide you want to tear open walls to get at wiring or plumbing, he will *not* buy what you salvage *and* you will be walking home. No doubt a few will run afoul of this or believe he is not serious, but they are both stupid and mistaken. Those who scrap in that way and had their own ride to and from Charlottesville will simply be identified for later blacklisting.

The adventure assumes that all adventurers are reasonably local, or at least local enough for long enough to be familiar with the area, local politics and such. As adventurers, they should also be able and willing to travel a reasonable distance on short notice, for whatever reasons might motivate them.

wealthy/statused: There is something you are *personally* looking for in the Charlottesville area. You have never gotten around to going there or hiring someone to go there, but this looks like an excellent opportunity and you may be able to get some of the hangers-on to look for your item as well.

impoverished: The reputation of the area means that it has not been scrapped as much as other towns. The relative affluence of the area means there might be usable high-tech from before the Dark Days that could bring a good price. Stuff like tablets, smartphones, even televisions if you have a way to get them home.

skilled grepper: For the same reason it is good for impoverished adventurers, the area probably has more than the usual quantity of obscure or rare raw materials for grepping. The university had physics, material science, chemistry and radiology departments, so specialized lab equipment might still be up for grabs.

thrill-seeker: It has the aura of exploration and danger, even if the actual risk is low. Rider will not encourage this crowd but cannot keep them out.

What could possibly get adventurers involved if they are *not* normally interested in scrounging is both direct and indirect:

bounty hunters: Quite a few of those on the wrong end of a warrant make money on the edges of the law, and scrounging is often in that category. A couple of bounty hunters posing as scroungers could easily pick up a few people on outstanding warrants. Conversely, an adventurer who has a bounty hunter as an enemy could find their new scrounging acquaintance is actually sizing them up to get them in a secluded spot and then incapacitate them for transport elsewhere.

support: Maybe the group needs an extra driver, or a cook, or a medic. Maybe a local entertainer thinks a captive audience would be a good way to make a few credits around the evening campfires. Maybe the local newspaper wants some photos but does not have a staff photographer who is able to go along. Maybe an adventurer who is not in good favor with someone is 'asked' to go along and snoop around in exchange for a reduced likelihood of falling down the stairs next week.

experts: People with expertise in a handful of fields are being contacted privately to ask if they would like to be part of the expedition. Rider is looking for items related to several specific fields of knowledge, centered on the library and academic buildings and former faculty of the university. Anyone approached who looks at the list and is suspicious can make a heroic(15) Awareness check to realize that the list of specialties is *deliberately* diverse and that what he is really looking for is only one item on that list. But he is paying the same, regardless. Each specialty is going to involve a different section of the university library and possibly the sealed Special Collections wing, a variety of individual professor's offices (including personal notes, laptops or other electronic devices), and a list of home addresses to be visited for the same reasons. Some of these may have burned down, been flooded, exposed to the elements, scrounged or vandalized, but someone went through a *lot* of work to make each specialty sought appear to be as important as all the others.

Possible hooks that the gamemaster can use are below. Some are vague or so broad as to be curious, while others are extraordinarily specific, with no indication of why.

- spectrographic analysis or runoff and spring water from various watersheds in the area
- historical documents and 19th century maps of long-abandoned precious metal mines
- local industries that were part of the war effort in World War 2 and which went out of business when the war ended
- computer code regarding the management of electricity distribution networks
- locations of Cold War fallout shelters and newspaper articles about same
- personal effects, journals and special collection materials related to the unrecovered Mk39 nuclear bomb from the 1961 crash of a B-52 near Faro, North Carolina
- Original blueprints of Charlottesville buildings constructed from 1880-1900 and records of any renovation or demolition of same
- Genealogical records of several families, most of whose surnames are recognizable as prominent in the local area (including Rider himself)

The reason to hire people skilled in particular areas is that if combing through a potentially large selection of material in a short amount of time, a person with a good skill or affinity to a subject is going to be better at spotting the most relevant materials, especially subtle things that a 'just grab it all' approach might overlook.

For plot purposes, which one or several things from this list are the main focus is up to the gamemaster. It could even be that all of them are red herrings and the real goal is the salvage of some particular item in town, and everything else is just to get people looking in the other direction while the sleight-of-hand is accomplished. Each of these things can provide an intro to some later adventure, but none of them are the focus for the adventurers.

The focus for the adventurers is making connections and learning to work together, along with maybe a little shared adversity to be a background for turning strangers into acquaintances and maybe friends. There is also the irascible and influential patron figure of Henry Rider, who could be a recurring figure until the gamemaster decides to have him exit the stage as part of some other plot.

Guard



Strength	8
Agility	8
Awareness	8
Will	9
Health	8
Fate	3
hits	16
stamina	8
toughness	3
move	4/6/8
dodge	4

Skill rolls:
brawling: 3d+2
firearms: 3d+2
intimidation: 4d+0
melee wpn: 2d+2

-0d
-1d
-2d
-3d

Scrapper



Strength	7
Agility	9
Awareness	9
Will	6
Health	6
Fate	2
hits	13
stamina	6
toughness	2
move	4/6/8
dodge	6

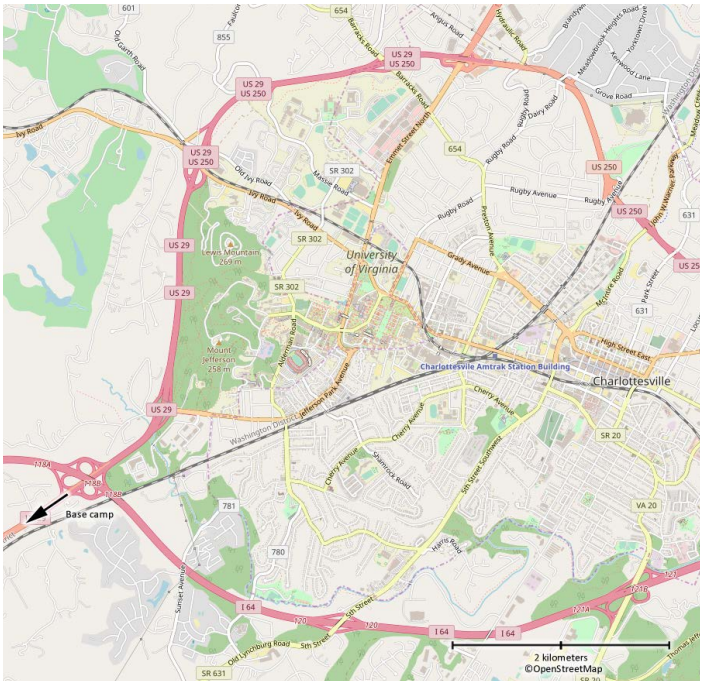
Skill rolls:
grep: 3d+0
brawling: 3d+0
scrounging(urb): 3d+2
firearms: 3d+0

-0d
-1d
-2d
-3d
-4d

Opening

Adventurers hear about the expedition through whatever channels are appropriate. Unless someone is wealthy enough to use (and risk) their own transport and is not interested in anything that Rider is looking for, anyone interested in the convoy out and back has to register at one of Rider's offices, say a used/rebuilt car dealership adjacent to his main scrapyard on the south side of town. This gives players a plausible means to run into each other, someone overhears someone else, a conversation starts up, the usual formality of introducing adventurers to each other. An adventurer who starts play with a vehicle could even be picking up their new purchase at this very lot.

Depending on the role an adventurer is looking for, there might be a real or staged event that gives them an opportunity to stand out. For instance, some bouncers are going to be needed and it would be a typical Rider tactic to set up an artificial fight just to see who intervenes and how they do so. Someone applying for a convoy job as security who sees a fight break out and does nothing is going to be noticed, as is someone who goes into it with far more force than is necessary.



The pay scale is left to gamemaster discretion. Those going for random salvage go with luck of the draw. If you assume the equivalent of a minimum wage job is about 10 Credits an hour, then low-end skilled jobs will pay about 100 Credits per day, plus food, transport and disability coverage.

Those being hired as specialists will have a base pay rate per day based on the rarity of their talent, say 150 Credits per day for more common talents, 200 Credits for less common and 250 Credits for obscure ones (plus food, etc.). Add in a ±25% bonus per full ±1d their skill roll is more than 4d+0 in that talent (remember any complementary skill bonuses).

Travel

Just the travel is the better part of a day, leaving early in the morning. Not that the trip is all that long (pre-Dark Days it would have been a two-hour drive), it is just the time involved in getting everyone loaded up, driving the convoy as fast as the *slowest* vehicle, detouring around the landslide that blocks the short route over Afton Mountain, setting up camp and so on will mean that it will be well into afternoon by the time everyone is there and unloaded. An advance team has already secured a large church that is mostly intact and provides a single roof, large parking lot and defensible position (and is considered safely far from downtown), and signs have been placed to direct convoy traffic there. All in all it seems professionally run and there should be no problems.

Scavenging/searching
As with the convoy, anyone working for Rider will find that things are being professionally organized. Teams are set up for each of the search parameters, there are maps, portable radios and a central base station at the church for relaying requests or asking questions. A limited number of heavy 'opening tools' are available and will be dispatched as needed, but in general each search team is expected to be competent to handle their sector on their own. If the gamemaster does not have any ideas for ...interesting things based on the complications that follow this section, roll 3d+0:

roll	result
3-5	structural failure resulting in accident
6-7	structural failure blocking access
8-13	no problems
14-15	human-based problem (altercation)
16-18	wildlife-based injury (snakebite, rabid dog)

Now, someone hired to look for something can expect to be spending a lot of time doing just that. No one wants to be out after dark given the reputation of the area, so assuming a 2 day exploration of Charlottesville, adventurers hired to look for something (or those there to scrounge) can expect to spent eight or more hours of each day doing just that. Make one roll for each day on whatever is the best skill roll they have for that purpose, remembering any complementary skills, specializations or Forte/Weakness that might apply. Apply *each* roll as below, and use the *average* of the two days (rounding down) for any long-term effects for how Rider's people will note the adventurer's file for the next time he is looking for someone with those talents. If adventurers are random scrappers, roll here as well.

fail a challenging(9) roll: *You suck*. Why were you even hired in the first place? If this is your average result, you will have little chance of working for Rider or whoever was his hiring agent ever again. Scrappers turn up a scant 20Cr worth of stuff for 8 hours of nasty work.

make a challenging(9) roll: *Your work is the barest minimum for calling it competent* (if you had a 4d+1 skill roll you could have done this by 'taking 2's'). This is worth +2 difficulty on the next hiring roll by Rider. Scrappers find 40Cr of usable stuff.

make a hard(11) roll: *Straightforward, competent work*. You make no major finds but also make no major gaffes. No long-term bonuses or penalties. Scrappers find 60Cr of usable stuff.

make a formidable(13) roll: *Slightly better than average*. Good enough to be noticed, but you find nothing surprising or extraordinary. This is worth -1 difficulty on the next hiring roll by Rider. Scrappers find 80Cr of usable stuff.

make a heroic(15) roll: *Solid work*. Whatever you are supposed to be looking for, you find it, and do so in a way that exceeds expectations. This is worth -2 difficulty on the next hiring roll by Rider and they will make an effort to contact you if an opportunity you might be interested in turns up. Scrappers turn up 120Cr of usable stuff.

make an epic(17) or better roll: *You stumble onto something important*. Whatever it is, it is related to that particular search and even if this is not the *actual* thing Rider is looking for, his field personnel flag it as important. The gamemaster will have to look at the situation and see if there is some way to use it as a later hook or plot device. If this is your average result, you will have a -4 difficulty on any roll related to working for Rider or whoever was his hiring agent the next time he is looking for someone with your skills. However, this comes with the price that Rider has probably investigated you because of your suspiciously good skills and may know more about you than you would prefer people did. Scrappers turn up 200Cr of usable stuff or can gamble. They find signs of something *more* valuable, but cannot get at it. The gamemaster has to decide where to go from there.

If an adventurer is not going out of their way to look for problems and the gamemaster is not going to force any on them, these are the rolls to see if they get anything other than their agreed-on payment for services rendered. However, there could be more to the situation than this.

DC involvement: The government in DC is making a not-so-subtle sign that they are keeping an eye on things by having two Humvees of 'private contractors' showing up from Richmond to reconnoiter Charlottesville, just coincidentally at the same time as Rider's salvage convoy shows up. They are *not* in uniform, but are armed and their being in civilian clothing is a polite fiction that lets everyone pretend these muscular, crew-cut and well-disciplined 'civilians' are not an official DC presence designed to be a "we're keeping an eye on you" message to the people of Rova. As a reminder, their being 'civilians' means they are deniable if they end up being an embarassment (and they know it).

A potential complication is that there are plenty of Rova separatist elements who hold DC and/or Richmond forces in very low regard and who feel confident enough in their numbers to provoke an incident. They are *not* just going to arbitrarily shoot someone or anything like that, but insults, rude gestures or a rock thrown from out of sight to shatter a windshield are perfectly possible. It is also possible that someone, maybe even one of the adventurers, has a personal grudge against one of the people from Richmond. If they have the DC government as an Enemy, then maybe one of the people is someone they know by name or recognizes from a past bad experience.

Defusing such a situation would be in the best interest of the Rider salvage operation, and is potentially worth an extra point of experience or later recognition for initiative and cleverness by anyone in the Rider organization that is looking for these things.

On the other hand, *not* defusing it or letting it escalate could play into DC hands. Some of the people from Richmond might retroactively become 'diplomatic personnel' who were 'assaulted without cause'. And while this is going to make little local difference, it plays well to the stereotypes DC presents regarding those not under Federal rule and the need to bring a civilizing influence to the region.

Bounty hunters: We already mentioned this. Adventurers might be bounty hunters, or might have an Enemy of bounty hunters. Even the people here from Richmond might have the proper documents for apprehending suspects with outstanding warrants. It is not a diplomatic incident if registered bounty hunters snag someone and drag them back to DC for arraignment and trial. Or more likely, to Richmond, which is less than two hour's drive. Having someone important to a later plot (or just important to one of the adventurers) snagged could drive later adventures.

Earthquake: On August 23, 2011, one of the larger earthquakes to occur in the eastern United States had its epicenter near Charlottesville. It was still not much as far as earthquakes go, and only did moderate damage. Another earthquake there might be a once-in-a-campaign event, but if it happened while a bunch of scrappers were poking around ever-more decrepit buildings, there could be numerous fatalities, lots of injuries and people trapped in wreckage and under debris. And given the evil reputation of the area, no one wants to hang around after dark, meaning that if rescue efforts need to continue into the night, then motivation and leadership may be needed to keep the more fearful on the scene. And of course, there is the potential for some grisly discovery later on for those who were not located until the next day.

The unknown: Charlottesville has its evil reputation for good reason, but specifics of that reason have never been determined, mostly because of a lack of survivors (or corpses). This makes it a useful location for plot points later on. Cleaning out the problem (whatever it is) would go a long way towards advancing an adventurer's career, and could also uncover information that leads to a new direction for the campaign. But in the here and now, with this many people here, it is almost certain that some of them will be greedier than they are smart, and will be out alone or decide to get a head start on the next day's salvaging by camping overnight in a 'secure' spot. A few of these people could just disappear without a trace. To further confuse matters, shortly after the disappearance is discovered, the watchers from Richmond might pack up and leave, which is what you might expect if they had nabbed a fugitive and wanted to get back to Richmond. Rider's people might go as far as to send a few motorcycles to catch up with the Richmond contingent just to see if this is the case (a possible side encounter for adventurers who have a role in security for the operation).

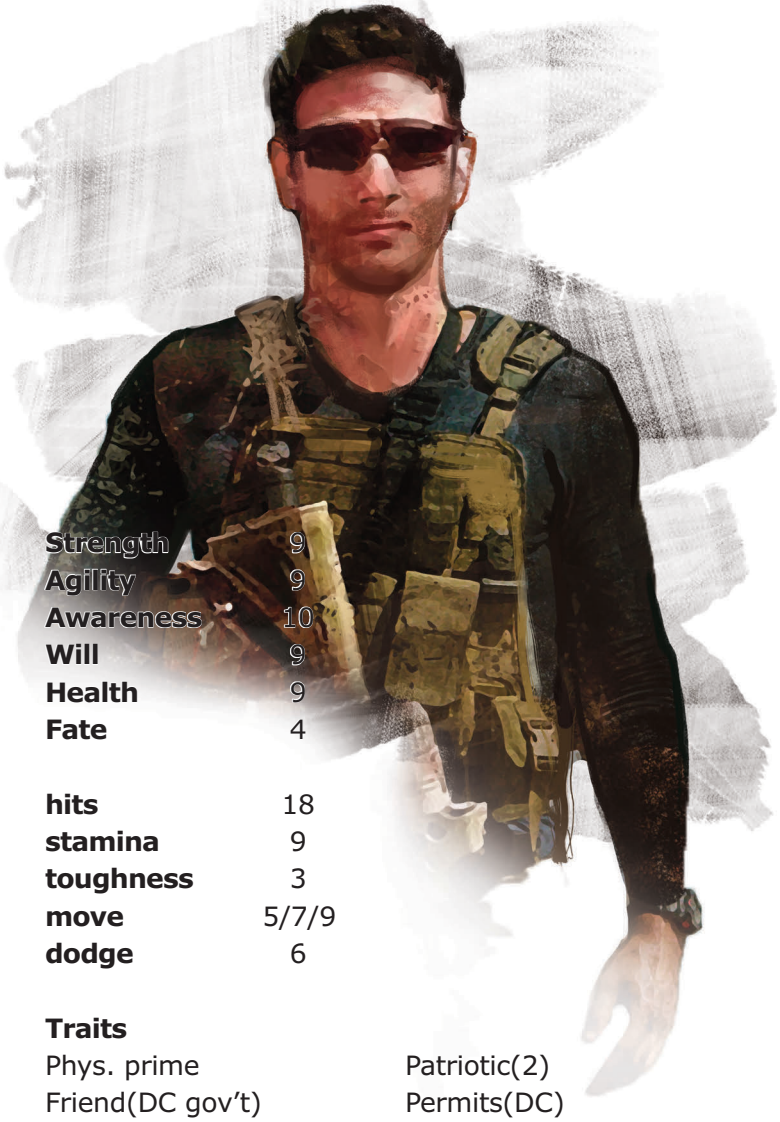
Wrapping it up

As with the departure, return will be in the early morning, so the full trip is four days (travel, two days of search, travel). Payments for professionals will be made upon return (actually, with a day of processing time for paperwork). There should be little incident on the return. Anyone with an exceptional performance (one way or the other) will be pulled aside and told so.

As far as experience goes, this is a short and simple adventure that you can run in a single session unless there are some drawn-out incidents or minor disasters, so award XP appropriately, keeping in mind any bonuses for clever play, advancing the campaign or staying in character even when it might not have been in the adventurer's best interest to do so.

DC soldier

*"What part of **United** States are you not getting?"*



Strength	9
Agility	9
Awareness	10
Will	9
Health	9
Fate	4
hits	18
stamina	9
toughness	3
move	5/7/9
dodge	6

Traits

Phys. prime	Patriotic(2)
Friend(DC gov't)	Permits(DC)
Enemy(DC gov't)	Hit bracket(+1)

Skill rolls:

grep: 3d+0	**driving:** 3d+0
firearms: 4d+0	**knife:** 3d+0
brawling: 4d+0	**lockpicking:** 3d+0
scrounge (urban): 3d+0	**area kn.(roads):** 3d+1

Troops deployed outside the Federal Exclusion Zone are generally more elite, flexible and intelligent, and are also given more leeway (and forgiveness) in how they accomplish their goals. While they *can* be killers, they also see themselves as missionaries, bringing the good news of a united America to those who might not want to hear it. *And the good news is coming, one way or another.*

Other plots

In any campaign there should always be more than one plot simmering. It is never a bad thing to have one-shot adventures that are totally self-contained, but for a campaign to have staying power there need to be forces at work that adventurers need to deal with, but who start from a position of concealment, superiority or both. The obvious 'bad guy' that everyone in a Rova campaign would know about would be the government in DC. Anyone old enough to be an adventurer and who lived in Rova remembers the tanks rolling down route 581, the Hesco bastions around the Berglund Center, and maybe even took part in some of the guerilla actions that eventually caused government forces to withdraw.

But they are far from the only thing simmering in the pot.

Bounty Hunters

There are plenty of criminals out there. Those who have warrants for their arrest for whatever reason may have a bounty on them. People may have also fled a jurisdiction and a bounty could require that person be brought back to where the bounty is offered.

The legal arrangements for bounty hunting vary from place to place, as do extradition policies and any local corruption that influences how effectively they are enforced. Most nations, even those on unfriendly terms, have some sort of reciprocity for bounty hunters and extradition. Exceptions of course include things like spies or other people doing bad things under their government's aegis. But in general, a bounty hunter has to catch their quarry and get them to someplace where the arrest warrant is valid, then turn them over and get documentation that they did so, and then submit this to whatever government agency put up the bounty, then wait to get paid. It is not an exceptionally high-paying job, and most of those who do it, do it for psychological reasons, thrill of the hunt and all that.

Bounty hunters have a certain reputation and they talk a lot of talk to foster that reputation, but the reality is not as glamorous or violent as the tales about it. Bounty hunters do *not* want to draw attention to themselves, either because they do not want to alert the person they are after, they do not want to interact with the local police, or both. They are often skirting the fine edge of a *lot* of laws, so going in quick and getting out quick are important. And for all their reputation, they are usually knowledgeable on the law and sticklers for procedure and paperwork (weapon permits, warrants, extradition procedure, etc.).

Adventurers can be bounty hunters, or have an Enemy who is employing them, or have bounty hunters be a complication because they are after someone the adventurers would rather see remain free. This could be something as altruistic as friendship, or as simple as because they have not been paid by that person yet. Bounty hunting can even get meta. You might be a bounty hunter because you got caught as a criminal, and working for law enforcement is part of the package that keeps you out of jail. You have family living in DC who are unofficial hostages for your good behavior, and you have to bring in some unspecified number of bad guys to work off your deferred sentence. You hate your handler, who does not much like you either (an Enemy), but the perks of working for the DC government give you a little backup (a Friend).

Bounty hunters skirt the law on both sides. The people they are collecting bounties for are often none-too-pure themselves, and we can guess at the ethics of the criminal circles their targets move in.

Bounty hunting is not so much of a long-term plot as a way to get to one. You rub shoulders with powerful elements on both sides of the law, travel a lot and are ready, willing and able to use violence to get things done. That gives you a set of useful qualities that a lot of people might appreciate in a deniable (and perhaps disposable) asset.

The Big Kahuna

This is another way to start a campaign, but putting the characters in a 'big fish in a small pond' situation. The players are tied to a subset of the starting play area by ties of tradition and family and circumstance, even if they would rather be someplace else. The local head honcho has established a little feudal state, playing off important but secondary local families against each other and using threats and implied violence where appeals to greed and power do not work. For instance, your sister might be married to *el honcho's* nephew, and if you skip town *el honcho* would be unhappy and his nephew might have to rough up your sister (and everyone knows he *enjoys* that sort of thing). Or your brother lost a leg in a mining accident and keeps a roof over his family's head by working in one of *el honcho's* grepworks, and *el honcho* wants you and *your* grep talents to stay in town or your brother might lose his job and what would his wife and three kids do then?

It is just a nasty, hateful little situation and the only reason someone has not potted *el honcho* with a hunting rifle is that he is the only thing keeping his sadistic children (somewhat) in check, and the entire area would erupt in several kinds of violence that would hurt more of the innocent than the guilty. Think of the situation in Iraq with Saddam Hussein and his sons, only over a smaller area.

The object of the early campaign is *not* to get out of the area, because that would leave relatives, friends and others still under *el honcho's* yoke, but instead find a way to topple *el honcho* in a way that does not result in a tiny little civil war, and carry it out without being betrayed by one of the far-too-many people who would cheerfully rat you out for a temporary personal advantage. *You remember what happened to the last person tried for 'treason', think about what you **almost** just said and who you almost said it to, and instead say "never mind" and then walk away...*

Nameless Cults

If you get a large enough group of people together, then no matter how obscure a special interest is, odds are that several people will share it. For instance, pick the wierdest fetish you can imagine and then search for it online (also known as 'Rule 34').

The post-grep world is the same. The plot is that somewhere in or across the Rova area, there is a small group dedicated to doing something *really* awful, and they use grep, their jobs and any secular authority they might have to both facilitate this awfulness and to cover up any evidence of it. They stay under the cultural radar because life is still chaotic. No one is being tracked all the time, so people just up and disappear on occasion. People leave abusive spouses with no warning, skip out on rent and are never seen again, that sort of thing.

So, the gamemaster has to decide *exactly* what is going on, who is doing it and how and why it will become important to adventurers. The 'why' is not as important as you might think. It could be as mundane as money, it might be a power trip, it might be bigotry or hate, or maybe all these people just have worms in their brains. They might possibly even tie into the **Incarnation** plot somehow. Some examples might be:

- a network of serial killers or sexual predators
- law enforcement in partnership with illegal grep experimenters, disposing of certain criminals that no one is going to miss
- the opposite of those in Lynchburg, believing that grep is a gift from Satan and using it secretly and abominably to please their dark lord
- a racial or ethnic hate group that is trying to purge the area of 'those people' by means that look like accidents or unexplained disappearances
- political extremists trying to foment a conflict between Rova and DC by creating 'incidents' that look like they are caused by one side or the other, increasing tensions in the area

The Slow Coup

Rather than the previous small-picture plots or introductions, the Slow Coup is one of the big picture plots, one that can start to be part of adventures from the very start (even if only as hints), and can set the stage for later, bigger things.

The big difference between territories like Rova and city-states like DC is that DC remembers when it used to be important and all-powerful. Its most important people were probably important *before* the Dark Days. In order to *stay* important, their ambitions almost have to be aimed towards reunification of the nation, and coincidentally, more power for themselves.

When the first "we're the government and we're here to help" efforts were rebuffed after the Dark Days ended, DC tried the "big stick" approach, coming in with force and setting up an "interim governor" backed by a battalion of troops and armor. Small groups like the unorganized people in Rova do not have the training or resources to stop a major army in open battle, but they *can* wreak havoc on a military occupation. Instead of moonshine stills in every secluded hollow there would be grepworks making anti-tank rockets and pepper spray by the barrel. And this sort of thing would not be unique to Rova. A European campaign could have the same sort of thing going on, with the added complication of actual nearby nations rather than different provinces of the same nation.

Rova did not so much drive out DC forces as they just generated losses that simply made it uneconomical for DC to stay there. In the post-grep world, an Abrams tank is a resource that *can* be replaced, but only at a ruinous cost. *And it just started adding up*. In addition, the 'Americans shooting Americans' was terrible for morale (on both sides) and could never be properly spun for propaganda purposes back for the DC audience.

So, after failing with the 'big stick' approach, DC is taking the long approach, working to influence nearby areas like Rova towards a more friendly attitude. Individual Rova council members whose districts are near DC are getting favorable business deals. The children of prominent Rova families get admission to DC technical schools, where they spend years in the DC culture and rub elbows with children of wealthy DC families. Contacts are made, friendships formed, and business deals and marriages help bring Rova into the DC fold.

And behind the scenes, Rova councillors with a hard-line stance against DC start having business losses due to theft, banditry or sabotage, they may get caught up in scandals (real or imagined) that are politically crippling, maybe have a family member run afoul of DC law and end up with the threat of a lengthy prison sentence, and a few have even suffered conveniently fatal accidents. And a few of the smarter ones who have avoided this (so far) are getting suspicious and putting their own secret operations into play.

All of this is ongoing at the very start of the campaign, though very few in or out of DC know that it is happening, or if they suspect, are unaware of the extent of it. Without any opposition or investigation, DC influence in the near future (several months to a few years) will be sufficient to sway a majority of the Rova council into a formal treaty with DC. The final pieces of DC influence or 'problem removal' could be part of or a complication of the first several adventures. An adventurer with a highly placed Friend might have that friend call in a favor that is related to this long-term plot.

If successful, Rova citizenry would never stand for a full annexation, but everyone old enough remembers the notion of state and federal government, and Rova would be the first 'state' of a new 'United States'. *Which is a grand and glorious thing*.

In theory, anyway. In practice, it would mean a slow encroachment of DC policies towards grep becoming Rova law, a general diminishing of Rova freedom and expansion of the DC surveillance state.

Players and adventurers could get involved and possibly become aware of this in a variety of ways. Anywhere off the main highway there is still the potential for banditry. Even Route 81 is not perfectly safe, but it has just enough traffic and mobile phone coverage that only a well-planned heist of high-value goods is worth the effort. As a matter of habit, travellers cluster in groups when possible, and valuable items travel with an escort. If a company is worried about theft or 'an inside job', they could hire a reputable outside security service (that the adventurers work for or run), or adventurers could just be travelling for other purposes and taking advantage of the added security of an armed convoy going the same direction (they will check you out, but as long as you keep your distance they do not care). Either of these could put adventurers on the scene if a DC-instigated event happens. Possible clues that it was not an ordinary attack could be found in the aftermath.

Or, a family member like rich old Uncle Amos might be someone who is too intransigent against DC and ends up having one of those conveniently fatal 'accidents' that leaves a more cooperative person (possibly a relative you never thought much of) to take the reins afterwards. But in old Amos' will is a fat envelope for the adventurer, with allegations, hints, theories and just enough evidence to make things plausible, but *not* enough to be damning. And the more pliable person now in place may be DC's front man (or woman) to 'deal with' any adventurers who get too nosy about things that are 'none of their business'.

Or, since adventurers are often the sort who work at the edges of the acceptable, they might be approached to do some questionable work (for good pay in whatever coin the adventurers happen to need at that time). Their contact would not have any discernable ties to DC, but they would be doing DC's dirty work nonetheless. As Rova residents, any qualms about doing what they are hired to do will have a perfectly plausible and superficially true cover story.

Someone needs to be beaten up or 'taught a lesson' because they sexually assaulted my son/daughter.
Such-and-so stole something from me and I need it recovered without getting the police involved.
My 'son/daughter' has a serious drug problem and I need you to find them and bring him to me for a 'family intervention'.

Or, it could be as simple as the adventurers becoming wealthy and influential and finding that *their* plans go much easier when they align with DC interests and tend to fail more often if they are in opposition.

This plot is in the long term, extremely important to Rova as a whole, but is small potatoes for an overall campaign. Resolving it could simply be the lead-in to something *really* important.

Stairway to Heaven

The implied promise of easy space travel that came with the presence of the Haaren ship inspired a *lot* of people right before the Dark Days. There was the thought "it can be done, therefore *we* can do it." The Dark Days cut short the newly funded space programs, and aside from two resupply launches in the early part of the Dark Days there have been no manned spaceflights for a decade. Even the International Space Station is empty, its final crews touching down in the United States and Europe in mid-2024. The ISS was boosted into a higher orbit using a magnetic tether, and some *think* its onboard systems are still being monitored, but no one is claiming to do so.

But the dream did not die. Initially funded by a billionaire space entrepeneur, the Stairway to Heaven project was actually started before the Dark Days were fully underway. One of the nice things about being a billionaire is that with sufficient 'incentives' you can effectively buy a chunk of a South American country, and your own and your analysts projections are reliable enough that you know that country will soon lack the ability to either interfere with you or shake you down for more money. Which is *exactly* what happened in Ecuador, where the Cayambe volcano is the highest spot on Earth at the equator. Mount Chimborazo was actually a better location due to altitude and stability, but was deemed too close to possible sources of human intervention.

Quickly and at exorbitant cost, a major research station and manufacturing facility and facilities ready for grepwork were put in place, and key personnel and their entire families moved in a well-choreographed operation that was over so quickly that none of the nations the researchers were taken from knew what happened until it was over. Sufficiently large bribes to Ecudoran generals kept external intervention at bay until the international situation deteriorated to a point where they had more serious worries than what some crazy billionaire was doing.

Among other things he was doing was making sure his facility's security forces were well armed and that all the normal land approach routes were blocked. This kept any potential Ecuadoran interference at bay until Ecuador's internal situation made 'the crazy man in the mountains' a non-issue. However, as proof that at least *someone* was concerned about him and his project, a 'stray' 100 kiloton fission-fusion warhead flattened the nearby town of Cayambe, and everyone on the Stairway project knew that it had been meant for them. In the long run it was actually a boon for the project, since it provided an area that could be mined for trace uranics if needed for exotic grepwork.

Despite the money thrown at the project, which virtually bankrupted its founder, the Dark Days were a rough period. People could not live outdoors for extended periods at the altitude of the base, so all housing and work areas needed to be slightly pressurized (you could go outside with no problem, there are just long-term health consequences). Above the treeline, even the raw materials for grepping food had to be acquired from lower elevations, and the oversized security force ended up becoming professional scavengers and often enough, thieves.

But, the Stairway project survived and began grepping in earnest in 2024CE. Boreholes and trenches for the foundation of a 50 kilometer tall structure were completed, and industrial-scale grep-enhanced diamond nanothread became the go-to material (they have worked out a continuous grep process capable of making unbroken threads several kilometers in length). The tether going into space from the top of the tower would be made of it, and it was used as lattice-work reinforcement in the aluminum-ceramic structural elements of what workers called 'the Eiffel'. By 2031CE the Eiffel is 7 kilometers tall (by far the tallest structure on Earth) and has narrowed to from 170 meters wide at its base down to its minimum diameter of about 60 meters.

The reduction in size would normally mean an acceleration of building speed, but it is now at a height where pressure suits are required, evne for grep-modified workers, and while 13 kilometers above sea level is substantial (mountain + Eiffel), it is not yet above the weather (i.e. thunderstorms) and so it is at the most dangerous part of its construction.

The Stairway's founder is still alive and while he is merely a near-billionaire rather than a multi-billionaire, that is *still* enough money to influence individuals in the outside world. And he *needs* to get some influence because he sees that the project is going to need resources and/or talents that he cannot acquire locally. Feedstocks of trace elements are running low, and the project is using them at a rate which would put a dent in the global supply. In some government circles he is blamed for a bottleneck in the these elements in the years immediately after the Dark Days, since he bought and absconded with significant amounts of them. For instance, pre-grep *global* production of scandium was about 10 tons per year and he *started* the project with a reserve of about 20 tons.

So, through middlemen, his own agents and any number of unsavory procurers, he is attempting to accumulate and consolidate quantities of things needed for the Stairway, then arrange shipment, something that is a lot more difficult than it used to be. And at the same time he is on the lookout for grep-adepts he can hire and new technology he can buy and hopefully reverse engineer. For instance, he does not have a fusion plant yet and dearly wants one. Since it is not something he could easily transport, the plans for one or people involved in fabricating one are the next best thing. Mind you, he is *not* abducting people or threatening them, but stealing things is an entirely acceptable means of acquisition.

This gives the distant Stairway project hooks that can attach to any campaign, but why is it a 'big picture' plot? Well, it is sort of like the 1960's 'space race' or the desire of nation-states to be the first to uncover some sort of extraordinarily powerful alien tech. A group which has cheap and reliable access to space is going to have first shot at the untapped resources of the solar system, as well as more mundane things like ease of satellite launch, lunar colonization, and for those interested in that sort of thing, the ability to lift really big rocks and drop them with precision on anyone you want, anywhere on the planet.

It is both the potential to enrich humanity and the potential to control it. The near miss from a Dark Days nuke means the founder is under no illusions about the "if we cannot have it, no one can" mentality of some people who are probably still in power. There are going to be all sorts of sub-plots involving the Stairway project:

- **assassination:** A deep cover agent is ostensibly a grep-adept who is hired by the Stairway project and will look for an opportunity to kill its founder in hopes that the successor will be more open to national overtures.
- **espionage:** Similar in *modus operandi* to the above, but with the aim of stealing any tech secrets the Stairway project may currently be in sole possession of.
- **sabotage:** Possibly through a smuggled device or through corrupted grep-code, something that will cause a structural failure in the Eiffel, which would probably be a big enough morale and economic blow to kill the project.
- **assault:** Plans are being made for a raid in force, aided by Ecuadoran warlords who have long been unhappy at their ability to collect 'protection fees' from the well-armed and altitude-acclimated Stairway defense force.
- **overtures:** Messages sent through quasi-official channels offering everything from materials to personnel to military advisors in exchange for exclusive outside access to the elevator when it is completed.

Incarnation

One of the things that is being done in secret just about everywhere there is a concentration of power, wealth and intellect, is attempting to recreate Haaren tech. It is being done in secret because the advantage of a large-scale success is like being the only nation to have atomic weapons. *You become the new superpower*. If someone else knows you are doing it, they either want you and your research, or they want you out of the competition.

This is the reason why virtually all privately created examples of grepped alien tech are of unknown origin and have 'steal me!' written in big flashing letters on them. Even the known examples in 'government' possession clearly are not standardized to any degree, showing that even if governments *are* making them, their ability to do so is limited and erratic.

While this secrecy is good for individuals who are researching this difficult and esoteric topic, it is hazardous in a different way. The Haaren and Cryptbian are *not* alive. *But they are not exactly dead either*. The Haaren, knowing that their damaged ship was not going to reach a safe haven for maybe thousands of lifetimes, turned their genomes and personalities and thoughts into information and had themselves turned into grep. A significant amount of grep in their ship contained a little bit of who and what they were. And the reason their ship failed in the first place is because the Cryptbian had *already* done this and had sabotaged the Haaren ship from within. The difference between the two is that the Cryptbian were fighting for vengeance.

The Haaren are xenophobic sociopathic conquerors who all but wiped out the Cryptbian and failed, but not for lack of trying. If the Haaren ship had arrived *intact* at Earth in 2018, humanity would be all but extinct by now. But no one on Earth knows that, and all they remember are the pictures of the dignified Haaren captain in his ceremonial uniform, crumbling to dust.

Neither the Haaren or Cryptbian are conscious entities in the opening of a **Grep** campaign, but they can be motivating forces nonetheless.

Every piece of alien technology that is created with grep brings the Haaren one step closer to reincarnation. And if reincarnated, they *do* know how to recreate *all* their tech. At *their* levels of efficiency rather than imperfect human copies. And most of it is the sort you do not want to be on the wrong end of.

Simply attempting to grep things that require an alien database tends to draw the *original* grep to that person. This is an *extremely* slow process, but tends to be cumulative. Any bit of soup used for even an unsuccessful alien tech grep tends to concentrate alien knowledge, which can both attract more original grep and make future attempts slightly easier. If you think about it like the Manhattan Project, you would not be too far off. You are starting with a raw material (generic grep), and each refinement step (attempt to grep alien tech) concentrates it some tiny fraction of a percent. Any given grep will not make a measureable difference, but if you do it long enough, results can be seen.

This process is slowed even further by the fact that no one knows this is what they are doing. Successes are attributed to luck, and any increased rate of success is attributed to skill.

Two very important things are happening as part of this. First, those who are doing the research and even those in the near vicinity are slowly picking up alien attitudes and biases. They use their skill to communicate to the grep, and the grep is subconsciously communicating back.

However, there are *two* alien cultures and tech bases in play here, the Haaren *and* the Cryptbian. And they do *not* overlap in tech and the cultures hate each other with the heat of a thousand suns. Someone who by chance began a grep based on Cryptbian knoweldge will have nothing to do with Haaren tech, and will be increasingly dismissive of it and contemptuous of those to try to create it. They are 'messing with things they do not understand', are 'a danger to the community' and 'no reasonable person would allow them to continue'. And someone who started with Haaren tech would feel the same about Cryptbian tech and researchers. Again, this not an obvious "I hate Haaren" bias, but is a strong and often rationally argued case against a particular technological development and a bias against those who use it that frequently seems justified by the actions of those people. Think of it like an intelligent, respected political or religious figure making plausible arguments for genocide of his ideological competitors/foes.

Similarly, if you are an elite squad trained in the use of some Haaren-based item, your constant proximity to and use of that item may cause you to act 'with excessive zeal' if you have the chance to use it with someone who triggers your anti-Cryptbian animosity. And the same can be said for the users of Cryptbian tech. Even the rare individuals who have alien tech will find themselves slowly adjusting their attitude towards certain groups or individuals.

This bias tends to politically polarize larger groups for several reasons. First, if alien tech is possessed, it is mostly by the wealthy and powerful, who have a disproportionate effect on politics. Second, even if it is only grep researchers affected, these people are seen as authorities on a subject that others cannot understand, and so some deference and credibility is given to their views. The more alien tech you grep or use, the more your personality shifts towards either a Haaren or Cryptbian mindset.

And all of this is only the *smaller* part of the problem. Remember how we said that soup used for alien grepwork tended to concentrate alien knowledge? Well, *eventually* it is going to reach a point where alien command sets get encoded into the software of electronics, alien memories get encoded into nervous tissue in biogrep, and so on. The Haaren and Cryptbian will be slowly and fragmentally becoming *conscious*. Researchers or those healed or head injuries or modified by grep may find themselves having lucid dreams or insights or even compulsions to do certain things, leading to an eventual grep that reincarnates a Haaren or Cryptbian.

Either of these is bad, but the Haaren would be worse. The Cryptbian would lay waste to Earth if that was the only way to destroy the Haaren, but it would not be out of any animosity to humans. They would just see the extinction of humanity as a regrettable but necessary cost of contain the Haaren threat. *The Haaren would exterminate humanity for the crime of simply existing.*

And both sides are clever and patient enough to conceal the full scope of their ambitions and plans until it is really too late for those who were duped or seduced by their own ambitions to do anything about it. Or as the Haaren might say, "*Promises made to aliens are not binding*." Human frailties can easily play into this. Remember in the movie *Alien* where the Weyland-Yutani corporation wants the alien alive so they can study (and profit from) it? *It's just one alien, how much damage can it do?*

As a long-term plot, this is *far* bigger than Rova and its petty squabbles. It is a *really* big world out there and the likelihood that the most important discoveries and calamities of alien tech are in or near Rova are *objectively* speaking, vanishingly small (Rova is about 1/15,000th of Earth's land area). Of course, drama is where you find it and it is the nature of roleplaying games that the interesting stuff tends to happen where the *adventurers* can be a part of it.

But *how* it unfolds is up to the gamemaster. Are people in the campaign area slowly becoming polarized and hostile towards each other? Are DC and Rova about to get into a shooting war because of competing alien research, a slow escalation that takes years of game time to come to a head? Or will the first time anyone hears about it be when mutant human-alien cyborgs come pouring out of the Rocky Mountains and tales of unspeakable horror arrive on the lips of the millions of refugees fleeing eastward?

In game terms, working on, constant proximity to or possession of alien tech will result in a slow personality shift that favors one side and distrusts and dislikes the other. The level of this trait will be a maximum of your Fate (which reflects the amount of grep in you). The rate of this would be something about like 1 level every six months or so. If you increase your Fate while you have an existing modifier, the personality modifier automatically goes up by 1 and is *permanent*. If you go cold turkey from alien tech, any non-permanent modifiers drop off at the same rate they went up. Having a bit of alien tech you keep locked in a safe and rarely bring out is not a problem. Trying to grep something alien once or twice a year is not going to turn you into a hate-monster. But having your life sustained by an alien-grep artificial kidney or being on the operational staff of an alien-grep fusion plant is another matter.

With the personality shift that comes from long-term exposure to alien grep or tech comes an equal degree of insight into how to grep alien tech. Each point of personality shift is a -1 to the difficulty of grepping alien tech of that type (Haaren or Cryptbian). This makes these people, despite their eccentricities, *extremely* valuable. If money or power has to choose between 'half-crazy guy who can work grep miracles and make us a fortune' and a guy who says 'that sort of grep is dangerous and you need to stop doing it!', then Security will firmly introduce the latter guy to the door. And after they do that a few times, then they will *open* the door and throw him out.

One of the things about the Haaren and Cryptbian that will affect the way people think about them is how they *look*. One of the classic images of the Haaren is the ship's captain, taken moments before the Haaren ship disintegrated. Clearly alien but also clearly humanoid, sitting in a command chair in a dress uniform. Dead, but dignified, even handsome by human terms, doing his duty to his last breath. It was an image that appealed to a broad spectrum of personality types. SF geeks ate it up. The military liked the implication that the ship had weaponry. Everyone liked the idea that intelligent life from some distant star still had two eyes, two arms, two legs and a face that did not hurt to look at. But when the first Cryptbian images start surfacing inside the code of a grepped device based on their tech? *That* is another matter entirely. The Cryptbian are alien slime molds. Amorphous blobs that look like something a surgeon would pull out of a cancer patient, they are the sort of beings that would make baby Jesus cry to look at them. Sadly, if there is a good alien/bad alien comparison to be made, the Cryptbian are the *good* ones. They do not actually hate us and would not go out of their way to destroy us if they were able to manifest in quantity. It is just that the Haaren *have* to go, and if the Cryptbian have to blow up themselves and the planet to do it, they consider it worth the cost. The Haaren, for all their aesthetic dignity, are militaristic xenophobes who in the long run *will* exterminate humanity.

The Thirty

The Thirty are so secretive that even they do not know who all the other members are, which is probably a good thing for them, since they generally want to kill each other. Among themselves they believe that some initial contact with grep shortly after the Red Square incident has made them 'special', and indeed it has. While their own conventional grep talents are merely average or even below-average, they each have the ability to manipulate what the grep in another person does. Specifically, they can bind the grep, its information and ability to transmit and receive to certain neural pathways. It is *not* magical and it is *not* easy, but it is pretty close to telepathy and mind control.

The Thirty work behind the scenes, staying as mundane and non-descript as possible to avoid detection, but over the past decade they have insinuated themselves into the halls of power and while it is difficult for them to make an absolute puppet of someone, gently steering them towards a particular course of action by virtue of reading their thoughts and knowing their desires is not that difficult at all. Being able to imperfectly eavesdrop through that person's senses also has obvious advantages, but is more often than not used on people who might be the political enemies of the one whose political ambitions are being fostered.

Initiating this ability requires physical contact for several seconds, and then can take days or weeks to fully take root. So, it is not something that can be done trivially to those who are surrounded by guards and who are important enough that simple access to them requires appointments and sufficient importance for said meeting to even take place. This often requires a member of The Thirty to work their way up through a chain of increasingly important people to get to their eventual goal.

The ability has other limits. There is only so much extra input their mind can handle and they generally have no more than half a dozen people in various states of manipulation and eavesdropping.

What The Thirty know about themselves and each other tends to make them rightfully paranoid. The few who know each other have discovered that they each have come to the conclusion that *their* personal agendas could be being manipulated by grep in the same way that they manipulate others, but they have no solid evidence of who or what this might be (e.g. *"I can influence other people without them knowing it, but am I being influenced without knowing it?"*). They know that they dislike the other members of the Thirty and if given the chance would eliminate them, but are not sure if this would genuinely eliminate the perceived threat or whether a new member of The Thirty would spontaneously arise. For now, they are seemingly content to expand and consolidate their respective power bases and are seeking to find a way to permanently contain or eliminate a member of The Thirty, while simultaneously trying to make sure that any way to do this is kept absolutely secret, lest it be used on *them*.

At least three of The Thirty were in or near Red Square on the day the Haaren ship crashed, but the rest have no measureable ties to the event. They generally believe that some bits of grep are more important than others and that somehow The Thirty have this special grep.

The wider world knows little to nothing about the existence of The Thirty, let alone their agendas. A few conspiracy nuts see patterns in events that they attribute to a secret cabal, but even though they are right, conspiracy nuts have *always* seen patterns in events that they attribute to a secret cabal. A few even attribute the actions of the Thirty to secret manipulation by 'psychic grep vampires', so that gives you an idea of how seriously people are taken if they start talking about the Thirty.

In game terms, what The Thirty can do is similar in effect to the Haaren/Cryptbian grep influencing the behavior and attitudes of those who have it. A person will be more inclined to be cooperative or friendly with that member of The Thirty, to pursue objectives that the member of The Thirty wants pursued, and so on. The same level of influence is also an effective Awareness into that person's mind, either for rummaging through memories or for real-time eavesdropping on that person's senses, though this is limited to a range of a few kilometers. Within this range, direct subconscious suggestions can be made, things that are not quite 'direct orders', but more of a influencing the way the person chooses when a decision has to be made, like "you have a bad feeling about the guy you are talking to", or "let's take a right at 11th street instead of 12th street'.

Occasional contact is needed to maintain or strengthen the bond, otherwise it will fade over the course of months. A member of The Thirty can deliberately hasten the process if they wish to 'unprogram' someone so they have room in their head to add someone else, but even the delilberately hastened process takes at least a month.

In campaign terms, the exact purpose and origin of The Thirty is one of those things that can be figured out by the gamemaster during play. A few possibilities are:

- The Thirty are an amalgam of the human being and a partial personality of either one of the Haaren crew or a Cryptbian saboteur. Not as monomaniacal as either of the alien races in the Incarnation plot. They are more a personality and attitude instead of intellect. While they lack the technical intellect to rebuild alien tech, they could have great insight into the situation and as long as the human part of them is dominant (even if the human is a rat-ass bastard), they would ultimately be on the side of humanity.

- Not all grep is the same. There is the grep that interfaces with the nervous system and this is different than the assember-disassemblers that do the bulk of grep construction (though all grep can replicate itself). The Thirty have the 'managerial' grep. Like your grep tells the manufacturing grep what to do, the manager grep can tell *your* grep what to do. It is the master programming modules for grep, and presumably is the vector through which the Cryptbian modified it to allow their own (and indirectly, our) use. It could be that what The Thirty do with it is as far as it goes, or it could be that they simply do not know the power of what they possess. But the Haaren and Cryptbian *would* know, and if they became aware again would move heaven and earth to get a hold of it. So perhaps both the secrecy and desire to gain power that The Thirty share is a subconscious survival mechanism (hide and arm yourself). Maybe the Thirty do not *consciously* know what is coming, but are preparing for it nonetheless.

- The Thirty just happened to have the right mindset and a natural affinity to use grep in the way they do. It is a talent that is exceptionally difficult and they just happened to be lucky. Their desire to manipulate people, remain in the shadows and fear/hate others who might pose a threat is merely part of the mindset that makes them able to use grep in this fashion. Though coincidentally, these personality traits correspond fairly well to the Haaren mindset as well.

The Thirty(again)

The Thirty in slightly different form can also be used as a completely different focus for the *entire* campaign. Give the Thirty virtually supernatural but not unlimited grep abilities as described earlier, and have them *fully* in place at the start of the campaign. All the city-states are effectively under their thrall, with entire armies acting as extensions of their will. Able to perceive through the eyes of grunt soldiers and generals alike, their tactical abilities are unmatched, and they are limited only by having nearly reached the maximum number of people they can influence.

So, they run their city-state either overtly or from behind the scenes, and the city-states are held in mixed but almost universally negative regard by everyone else. The city-states have low crime, are efficiently run and economically prosperous, but their officials are somewhat creepy and the populations seem so artificially cheerful that is it is like they are afraid to be seen as unhappy (dissent gets you noticed and then suddenly you change your mind and become a loyal supporter of the regime).

At the start of a campaign, the Thirty have just finished cementing their local power base and have gotten over any abortive attempts at outright conquest of the surrounding territory. Now they are trying to extend their influence by proxy, trying to take over local governments and get 'cooperation' through means that government's people would see as acceptable. Even with their powers, this is not an easy task or foregone conclusion. Range *does* reduce the level of control they can exert, so they have to be subtle in their influence and will spend some advance time looking for people whose inherent personality makes them more likely to be nudged in the direction that member of the Thirty wants them to go.

But as before, all of the Thirty seem to be hostile to the others, or grudgingly cooperative if it is in their perceived best interest. So, if there is a member of the Thirty who wants to influence Rova in hopes of eventually bringing the entire Shendandoah Valley under his or her sway, then the member of the Thirty who is running Atlanta or New York City or even London might be putting agents in place to counter those efforts. Remember that **Grep** is *not* a Mad Max wasteland for the most part and that Rova has scheduled international airline flights at least once a week. So, agents, counter-agents and mysterious distant patrons with unknowable motives are all there for adventurers to deal with.

The machinations of the Thirty and their ubiquitous dislike of each other is a quite destabilizing influence on the world that most people just see as 'business as usual'. No one who was alive before the Dark Days sees anything odd about power blocs hating each other for apparently trivial reasons, or working against the reasonable aims of someone just because they look a little different, talk a little different or live on the other side of an imaginary line on a map.

In the long run, *all* of the Thirty have to be deposed. Not just that, the power the Thirty represent or contain or are being controlled by has to be neutralized or contained. It would not do any good to kill a member of the Thirty just to have a replacement spontaneously appear somewhere else a few months later.

So, discovering a means to do this has to be on the priority list for anyone opposing them, and this could involve grepping alien tech, which has its own problematic side effects. For their part, the Thirty seem to recognize that alien tech might be their weakness, and their general anti-grep policies may be equal measures of fear of any grep that is not them, and desire to control any grep that is not them.

In game terms, the level of control this variant of the Thirty have is much more overt, and the best defense against it is having a good Fate (your own natural affinity with grep). You can set a base difficulty for the range from that member of the Thirty and the time interval after being 'infected', and the conditions under which this can happen, after which the person gets a roll on their Will+Fate to resist it. Say:

Base difficulty	15
Distance level for -1 reduction(10km)	-1
Time level for +1 difficulty(1 week)	+1

Failure means that the person is unconsciously under the thrall of that member of the Thirty. They *think* they are the same person they used to be, and have justifications for any changes in attitude they have, but they are now doing the things they do in support of someone else's agenda, even if they are not being micro-managed. In addition, that member of the Thirty can see and hear through that person with sufficient clarity to make them a really good infiltrator into enemy organizations.

Practically speaking, you set it up so that anyone in Rova (distance modifier of -6) with a Will+Fate of 15 or less likely fails the roll within a few months (+4) to a year (+6).

There would be two possible counters to this process. The first is making three resistance rolls in a row, which means your internal grep boots out the Thirty grep and you are back to 'normal'. The other is that a *different* member of the Thirty tries the same with you. The two sets of invading grep fight it out in what looks like a psychotic breakdown in the target, and in the end only one is left in place at the initial difficulty level, from which resistance rolls can be made again. But note that getting rid of one means you still have the other, at least until you resist *it* three times in a row. Bystanders could easily misinterpret control by the other member of the Thirty as a person's gratitude for being saved from the clutches of the first one...

Other campaign notes

This section is things that are not unique to the Rova region but can apply to just about any **Grep** campaign.

Population density

One thing that may be slightly hard to grasp is "how do you go about hiding important stuff in a world that has most of a billion people in it?" While a billion is a *lot* of people, the world is a *big* place. If you say that ninety percent of the people live in urban areas, then divide up the rest (100 million) across the land area of the planet gives you an average density of less than 1 person per square kilometer. When you consider that most of the non-urban population is still slightly clustered (a farm family of four is going to be centered on their farmhouse and fields), the actual density is even lower. In areas not that suitable for human habitation, the density is actually near zero.

You can tailor the Dark Days to have whatever population decrease you want to generate the emptiness you desire. All it would take is a nasty bio-weapon being released at a time when the ability to contain or treat it was next to impossible. You want the population to drop by ninety-nine percent? *Then just make the 'grep sickness' really, really lethal.*

To put that into perspective, a die-off of ninety percent during the Dark Days would leave the world with a population of about 700 million people. This is what the world population was in 1750CE. That is, before the Revolutionary War and westward expansion in the United States, before the source of the Nile was discovered in Africa, before Darwin's voyage, before the first Europeans set foot on Hawaii or Tahiti (or got killed there by angry natives), before the first landfall is made in Antarctica, and before the great peaks of the Alps or Himalayas are climbed. So, you could still have a lot of people in the world, but as long as they are fairly concentrated you can still have a *lot* of unknown territory.

Regardless of population there is also the practical matter of human habitation. If there is nothing there that people want, there are unlikely to be people there.

Unknown territory is also more than mere abandonment or inhospitability. Look at your own life. If you are working, look at every street you pass on your commute that you have never gone down. If you are a college student, look at every highway exit you have never taken on your way home. Unless you have a reason, there are countless places you choose not to go, even if they are close and readily accessible. If you work in an office building, how many floors of that building have you been on? How many buildings on your campus have you never set foot in? How many stops on the subway have you never stopped at? While these places are certainly not new to everyone, for purposes of 'adventure' they are new to *you*.

This is even more true in the somewhat more dangerous and chaotic world of **Grep**. Even within the Rova campaign region, there could be populated areas within an hour's drive of Interstate 81 that have only had a handful of visitors in the past two decades. There could be abandoned towns with nothing but a deranged hermit, a crumbling industrial park that is home to a growing pack of war-grepped hyenas, an apocalyptic cult living quietly in the hills and just as quietly cannibalizing anyone who stumbles across them, and so on. And if any of these come to light, there will be official wringing of hands and 'how could something like that happen here?', but this would not stop the same thing from happening again elsewhere.

The 'nice' thing about the Dark Days being less than a decade ago is that all of the bad things can still be lurking out there, and the ones that survived are smart. No one knows about them because they avoid those who can hurt them, and leave no witnesses among those who they prey on.

Human motivations

You can never underestimate the power of irrational people in positions of influence or that of stupid people in large numbers. Or even the disproportionate influence of individuals with these qualities who are in the right place at the right time. Look at how recent history has changed because twenty people hijacked airliners on September 11, 2001. World War 1 started because of a lone assassin and major nations deciding that starting a global war over the treaty implications of that assassination was the right thing to do.

While adventurers (and players) may be 'rational actors', there are plenty of people in the gameworld who are going to act out for reasons that are not rational, hard to predict and who cannot be swayed from their course of action by things like facts, rationality or logic.

Much like things are in the real world.

Just remember that by definition half the populations is below median intelligence or has above average gullibility, and adventurers are going to rub shoulders with one or both groups on a daily basis. And these qualities do *not* stop someone from having a normal or even an important job. The 'biased and intransigent' bureaucrat, the 'conspiracy nut' or the 'fearful do-gooder' who is so easily terrified of some imaginary 'them' that they willingly support actions against others that they would never support against themselves. Competing groups of these people are generally known as 'political parties' and drive enough real-world drama that it would be a crime to *not* include them as a factor in your campaign.

Scrounging

It is not the majority of people by any means, but a *lot* of people get by on basic scrounging. During the Dark Days, scrounging for just about everything was half of survival. Food, fuel, batteries for flashlights, bullets, coffee, you name it. People who could reliably grep necessities were rare enough. Spending extra grepping time trying to make coffee beans or condoms was just not practical, so people scavenged, or bought or traded for things that other people had scavenged. After grepping became common and reliable enough, scrounging moved to things very hard to grep, like electronics and medical supplies.

In the present-day, scrounging is usually one of two extremes. First is the equivalent of homeless people, who scrounge low-value stuff to trade to commodities dealers, or who scrounge the raw materials they need to grep food, clothing, drugs and liquor. They are the equivalent of the crazy guy with a shopping cart full of tin cans. These people are mostly harmless. Young and unskilled adventurers could fall into this group as a starting point, and roving about and living off the land is an excuse to get them to a place where interesting things can happen. However, it is not really a long-term career or adventure option.

The other type of scrounging is a bit more sophisticated and is actually a respectable profession. Because of the extreme drop in population and lack of laws, there are a lot more luxury goods and specialty items per person than their used to be. But all the easy to acquire good stuff has already been taken. Everyone who wanted a Ferarri has already raided the dealerships. If you want a 2020 model year compact car, no problem. If you want a 2020 Tesla Model S, you are out of luck. So, there are people, small groups and even companies that specialize in tracking down, securing and transporting pre-Dark Days items for a fee.

While you could *theoretically* grep a 1967 Shelby GT350 Mustang, it would probably be cheaper *and* easier to pay someone to find a real example in passably good condition and then restore it using grep. So, if someone is willing to pay the equivalent of 60,000 Credits for one of these, this covers several weeks of salary and travel time for a small crew and leaves a decent profit margin. Or, if a hospital needs a new MRI machine because their old one crapped out or because they have enough business to install a second, that is a multi-million dollar machine. Acquiring the desired model, packing it up and transporting it could be the biggest haul of the year for a small company. Unless someone else gets their first, or takes it from you after you get a hold of it.

Look at the opening scene in the first *Indiana Jones* movie. Indy is plundering a tomb in someone else's territory to acquire something for a museum, and he gets robbed by Belloq, who is selling the antiquities for a profit.

Adventurers could run such an outfit, work for such an outfit or be freelance 'finders' who locate things for other crews to dismantle and transport. This can also extend to unusual and or dangerous raw materials. If someone needs some $Cesium_{137}$, there is not that much of it lying around, and it is dangerously radioactive.

This second sort of scrounging runs the full spectrum from legitimate to the opposite. If the only example of what you want belongs to someone else, in a different legal jurisdiction, then 'scrounging' it from its current owner and scooting across the border to where you cannot be prosecuted for the theft is most definitely something that happens. There are a handful of wealthy rivalries where ownership of a particular item is for the sole purpose of annoying the other person, even if the item in question could be grepped in identical form, a sort of "I have it, come and get it" challenge.

Commerce

In the real world, anyone can make a bag lunch, but food trucks and sidewalk cafés are still packed with lunch hour traffic. The same sort of thing holds true in **Grep**. Just because people *can* grep something does not mean they *do*. The Dark Days meant that a lot of people had no choice. People grepped because it was 'grep or die', just like people throughout history have improvised and tried desperate measures to survive when things got really bad. But after two decades, enough normalcy has returned that people are willing to pay for convenience. Grepping is a marketable talent, but you do not *need* to do it to make a living or survive. What it did and continues to do is make long distance transport of anything other than bulk raw materials economically impractical.

Unless you are really good at it, grepping almost anything takes at least an hour, and if you are smart, you stay close enough to check up on it during the process. So, there are plenty of jobs and careers that pay people enough for them to pay full-time greppers to do things for them. And for many greppers this works out, because grepping a *batch* of things that you can sell *individually* is a win-win. It costs you less effort per item and you can sell each of them for a profit.

So, there are plenty of specialty greppers who may have a local market, but who are also good enough at what they do that it is worth it to ship their products some distance for resale. If you have a nice pre-grep rifle and want ammunition certified to be sized within a few hundredths of a millimeter from factory specs, you could try to grep your own, or you could just buy a box or a case from some outfit with a Radford Arsenal stamp on it.

There are a number of low-level adventure possibilities or hooks that derive from all this. Stuff with value is a target for theft. The harder it is to make, the more attractive it is. So, a company may not have a full-time guard service, but will contract out for hired guns when a big shipment has to travel a long distance. This is the post-Ruin equivalent of 'caravan guard' as an adventure hook. For some long distance travel, people going the same way will tag along to gain the benefit of armed security without paying for it. While most guards are contractually obligated to not help anyone other than the client, some clients do not object if overall security for them is not compromised.

Another thing is that bulk goods are hard to steal, and bulk carriers can add no-frills passenger capacity with little problem. A train carrying scrap iron or recycled plastic can add a few passenger cars. So, this is a travel option for adventurers that could bring them in contact with other frugal travellers.

As a variation of scrounging, adventurers might be involved in some sort of raw material commerce. If a grepping outfit wants to work out of place X and their primary raw material comes from place Y, then they will regularly need shipments of it. It is not often that you have a case of highway robbery for bulk materials. Who is going to steal a flatbed full of crushed cars from the grepper who makes custom I-beams? But the transport does involve travel and meeting people and hearing things, so it is a possible place to start.

Think of grepping like it is a magic talent that anyone can learn, but some are naturally better than others and it takes years to learn how to do it well. If it is more cost effective for you to take your time to do something else and pay someone for grepped goods, then that is what you do unless you like grepping. If you are a highly paid brain surgeon, you can still learn to be a mechanic and repair your own car, but odds are you simply pay someone else to do it.

Food

A farmer in pre-grep America could with the aid of machinery, fertilizer and chemicals, feed about 150 people. A person with a grep roll of 4d+2, average raw materials and good soup stock can, if they want a 90% success rate (difficulty of 11 or less), have a reliable power supply and work 8 hours a day, feed 32 people (assuming an average person eats 2 kilograms per day).

base difficulty (32kg biological)	23
complexity(purity): average	+0
complexity(combinations): common	+0
complexity(relative): average	+0
danger: none	+0
resources(quality): average	+0
resources(energy): whole-house current	-6
time: 4 hours (do this twice a day)	-4
compatibility: standardized	+0
soup starter	-2
final difficulty	11

Use of totems, skills specializations or grep affinity can improve this, with the benefit that the food can be grepped in an urban area, or in some cases in the back of the store that sells it!

In the early part of the Dark Days, levels of starvation varied greatly. Those completely reliant on imported food and who had to walk through freezing conditions to get anywhere that did have food, fared very poorly, very quickly. Those in places with a lower population density or near a distribution warehouse for food did much better and had a longer window before they had to rely on grepping for their daily bread.

And in the first late spring after the worst winter, those who could planted and worked to rebuild their decimated herds, which gave people an even longer window to become food greppers.

By the time a campaign starts, food production is in two main forms: actual food, and raw materials. Quick to grow, easily convertible stuff like sawgrass is harvested, turned partially into fuel to run tractors and combines, and partially into stuff that has a variety of local names, but is really just 'people chow'. There's brownish chunks with a meaty texture and flavor, yellow ones that are corn-ish, white fluffy slabs that are a reasonable substitute for bread, green *things* that are reminiscent of beans and reddish cubes that are not quite apple chunks. These are what you eat if you do not have the money for anything better. They also have the advantage that they do not spoil as fast as regular food and you can grep them directly as sealed packages with a good shelf life. As a result, they make good travel food and soldiers everywhere *despise* them because a sealed pouch of grep chunks is normal field rations.

The rest of food produced is more or less the same as normal for a particular agricultural zone, with leftovers (stalks of wheat, etc.) going to 'people chow' or secondary needs like fertilizer. A farmer's efficiency is not up to pre-grep '150 people fed per farmer' levels, but it is still pretty good. Between the grepping needed for agricultural raw materials like fuel and machinery and fertilizer, grepped food and conventionally produced food, a first-world country supports about 30 people per person in the support chain. That is, farmers/herders, supporting family members or hired help, food greppers, fuel greppers, fertilizer greppers, machinery greppers, transport drivers, etc. Agribusiness is still a thing, but the days of shipping fresh produce from California to New York are over. Businesses are much smaller and local to the areas they serve.

The biggest difference between the pre- and post-grep world is that major urban areas have several large-scale grep operations in the city itself, recycling organic material into either food or raw materials for related greps. Most people do not like the notion that their sewage treatment plant is the front end for the production of 'soylent brown', so there is usually the belief that trash and other waste is turned into fertilizer and sent to the farms, while only 'good' organic waste like table scraps and leftovers from the fish market is grepped into actual food. *Whether this belief is true or not depends on the locality.*

Daily life and grep

People fall into one of several groups when it comes to grep:

- those who have to grep
- those who want to grep
- those who do not want to grep
- those who cannot grep

Let's get the *last* one out of the way first. This is by far the biggest group of people and is between eighty and ninety percent of the population. With rare exception, everyone has the *potential* to grep (unskilled default on Will), but unless you actually work at it enough to make it into a skill, it does you no good. You are like a person who watches Formula One races compared to someone who competes in one. Those who cannot grep are a higher percentage in most of the city-states, among the old and among those who have a religious objection to it, and a much lower percentage among the young and for populations living in extremely marginal or hostile environments. The relative stability of life by the start of a campaign means that those who never had the inclination to learn grepping can still lead normal lives.

those who have to grep: This group is a fraction of a percent of the population. And by 'have to', we mean 'you will die if you do not'. This is for people who are some combination of destitute and living in harsh conditions, where you either need to have a very good ability to scrounge, or a moderate ability to scrounge and grep to make up the difference. Or, it is for people so far from civilization that grepping is the *only* way to acquire things like fuel, ammunition and spare parts. People living in Arctic climates or deserts or the ruins of Las Vegas would be a good example.

those who want to grep: This group is most of the people who can grep and is about ten to twenty percent of the population in most areas. It also includes people who grep even if they do not *like* to all that much, because grepping is their job. Anyone who has a grep skill of +0d or more has enough of a desire to do it to have practiced at it for a while, and anyone with a skill roll of 3d+0 can with a little work, do entry-level grep work like trash sorting. Even people with low levels of skill might specialize in something that interests them and that might be the only thing they ever grep. Note that you can be a 'grep hobbyist'. Serious greppers look down on you, but you can get a +1d level of skill for only 1S. They might only keep 'best 2' instead of 'best 3' on their rolls, but if they start with a Will of 2d+2 they are rolling 3d+2 and dropping the low die. So, they have a pretty good chance of doing stuff with a difficulty of 9 or 10. They will never be able to 'take 2's' to succeed, though.

those who do not want to grep: This is those with a religious or other culturally ingrained opposition to grep, or those with wealth or status. Most residents of city-states like DC are morally opposed to grep because *"It is a dangerous technology that should not be toyed with by civilians. This is not the Dark Days anymore, no one needs to grep."* Basically, take *any* knee-jerk ideological position from the country *you* live in *now*, substitute in 'grep' as the bogeyman and you are set to go.

There are also those who consider grep to be *genuinely* evil and who do not practice or condone it for that reason, though both groups seem to have a temporary change of heart if they or someone they love need the benefits of grep for some reason. So, the guy who curses you as a witch for using grep might be the one knocking on your door after his daughter was mauled by a rabid dog and you are the only one who might be able to come up with some anti-rabies shots.

The last of the 'do not want to grep' people are those for whom it is seen as a diminishment of their status. Naturally produced or normally manufactured goods are in most cases more expensive, and so it is a measure of status to *not* use grepped goods. These people might actually know how to grep, or even have a job involving it, but they do not bring their work home with them in that regard. *Real* steak and *real* wine poured from blown glass bottles and eaten off of genuinely fired and glazed china is a sign that 'we are better than normal people'. It is nothing more than pre-grep conspicuous consumption moved to the post-grep world.

The extent to which grep is indirectly part of your daily life depends on where you live and of course your social status. If a natural resource is readily available, its grep equivalent is unlikely to be found. *No one on the Maine coast greps lobster meat and no one in Florida greps alligator leather.* But in most places vehicle fuel is grepped. In Rova, almost all ammunition is grepped. Advanced medicines and recreational drugs are almost always grepped (marijuana is an exception). There will be some combination of difficulty of conventional manufacture, price, distance from a manufacturing plant and demand for the product that determines whether an individual good ends up being made the old-fashioned way or grepped.

How did it go wrong so badly?

Sitting in the comfort of your home, there may be some disbelief that civilization as you know it could fall so quickly and that the population could crash so dramatically for any reason short of a major asteroid strike. To put things into perspective, remember that in the 'first world' (nations like the United States and most of Western Europe), eighty percent of the population is urban. Of that eighty percent, the top 50 cities in the United States account for two out of ten, and a total of nine out of ten live in areas with 50,000 people or more.

There are over a hundred communities in the United States where the population density for people living there (not just working there) is 4,000 per square kilometer (≈10,000 per square mile), or *at least* one person per square of land 15 meters on a side.

All of this matters if we put it into perspective with any fantasy setting that takes these things into account. In a medeival world, *each* person living in an urban area is offset by twenty or so farmers and dependents. Farming was so inefficient that it took *multiple* farmers to support each person who was not one. On the other hand, if you add up all agricultural workers in the United States *and* all the people in related industries (food processing, food distribution, etc.), only one person in eleven is doing that sort of work. So, you have about nine urban people and one rural person supported for each person in the 'food chain', and actual farmers are only about one percent of the population.

A major city like New York City imports just about everything. Food, fuel, water, most durable goods, etc. If the 13,000 food retailers in New York City do not get 80,000 tons of food each day (12,000 tons of which are from overseas shipping), then shelves will empty faster than they are refilled and when they are completely empty people will start to go hungry.

Similarly, New York City uses about 4,000,000 tons of fresh water, 10,000 tons of gasoline and 120 million kilowatt-hours of electricity. *Each day*.

It does not take much of a disruption in any of these sectors to cause a *major* problem, and a long-term snag in any of them is going to be *catastrophic*, as we described with the **Los Angeles** example (page 2.7). Without water, people either die of thirst or use probably unsafe sources. Without food, they go hungry. Without power, they have no lights, no traffic lights and no subways. Without fuel, vehicles are stranded and deliveries cannot be made. And while the slow-motion disaster of grep did not absolutely cripple any one of these, it did affect *all* of them. And when combined with human nature, it became a global tragedy. Fuel-less vehicles blocked streets, forcing those who wanted to leave to walk. Law enforcement could not adequately stop looters, fire crews could not extinguish blazes. Food deliveries that did make it to the outskirts could not be delivered to where most of the people were. The islands of normalcy that had backup generators or gravity-fed water supplies or which had more food than average, lasted until one or more of these ran out or was overrun by those who wanted what someone else had.

It takes a while to starve to death. Even in cold weather. Even when you are eating anything remotely edible to stretch things out. But if like ninety-nine percent of the population, you have no skill or knowledge of how to hunt or trap or find edible plants (and no internet to look it up on), then eventually you *will* starve. Or you will learn how to grep enough food to survive, or link up with someone who can and have a skill useful enough to keep you around.

"Nope, don't need no investment banker. Same for your trophy wife, your prep school kid and that pampered pooch you brought with you. Let me take that back. We'll give you a hot and cot for the night and send you on your way in the morning...in exchange for the dog."

Area like Rova are somewhere in between the extremes of scarcity (Las Vegas) and abundance (a tropical coast). Not so far north that they completely lost the growing season of 2022CE (what people called the 'Frost Line' was somewhere around the northern border of Pennsylvania), and not so urban as to be unsustainable with huge imports of food and water, it was just snowy beyond living memory and beyond the ability of road crews to plow. Ice storms brought down power lines and countless thousands of trees, freakish cold snaps during the rare clear nights froze and ruptured underground water mains, outdoor propane and natural gas tanks were too cold to run furnaces, and firewood supplies good for a normal winter were exhausted in January and two or more meters of snow on the ground made getting more problematic. People starved, people froze in their homes, people got stranded in blizzards and died of exposure, people got into fights over limited resources, people accidentally burned their houses down or died of suffocation from generators or improperly used gas or kerosene heaters.

A lot of people died. Just not nearly as large a percentage as died in Los Angeles, but a larger percentage than died on Barbados.

The Frost Line is a term with several international equivalents, but in the United States it represents a zig-zag line across the country where almost everyone outside of a city and north of that line died. The loss of infrastructure, herds and more than a full growing season meant that you almost had to grep in order to eat, and anyone not grepping was busy collecting things to burn in order to stay warm, or lived in groups in insulated interior rooms where shared body heat could accumulate in useful quantities (which had later social implications). City-dwellers who could grep had the advantage of better facilities and larger support networks. Combined with the normal urban/rural population distribution, countrysides north of the Frost Line were hit proportionally harder, while in warmer climates the reverse tended to be the case.

Children and grep

Every generation of parents has something they want to keep their kids out of. Sometimes it is the old standbys of sex and liquor, sometimes it is something new. Drugs, trashy novels, rock & roll music, cigarettes, role-playing games, the works. Grep is the new thing parents are worried about their kids getting caught up in.

How it is dealt with is both a cultural and personal affair. In places loike Lynchburg and DC, the attitude is 'just say no', with the difference that one is based on religious reasons and the other is couched in more rational reasons. The latter of course is genuine. Even if they are trying it in plastic milk cartons set out in the sunlight for energy, you can still make poisons instead of drugs, methanol instead of ethanol, unstable high explosives, all sorts of bad stuff. So even parents in permissive areas who approve of grep and see it as a useful and desireable thing for their kids to know, *still* want to make sure it is done responsibly and only when the child is mature enough to understand the risks involved. A good parallel would be the modern American cultural divide on firearms between rural conservatives and urban liberals.

Regardless, *because* it is forbidden it has an allure to it that sometimes gets kids in trouble or puts them in harm's ways.

In areas where it is formally taught, lessons begin in school probably around the 7th grade (≈age 13), starting with theory, a few basic demonstrations and written exams, and then moving on to lab work and even 'vocational' training for people who probably cannot handle college but have enough grep aptitude to get a job in a speciality grep field. These school courses give young adults the knowledges to tell good food (or alcohol) from bad, warning signs of a failing grep, dispelling myths about grep and basics on not electrocuting yourself with grep power cables.

The other aspect of children and grep are those who were children during the Dark Days and learned these lessons not in school, but the hard way. The characters in the vignette (Will and Lenha) are orphans and maybe nine or ten years old during the Dark Days. Young enough that only the worst of the memories still haunt them (and are not spoken of), but old enough to start learning grepwork, if only in terms of scavenging for raw materials. After their mother died and the group they were part of fell apart, the two were on their own and had to scavenge and grep to survive. They were lucky and got good enough at both to do so even without adult assistance, though they did get to Rova during the last part of the Dark Days and were taken in by what passed for the government and sort of watched over from a distance by Geezer, for reasons unidsclosed and whose oversight was subtle and remained unnoticed.

The attitude of Will, Lenha and most others in their age group who spent the Dark Days outside the city-states is 'anything goes' as far as grep is concerned. They did what they had to do to survive and if the people who were not there to protect them want to criticize them after the fact, then they can (insert the action and anatomical part of your choice). This makes them a bit less acceptable in polite society and they are often loners or only comfortable in the company of others like themselves. These self-taught outsiders are the ones likely to be living in communal groups on the outskirts, experimenting with things that they are good at, but really do not fully understand.

More on daily life

Grep could have ushered in a golden age of prosperity and interplanetary expansion for humanity. The problem is that grep fell into the hands of humans instead of a *rational* species. Governments wanted a monopoly on the technology or wanted to ban it entirely, while too many individuals saw it as a means to express hate, selfishness or avarice. And the combination of ham-handed government policy and petty human short-sightedness made the world go down in flames.

So, what is life like for the survivors circa 2031CE? If you read through the descriptions earlier, you see that in a lot of respects it is not all that much different. Grep has *not* turned the world into a wasteland full of tattooed cannibal grep-bandits who want to break you down into your component elements. People still shop, commute, work at a job, go to school, raise families, complain about politics and the weather, and so on.

People still use money, so there are still banks. Banks need tellers and loan officers and guards and janitors. Someone has to run the water and sewer and electrical and phone service that supplies the bank. Police protect the streets, fire brigades are on call, hospitals and clinics need staffed, and so on. Not everyone can grep or wants to grep. If you have a choice between spending an hour to grep gas for your daily commute or working for an hour to get enough money to buy enough gas for a week's worth of commuting, you do the latter. You can grep yourself a lunch, or buy a sandwich from a street vendor. Grep is the ultimate do-it-yourself technology, but many people still prefer to spend money for the convenience of having someone else do it for them. *Anyone can change the oil on their car, but we still have successful businesses that do nothing but provide the service of changing people's oil for them.* And grep is the same way.

The big difference is that after consumables, there is a lot more stuff out there than there are people to use it, and this state of affairs will probably continue for at least another decade or two. You might have to grep petrol, but finding a new car is as difficult as going to a car dealership and picking the one you want. You might have to grep bullets, but in the United States there are at least a dozen guns in circulation per adult, and that is *after* accounting for those lost or destroyed during the Dark Days. In places like New York City, Chicago or San Francisco gun ownership was much lower and during the Dark Days many of the guns in these cities were primitive grepped models, but by the start of a campaign, trade has allowed surplus to make its way any place there is a profit made by getting them there.

What this means is that the manufacturing side of the economy is limited in sectors where there is still a surplus. The grep examples listed walkie-talkies and smartphones, but you can still rummage around the back room of a WalMart or Best Buy or some cavernous Amazon warehouse and find these things still in the shrink-wrap.

So, the economy has a huge scavenging sector and related service economy that takes the place of most manufacturing. For instance, say you used to run a business that sold tires. Today, you can still run that same business. You have a smaller staff and do less business (because there are fewer people and they do not drive as much), but people still have cars and they still need new tires. Instead of buying tires, you have crews that go out and scout for abandoned cars with good tires. They jack them up, take the wheels and go. Dismount the tires, catalog and warehouse them, and sell most of the wheels to a scrap metal dealer. So, if someone needs new tires for their car, they can either grep them, go out and search for a car that has the right size tires, or go to you and get a good, new(ish) matched set. Most people if given the option, come to you.

Same for a new car. You can get one off a dealer's lot, but if you cannot find the key, you have to tow it, bust open a window and disable the computer interlock on the ignition. Or, you can go to an 'auto dealer', tell them the make, model and color you want, and they will find one, professionally jack the car without busting anything, rekey it and deliver it to your door. It may cost several thousand credits, but for many people it is worth it. Used cars are the same. There are plenty of places like Rider's scrapyard that take vehicles abandoned on the freeways, turn the useless ones into parts and raw materials, restore others and sell them. In 2031CE there are still no conventional auto plants, nor conventional manufacture of any sort of heavy equipment.

The big manufactured goods that are grepped are things that were uncommon to begin with and for which no conventional manufacture is being done anymore. For instance, a lot of tanks got destroyed during the Dark Days and there are no conventional tank assembly lines running, so anyone who wants new tanks has to grep them. Jet airliners are still flying (only a fraction of a percent of pre-grep traffic, though), and while there are a lot of scavenged parts being used, some parts that wear out are more easily made with grep rather than trying to fabricate them conventionally.

So, the economy in most 'civilized' areas is composed of:

- public services (police, etc.)
- retailers & service industry
- infrastructure businesses (banks, etc.)
- scavenging and recycling
- agriculture & related businesses
- grepwork (which can be in any of the above)

The distribution of these depends on the area and the above list is roughly proportional to population density. That is, a very urban area has a lot more public services and retailers, while a very rural area has a lot more grep-work and agriculture.

The international perspective

No matter where you are, someplace you can get to is going to be another country. For instance, you can still get a transatlantic jet from DC to London or Paris. France is still adjacent to Germany and Mexico is still sitting on the southern border of the United States. Your particular area or the area you choose to start a campaign will have its own chance of international tensions based on pre-Dark Days borders and recent events. Friendly countries may have no real border at all anymore, or an informal one that might as well not be there.

Governments have very little power to enforce 'national' boundaries any further than the edge of their city-state, but many areas still have a strong sense of national identity or long-standing territorial imperatives. There is no doubt that in 2031CE there are still Serbs and Croats killing each other over imaginary borders, and any survivors in Israel and your choice of its neighbors still slugging it out over territory conquered through genocide several thousand years ago.

Each gamemaster has a unique perspective on *local* politics and borders and how this will affect the tenor of a campaign. For instance, Rova has a little border tension, but is otherwise a fairly bucolic place that to a 2018CE observer might look perfectly normal at first glance. On the other hand, if your campaign opens in Damascus or Grozny or Donetsk, then the Dark Days were filled with bitter, high-intensity warfare and the years since filled with grep-fueled conflict. Your campaign area will look like a ruined city from a Terminator movie and virtually everything you own or eat will be grepped, because no merchant in their right mind would trade in such an area and recycling is the only way to survive. And people in these areas may have lived so hard for so long that they have forgotten that there is even a less violent world out there. And even if you do not *start* in such an area, a conflict zone like this could be a long-term campaign plot.

For instance, the most extreme of the warring factions finally wins, and considers this a divine mandate to take their struggle outward. Battle-hardened grep experts up to and including cyborgs, bio-engineered animals and designer diseases start an aggressive 'convert or die' military expansion. And given human history, there are generally enough who will 'convert' to cover for any losses they take making the rest 'die'.

Remember that even with the QuauntumNet, things like this can be brewing closer than you think without people really knowing the depth of a potential problem. You cannot just go onto Google Earth and get fairly recent satellite or aerial photography of an area. People may be fairly well connected, but these connections are dots on a map with a lot of 'here be dragons' in between the dots. The average person in Rova or even Roanoke proper does knows as much about what is going on in Ohio as they do for what is going on in Moscow. When it comes to long-distance, news and rumor are almost interchangeable, and even the news is going to be colored by the views and beliefs of the one conveying it. So, you could have a nice peaceful setting with common knowledge that there are some worthless malcontents living up in the hills or "off to the west somewhere" and all of a sudden they are an armored convoy in the center of town with a hundred hostages from the most important families to insure the good behavior of any would-be freedom fighters. *Surprise!*

Grep limits

Grep has been described as utterly pervasive in 2031CE, and this is mostly true. It has spread to some extent to everywhere surface water, air and dust has gone. So there are some environments where you will not find enough grep to do anything useful and any grep that arrives there by chance has to slowly replicate itself up to a useful level, which depends on the local materials and energy gradients. So, you will not find any grep on an ice core you dug up from a glacier, nor in a fresh lava field. These are trivialities for the most part, since once a person goes to these areas, they bring their native grep with them and that fixes matters in a matter of days to weeks.

However, as a more campaign-oriented thing, Grep does not function well in environments with radiation. It does not mutate into some horribly aggressive nanotech or anything like that, it is just damaged and does not work as well. Doing grep in most of the areas that took nuclear strikes is difficult and doing grep involving radioactive end states is also difficult (this is taken into account in the grepping rules). So, using grep in space means you want a shielded hull and that repairing the surface of a spaceship in a radiation-intense environment is next to impossible.

Where grep and radiation has a more interesting problem is with biogrep. When grep modifications are part of something's DNA, there is a chance that radiation damage can cause directed mutation rather than uncontrolled things like cancer. And as part of the organism's DNA, these mutations are inheritable.

This is *barely* plausible and is really just a gimmick for the gamemaster. Zones that suffered nuclear strikes (like the Bristol Crater in the southwest of the Rova area) can have populations of mutated animals (or people!) that are excessivly dangerous or have unforeseen abilities. Mostly the problem would be animals, who in the past decade could have had several generations of offspring. And because grep does not spontaneously affect living creatures, the original mutants would have to have been grep-modified, and most of those were clandestine experiments for use in warfare.

So, imagine a pack of feral pigs that have multiple hearts and a brain of a dozen nodes distributed through its body. They would be vicious, territorial hunks of meat and tusks, capable of carving open a car like a tin can and which have no vital spots you could get a one-shot kill on.

Or plants that absorb carbine dioxide and give off oxygen...and poison gas.

Or colonies of of ants or wasps with acidic pincers/stingers. Not just territorial, they will travel kilometers just to attack the scent of humans or they are attracted to the sound of machinery.

Or simply hyenas that operate in packs of a hundred or more and which are far too clever for their own good, a grep-enabled hive mind where no individual is intelligent, but the whole *is* sentient...and does not like you.

The QuantumNet

This has been mentioned several times but deliberately not given any detail until now. The Internet as we know it went down during the Dark Days and never quite returned. While it was designed to be fault tolerant, it still required undersea cables, satellites and lots and lots of electricity, all of which were erratic or knocked out, and that is not even covering the government orders in many places that simply shut it down *before* the infrastructure failed.

But at some point very early in the Dark Days, *someone* grepped a quantum communication box. Grep itself seems to have a quantum link with some subset of other grep, forming a worldwide mesh network. The QuantumNet box seems to be a concentration of the idea. We say 'seems', because no one has been able to reverse-engineer or duplicate them and the best guess is that there is only one person or group in the world making them.

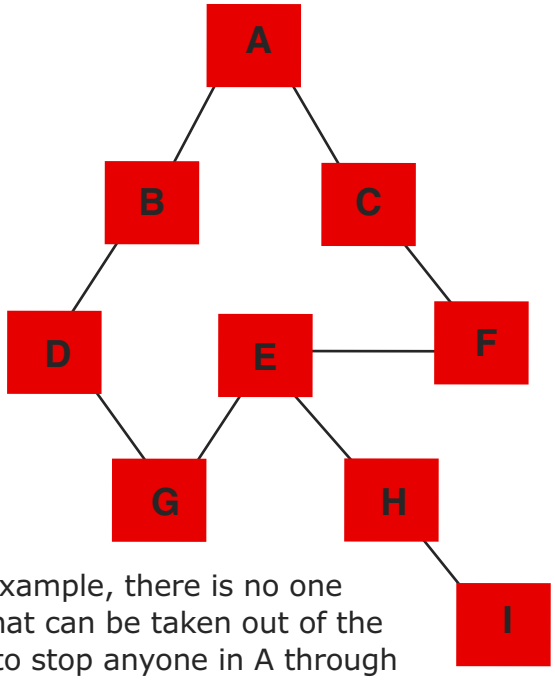
But what a QuantumNet box is and does is fairly well known. What it is, is a cube about 35 centimeters (≈14 inches) on a side, with rounded edges and corners, black and barely translucent. It has a standard power cable adapter on one side, and ten input and output ports with RJ-11 Ethernet jacks. When you plug it in, occasional faint flashes of light can be seen inside it.

What it does is pass information. Any electrical signal going in an input port shows up at the same output port of two other QuantumNet boxes. Which two other QuantumNet boxes is fixed and is apparently determined when they are created. This communication cannot be intercepted or interfered with and as best anyone can tell, has no lightspeed delay. The amount of information each channel can pass is not unlimited, but is easily able to handle several hundred high-quality audio streams or several high-def video streams at one time.

It is important to note that the QuantumNet boxes are information-agnostic. They do not encode or decode anything, they simply pass what is given to them out the other side. So, you need conventional hardware to decode the signal being sent to you, and to this extent, regular computers and old internet protocols work just fine. And in this regard, they are the new Internet. People log on to a local network and it runs on the same old protocols, but all the long-distance heavy lifting is done by Q-boxes.

As an example, the city of Roanoke has two Q-boxes, which are directly connected to parties in Tokyo(Japan), Atlanta(Georgia), Bogota (Columbia) and Raleigh(North Carolina). Roanoke residents can connect to a city-owned server that routes traffic based on internal or external addresses. External ones are handled by a regularly updated addressing table handled by system administrators at the various nodes, so that a message knows where to go to and waits for an opening, even if one is not immediately available. Internal traffic runs over mobile phone towers and copper wire, and covers the Roanoke area. Spots up and down the Route 81 corridor can access the QuantumNet via mobile phone frequencies, albeit at reduced bandwidth and increased cost. Prices for service are tiered based on the proportion of internal and external bandwidth used.

What makes the QuantumNet a useful network rather than a curiousity is that no two QuauntumNet boxes are connected to the same two other boxes. So, if Q-box A is connected to B and C, and B is connected to A and D, then all you need for channel 1 on A to connect to D is for B to connect its channel 1 output to one of its inputs. So, a signal going from A to B now also goes to D. If A connects its output from B into one of its inputs, you can now connect from C to D.



In this example, there is no one Q-box that can be taken out of the system to stop anyone in A through G from communicating. The E-H-I link can be disrupted, however.

This is only important in a campaign plotting sense. Someone interested in stopping news from getting into or out of an area needs to know the links so they know where to cut them. Which is easier said than done, since the two links a Q-box has could be anywhere on the planet.

Acquiring a Q-box is an arcane process. There is an anonymous site where you can post a request for one, along with your reasons for wanting one and the resources you have available for paying for it. One Q-box costs about a million credits, and there is a waiting list of indeterminate length. Requests are granted or denied not necessarily in the order received, and if the request is accepted, the payment to be made is paid in advance with no guarantee of delivery date. This annoys people to no end, but as long as there is only one supplier, they get to make the rules.

The absolute anonymity of the Q-boxes is a mystery that any number of people would *love* to solve, and there is a standing (but officially denied) bounty of a *lot* of money for info leading to the source of the Q-boxes. Based on the worldwide distribution of Q-boxes and the pattern by which they went online, the current theory is that they originate somewhere on the North American continent, and informed speculation is that it is somewhere in a major city east of the Mississippi River. But that is still a lot of territory, and since Q-boxes are small enough to be grepped in a bathtub, they could be created literally *anywhere*.

As said, the price is generally about a million credits, but the nature of that price varies on a case-by-case basis and what is considered to be worth a million credits varies. Sometimes it is a straightforward deposit to be made to an anonymous account at a major banking concern. Sometimes a town or city might have to pass a particular law. One city-state had a price of releasing a *seemingly* random list of prisoners from its prison. They refused and instead paid a huge sum to acquire one from someone who already had a Q-box, at which point that Q-box suddenly stopped working. They eventually relented and got their Q-box.

The creator(s) of the Q-boxes seem fairly well informed and socially active and do not seem to *need* the money. Rather, the genuine scarcity of the boxes means they can set an arbitrarily high price for them and you either meet the price or someone else gets the next Q-box to come out of the soup. By the start of a campaign there are several hundred to a few thousand Q-boxes worldwide, in several networks that are well-connected internally but fairly fragile externally. For instance, using the previous diagram A through G are immune to any outage from a single loss, but there might be an entire *other* network connected to I, but E, H *and* I are weak links that are the only contact points between those two networks.

Bandits & Raiders

These are two radically different things in **Grep**, and go by different names in different areas. Bandits are your run-of-the-mill highly mobile robbers. People who travel from place to place, looking for quick opportunities for profit. This could be a series of quick robberies in a town, home invasion of a few isolated farmsteads, or even pulling over a lone vehicle at gunpoint on a major highway. They can be smooth con artists or just plain thugs. The con artists are interested in a smooth job and a clean getaway, while the thugs generally are not into thinking it through. The rough justice that the thugs get if caught tends to make them rough customers who would prefer not to kill you, but who are not going to hesitate much if they feel they need to.

Raiders are another matter entirely. People got hungry during the Dark Days. And history shows that some subset of people that get hungry enough will eat other people. And some of *that* group will not wait for you to die of natural causes first. Raiders are survivors of the Dark Days that fall into that last group. They are groups of people who by virtue of a ruthless pragmatism were the sole survivors in a geographical area (usually a town or small city). *However, they lost their humanity in the process*. Ten years later, they and their children now grown to adulthood are the ones running the show in a particular region and everyone else gives them a *wide* berth.

Now, you cannot survive *exclusively* on cannibalism when it takes so many years for your prey to get to eating age, so raiders *do* raise animals and even crops and grep just like everyone else. It is just that to a raider's point of view, there is 'us' and 'food'. And if you are not part of the 'us' group, then you are not seen as human. There is no mercy given towards you, no remorse at killing you, no value placed on any skills you might have. To a raider, they care exactly as much about the cries of a victim as workers in a slaughter-house care about the mooing of cattle.

It is a mindset that is frankly *terrifying* to the average normal person in **Grep**, and while raiders do not *care* about whether they terrify their victims, they are *aware* of the value of this fear and do exploit it to their advantage.

Think of any cultural group in recent history that engaged in wholesale slaughter of people outside of their group, and translate their complete lack of empathy for anyone who was not them into the **Grep** perspective. If simply being human is not enough, you could have them infected with some subset of the **Incarnation** big picture plot. This would also explain their behavior.

As long as Raiders are far away or someone else's problem or leaving us alone, no one wants to be the one to risk their life to go in and root them out. So, they very slowly grow in numbers, exceed the capacity of an area to support them, and so a group has to split up and expand. Which is why they are called 'raiders'. They will hit an area, wipe out everyone and everything, vanish, and then do it again somewhere else.

And they are not savages in loincloths with filed teeth and bones through their noses. They look exactly like everyone else in an area. They may not operate with military precision, but they are used to hunting intelligent prey and the survivors are the ones who over the past decade have proven themselves up to the task.

For instance, a married couple and teenage daughter might check into a small hotel late one night. Waking up the proprietor or some poor schmuck stuck with the late shift, they spin a plausible tale for being on the road at such an awful hour and make friendly small talk. And at some point the process the pretty young daughter steps behind the clerk and slits his or her throat. The parents then check the guest book, grab the master keys the maids use and call their companions.

Armed with keys and sledgehammers to bust through flimsy door chains, they break into every occupied room almost simultaneously. Crossbows or homemade silenced weapons mean that even buildings next door might not notice the slaughter.

Collecting loot and meat, they pile back into their vehicles, turn onto the trackless pavement and vanish into the night. They will be a hundred or more kilometers away by sunup and the grisly discovery. Step one of making an area so undesireable that everyone else flees it is now complete.

Raiders know that they cannot win pitched battles against a dedicated attacker or defender, and simply refuse to engage on those terms. They avoid strongpoints and retreat from counter-attacks. They can scatter to the wind in family groups indistinguishable from any other and regroup later at any of several contingency locations. They are excellent scavengers and improvisers. They just crossed a line of social and moral taboo that cannot be uncrossed, and whatever part of them regrets what they have become is long dead and buried. They are incapable of even understanding why what they are doing is wrong, but they do understand the need to *not* be that way for limited periods of time in order to blend in and survive. They do not discuss raider philosophy over a nice set of barbequed ribs. They do not invent or create or innovate in any way that does not help them be better raiders. They are just apex predators who use intelligence as a predation tool.

Perhaps the scariest thing about raiders is that they have no qualms about using future food as grep material, especially for experiments. They *do* take captives and *are* interested in biogrep. Either modifying themselves in ways to be better at what they do, or attempting to come up with a self-sustaining form of vat-grown meat (which may or may not retain a sense of consciousness afterwards). Like everyone else pushing the limits of grep, they have their successes and failures.

As long as the failures are useful, they are kept around. So, you might have the idiot mutant killer who is three meters tall and has Wolverine-like claws, or the wasted body but immense intellect tactician who has to be kept out of sight unless needed, as well as the normal Mom-Dad-and-kids amoral killers who can shop at the farmer's market and chat about the quality of apples while scoping out which farm would be the nicest place to recreate a Jackson Pollack canvas at.

Raiders tend to generate the same sort of reaction as you would imagine vampires would, if vampires could walk about in daylight. If you are remotely close to an area where there are raiders, there is a vague unease about anyone you do not know. It is where you walk into a bar and no one knows you, and the room goes silent. And then the bartender says "Been a while since I've seen you, Fred", and everyone breathes a silent sigh of relief and goes back to what they were doing.

There is much more unease than usual about travelling alone, less likelihood you would stop to help someone in need on a deserted stretch of road, a set of unfounded suspicions and ways to act and signs to look for, things exactly as useful as hanging a string of garlic over your door to ward off Dracula.

Raiders tend to be more likely to develop or be in greater numbers where situations were *really* bad in the first winter. If people were isolated and there was already some sort of us/them tension, the odds that either 'us' or 'them' were the only ones who made it to spring were greater. There are entire *cities* north of the Frost Line where ordinary people just do not go, despite the potential wealth of scavengable goods there. And there are cities north of that line where this did *not* happen. And places where one of each are close enough that guerilla war is happening and outside mercenaries might be hired. By *both* sides.

Edmonton and Calgary (Alberta, Canada) are such a pair. It is a slow-motion war, waged mostly in the summer months, with ugly guerilla actions on the long, cold nights of winter. *Both* sides lure soldiers of fortune north with promises in southern newspapers that are mostly fulfilled, offseting their losses in numbers but not managing to strike a telling blow to the other side. Imagine a party of adventurers drawn north by promises of wealth and a homestead, only to find out that they were hired by the raiders...

And why one city goes wrong and not another could just be a matter of chance.

In campaign terms, the Bristol Crater area is infested with Raiders, who are just now at a level where they need to expand. No one in their right mind drives through the area, and even going a wide ways around it means taking questionable back roads. After a well-publicized incident in 2029CE, even commercial airline flights going southwest out of Roanoke make a dogleg around Bristol rather than flying directly over it. The presence of Raiders there blocks travel and trade over a far larger area than the Raiders actually pose a threat in.

During the Dark Days, no one really wanted to live in the radiation zone assumed to encompass the ruined city and at the start of a campaign no one wants to go in force to root them out. Unseen radiation is almost as scary as Raiders to most people. The Raiders may have a somewhat higher cancer risk as a result of their location, but that is the least of their worries in terms of life-shortening habits. There is no census count of Raiders in that region, but those who try to keep track of such things estimate a total population of a few thousand, in several semi-cooperative clans of a several hundred each. They do not seem to have QuantumNet access, but it is believed that they have acquired mobile phone accounts that let them get limited access if they get within range of a phone tower. And of course they can point television and radio antennas to pick up commercial broadcasts.

End of the world

The ability to write a stable record of identified molecular events into a specific genomic locus would enable examination of long cellular histories and have many applications, from developmental biology to synthetic devices. We harnessed this feature to generate records of specific DNA sequences into a population of bacterial genomes. We then applied directed evolution to alter the recognition of a protospacer adjacent motif by the Cas1-Cas2 complex, which enabled recording in two modes simultaneously. These results lay the foundations of a multimodal intracellular recording device.

Science *(06-09-2016)*

How the world ends



This is normally where we put a chapter about gear, but since all gear in **Grep** is either modern gear or totally custom, we will just have a grep-friendly table of items at the end. Instead of gear-related text, here is a guide to post-ruin settings and things to consider if you ever decide to create one.

For any sort of rebuilding-civilization rpg setting, the way in which things *went wrong* for the previous civilization has a lot of input on the way things are afterwards. Both of these are really a lot of hand-waving by the designer to generate the setting they *want* rather than a perfectly realistic reflection of the way things would *really* turn out. This is especially so if you end up including aliens, fantasy elements, mutants and so on. **Grep** is no exception to that rule. But, let's talk about the details of how things *can* go wrong in a modern world, and what happens if they do.

Food, water & power

These are the three big things that any modern civilization requires in large quantities on a constant basis. 'Power' is loosely defined and could be electricity, petroleum, coal, wind, water, whatever. If it is what keeps people warm, turns light on at night and helps get lots of stuff moved around, it is power. So 'power' can represent multiple things. For urban 2018 it would mostly be electricity and some form of petroleum.

The population of some sample nations on Earth circa 2018 is distributed in the following percentages:

	urban	rural
Kuwait	98%	2%
Australia	89%	11%
Brazil	85%	15%
United States	81%	19%
Saudi Arabia	81%	19%
United Kingdom	80%	20%
Canada	80%	20%
Mexico	78%	22%
France	78%	22%
Russian Federation	74%	26%
Germany	73%	27%
Italy	68%	32%
China	54%	46%
India	31%	69%

The percentage of a population that is urban is *utterly* dependent on imports of all three of food, water and power, and a modern city has very little ability to stockpile any of them. For instance, New York City consumes 80,000 tons of food and 4,000,000 tons of fresh water *each day* (the last of these is equivalent to treating a major sports arena like a bowl and filling it to the brim with water).

A disaster which affects any of food, water or power will have an immediate and nearly catastrophic effect on urban populations, and how bad and how quick depends on the area. For instance, a rainy area or one with a relatively unpolluted river will manage a water shortage better. A city can run out of local water in a day, out of stored food and fuel in less than a week and out of power in an instant for most people and when the backup generators run out of fuel for everyone else.

The exacerbating problem with any disaster is human nature. Cities are designed around having certain imports available *and* around a certain amount of people moving from point A to point B. Not having the former leads to people wanting to leave the city to where they can get these things, and exceeding the latter leads to things like traffic jams, which makes it harder to get new supplies into the city, which makes more people want to leave, and so on. You read this in every end of the world novel, roads packed with abandoned cars, swarms of fleeing refugees, etc.

Having something like this happen over an area rather than a single city will immediately overwhelm the ability of relief agencies to assist. *Everyone will be on their own*. And to be cynical and realistic, most of them will not be up to the task either intellectually, emotionally or physically.

Those in rural areas will fare better, but are still not off the hook by any means. Those in the countryside still need food, water and fuel as much as those in the cities, they just have the advantage of being closer to usable supplies of all three and a better stockpile per person. Power is still a problem. You cannot run a pump for your well (or your gas station) without electricity. Produce cannot be harvested or transported in quantity without fuel, and so on. Yes, there might be a few antique horse-drawn threshing machines out there, but it is not the way to bet.

Weather and such

People design things exposed to nature around certain expectations of climate and then have them built by the lowest bidder. Or, places are lived in because it is where a city was originally founded, even if it is not the best spot for the city that is there now. London was originally a marsh. Nobody knew (or cared) that San Francisco was in a major earthquake zone. No one figured that New Orleans would end up being below sea level. Planners for major projects look at what they consider as '100 year events' or sometimes '1,000 year events', like "we are going to build this structure to be strong enough to withstand a once-in-a-hundred year hurricane". *This is a good thing*. At least in countries where the regulatory process is robust enough to enforce it. You regularly hear about buildings collapsing in various countries because building inspectors were bribed, or horrific death tolls from earthquakes because people built unreinforced masonry structures, or flood or typhoon deaths because there simply is not enough money in the economy to build sturdy enough structures.

So, what does a '1,000 year event' look like anyway? Well, if we are looking at global warming scenarios, a rapid rise in sea levels because of Antarctic melting could displace a lot of people and do a lot of economic damage, but not nearly as much as you might think. For instance, it would take a three *meter* rise in sea level to put 70% of the population of Miami, Florida underwater. *And that's a pretty hefty rise in sea level*. On the other hand, this would also put *all* the airports, rail stations, port facilities and FM radio stations underwater, as well as all the major hazardous waste sites and sewage treatment plants. Miami would be utterly destroyed as a city by such a rise, and that is not counting what would happen to the remaining infrastructure from increased exposure to hurricanes. For example, it would also remove all the barrier islands from the eastern USA, meaning storms could hit the coast without any mitigation.

So, sea level rise is bad, but is only going to happen over a long period and the population displaced will be a small fraction of the total population and in most cases could adapt to it gradually. This displacement is going to be more of an economic hit to a country than a physical one, except for countries which have a huge amount of their area close to sea level (like Bangladesh, where half the population is within 10 meters of sea level).

Other sorts of thousand-year events happen much faster and may or may not be restricted to a single area. Take earthquakes. In areas without frequent earthquakes, buildings are *not* built to standards designed to withstand them. A magnitude 6.5 earthquake happened in Vermont in 1638CE, the New Madrid (Mississippi) earthquake of 1812CE was magnitude 7.7, and the Cascadia earthquake of 1700CE (Pacific Northwest) was magnitude 9.0. Any of these happening today would be devastating, and in the context of a larger disaster where relief or rebuilding was not possible would destroy infrastructure over a large area (bridges, tunnels, rail lines, etc.). And as a reminder for **Grep**, big infrastructure projects are stuff you really cannot do with grep, so once these things are broken they are probably going to stay broken. If the Golden Gate Bridge goes down, will anyone in 2031 have the money or equipment to replace it? The perimeter wall around DC in **Grep** was built the old-fashioned way.

Any coastal earthquakes have the potential to generate a tsunami. The previously mentioned Cascadia earthquake resulted in tsunami damage in Japan, 7,500 kilometers away. Similarly, there is a big chunk of volcano in the Canary Islands all set to slide into the Atlantic Ocean. If it does, the most catastrophic model (which is disputed) says the resulting tsunami could be still be 50 meters high when it slammed into the entire east coast of the United States, and would be equally high when it hit London. The death toll and economic damage would be incalculable.

A more conventional '1,000 year flood' could take place due to excessive rainfall. Since rivers are even more popular than coasts as places to put cities, there is a lot of urban damage that can be done. For instance, Tennessee had a '1,000 year flood' in 2010CE, with portions of the state getting half a meter of rain in two days. Approximately thirty percent of the state was considered a 'major disaster area' and about 100 bridges, 200 roads and 20 water treatment plants were affected. In a larger post-Ruin sense, this happening over a large region is going to be a long-term communications bottleneck. Rebuilding a reinforced steel and cement bridge is not something you do with shovels and wheelbarrows. Surviving bridges and roads, even if they cause detours, will still be the best ways to get large or heavy cargoes from one spot to another, causing new towns to spring up and formerly important places to wither.

The same sort of thing can happen with *any* sort of weather. If your area is not used to heavy snow or ice, then roofs are not designed for the strain of a meter of ice on them. All your flat-roofed department stores in warmer climates will be crushed. Roads not built for multiple freeze-thaw cycles will crack and buckle. Mountain passes will have landslides. Water pipes not buried deep enough for sub-freezing temperatures can freeze and rupture. You can look at any number of anomalous events like Hurricanes Katrina and Sandy in the United States, and then multiply by a hundred or a thousand cities if your disaster is a *global* weather anomaly.

The longer the 'ruin' period before things stabilize and people even consider rebuilding, the worse things will be and the fewer the bits of usable infrastructure will be left. Train tracks might be nice within a limited area, but if all you have is fifty kilometers of track and destroyed bridges at either end, then long-distance rail travel is out of the question until the government or private money decides to rebuild it.

And all of this is just the '1,000 year events'. It does not even begin to take into account how bad things could get in the wake of a really rare but eventually inevitable event like a major meteor strike like the one that took out the dinosaurs. The Chicxulub crater on the Yucatan Peninsula is about 180 kilometers across and was caused by one object about 10 kilometers in diameter. The resulting global mess was several hundred times as bad as the Mount Tambora volcanic eruption of 1815CE, and that one resulted in what was called 'The year without a summer'.

While it is not something that happens in **Grep**, the 'weather' of the Sun is also something that can mess things up. There is something called the 'Carrington Event' that happened in 1859CE. This was a solar storm that generated a coronal mass ejection (CME) that slammed into Earth's magnetic field. The result caused auroras down to the equator and set telegraph stations on fire. Imagine what it would do to the internet and all the electronics you depend on, from phones to ATM's to the computer that runs your car's engine. An estimate by Lloyd's of London had the economic damage of such an event happening *now* would be several *trillion* dollars.

Side effects

Disasters are bad enough. But in areas of concentrated population, disasters feed on themselves. If your fire department relies on local water pressure to fight fires, and streets clear enough to get fire trucks through, fires can be bad news. Just because a skyscraper is made of steel, cement and glass does not mean it will not burn and will not fall down.

The human element

There is nothing like stress to bring out the best *and* the worst in people. There is nothing that nature can throw at us that we cannot make worse through our own efforts. We riot, we loot, we kill, we burn, we are a bunch of ignorant villagers with pitchforks and torches who are so scared of Frankenstein's monster that we burn down our own houses and use our pitchforks on our neighbors. It can also bring out the best and most noble in us, and the conflict between groups of one and the other can be part of the pre-game history/ mythology.

Perhaps only a minority of us are *deliberately* that bad, but we do have the distressing tendency to engage in behaviors that may be to our individual advantage, but when done in groups hurt everyone. If *everyone* flees the city because they do not want to risk getting stuck in traffic, *everyone* gets stuck in traffic. *Remember that last time you left a concert or sporting event at the same time as everyone else?*

People also tend to tear stuff up, for reasons ranging from pointless to expedient to quite unfortunate but necessary. *Why does someone throw rocks to break a perfectly good window?* On the other hand, a military force might *have* to blow up the only bridge across a river to keep an enemy from using it. In the middle is a farmer who eats next year's seed crop because the alternative is dying of starvation *right now*, or someone who burns antique furniture because the alternative is freezing to death. All three of these can be happening in the earliest days of a Ruin, and the losses caused by actions taken out of desperation can be reflected in society long after everything has been rebuilt and the past disaster is merely a note in the history books.

And then there is the human element as applied to role-playing, compared to what the human element is really like. Your adventurers are generally the cream of the crop when it comes to humanity. You are more skilled, clever, healthy and have a gamemaster who really does *not* want you do die an early, ignominious death. But in the real world, a disaster wide enough to preclude serious relief efforts is going to have casualties that are beyond the imagining of almost everyone currently alive. And those who have lived through something like that probably are not gamers and probably do not want to talk about it and most certainly do not want to role-play it as a form of *entertainment*.

For instance, everyone whose life depends on specialized products of an advanced society is out of luck when those products run out. Everyone who relies on injectable insulin to control diabetes is handed a slow death sentence. People on specialized drugs because of immune system disorders are out of luck. Those taking high blood pressure medication likewise. Those who are self-sufficient because of advanced technology like motorized wheel-chairs will become completely dependent on the charity of others. People who can only function because of specialized eyeglasses have to be careful, because those glasses cannot be replaced.

And those are just one form of immediate and semi-immediate casualties. Think of where you live. Odds are it is an urban environment. If you are anywhere north of 35° north latitude (or south of 35° south), how well are you prepared to spend a month at a temperature of -15°C (5°F)? Do you have a fireplace if the heater is not working? Do you have water (or a way to melt it) if the pipes freeze? Do you have enough food to stoke your body's internal fires for a month?

Or let's say you are in a rural environment. Staying warm might be easier. But have you ever killed an animal for its meat? Do you know what local plants are edible? How far would you have to walk (or bicycle) to get any sort of vital supplies?

Most of us are exceptionally ill-prepared to deal with a disaster more severe than losing mobile phone coverage. The setup for a post-Ruin game almost always involves one or more disasters that just do not quit. Considering yourself prepared because your pantry has a week's worth of food and you have some jugs of fresh water for an emergency will not save you if your food supply is cut off for a month. A backup generator only lasts as long as you have fuel for it. The people in the setting who were *somewhat* prepared were merely the last ones to die.

The survivors, the ones who rebuild or recover to whatever extent this happens, are going to have some combination of the following qualities:

damned lucky: You just happen to have been on a hunting trip in your off-road recreational vehicle that has auxiliary solar panels. Or when the massive radiation flare hits, you and your friends were on an extended caving expedition. This is going to be the smallest group of all survivor types.

hyperskilled: You have the exact skill set needed to deal with the situation in the exact location you are at. And this does *not* have to be a survival skill. If you are a born leader or organizer, that could be the skill that helps keep you (and some of the people around you) alive.

just plain useful: You do not have a skill that helps you survive whatever the disaster is, but you have a skill some *other* group surviving the disaster needs. A gang of vicious, looting thugs that has set up a fortress to protect the food they have looted might not care if you were a banker, but they might share with a doctor. The exact skill that is useful is going to vary with situation. A veterinarian is going to be useful where people still have herds or flocks. In other places the useful skill might be a mechanic or someone who can use a sailboat or a belted fighter from the SCA. Or in **Grep**, someone who can grep the things that group needs to get through the Dark Days in one piece.

friendly: You may not be hyperskilled, but you have people who care about you, and you about them. You are willing to risk for them and share burdens for them, and there is strength in numbers. Extended family groupings, church congregations, military units, that sort of thing. No one person is all that good at surviving, but as a group you muddle through, at least for a while.

pragmatic: Not necessarily unprincipled and vicious, but willing to make hard decisions and follow through on them. Quite often, decisions that are hard for *other* people but which enhance *your* survival. In the early stages of a post-Ruin world there will be groups that fail because they were *too* kind. They took in more refugees than they could feed, they trusted people they should not have, they did not triage their medical emergencies, and so on. The pragmatic person is the one who knows when to cut their losses and does so. In some cases, this can mean walking away from a group that is headed for disaster, even if your desertion hastens that disaster. They are not likely to be popular in the short term, but in the long term may be remembered as leaders or heroes.

vicious: Basically, selfish to the point of violence. Whatever it is *you* need to survive, you take. If you cannot lead, you join a group of fellow takers, because there is strength in numbers. In the short term you can call them bandits. In the medium term you can call them warlords. And in the long term, if they are successful, you can call them the founders of a respectable dynasty, whose origins will be whitewashed by hagiographers.

The Dark Days in **Grep** are a combination of an alien McGuffin whose wonderful potential benefits were overpowered by the the flaws of human nature, added to a global war and a climate-altering disaster and a plague of unknown origin. Whether or not this would kill nine out of ten people on Earth in about two years is arguable. It might be less, it might be more, but thankfully we are unlikely to find out. As with all fictional backstories, it is merely the setting of the stage. And as with all such disasters it is quite possible there is far more going on than the average person knows or is capable of knowing about. Some very smart and connected people in **Grep** might look at what happened and think "there is no way it should have been as bad as it was". Yet, they are living in a world where it *was* that bad and the only possibly conclusion is that their assumptions and information are flawed, or *something else* was going on at the same time that no one has figured out or taken into account. And when the gamemaster figures out what it is, things get *more* interesting.

The chaos of the Dark Days is backstory that gives the gamemaster room to maneuver on both a global and local sense. There can be strong governments for good or ill, wastelands almost devoid of people, strange subcultures and so on, yet it is set in a world whose landmarks are familiar and whose famous people from 2018 might still be alive. The Dark Days are what was before the new world, in the same way as the Dark Ages was what was before the Middle Ages. The difference in **Grep** is that the world from before was only a bit more than a decade ago.

The unknown
Part of almost every rpg setting is the great unknown. It could be as clichéd as dungeons to explore, or an interstellar civilization rebuilding itself, trying to find the fate of colonies and worlds that have been out of touch for a millennium or more.

In **Grep**, the *main* reason for the high casualty count of the Dark Days is to make room for the unknown. *Which is a lot easier than you might think*. Think of every place within say ten kilometers of where you are standing that you have never been to. And we are not just talking about people's homes. How many streets are there on that map that you have never seen, let alone driven on? If you work in an office building, have you even set foot on all its floors?

Speaking as the author of **Grep**, I live in the boonies. Despite having lived where I am for decades, I could step out my front door, walk for ten minutes and be on a patch of ground where no human might have ever set foot. There could be an alien spaceship, sasquatch clan (or moonshine still) right over the next ridge and I would never know it. There is probably nothing so prosaic outside *your* front door, but you do not need a civilization-wrecking Ruin to have important mysteries just out of sight, decades or even centuries after civilization has rebuilt itself and moved past whatever Ruin it had. Centuries- or even millennia-old mysteries are the staple stuff of adventures. *Just ask Indiana Jones...*

That is after all, what fictional adventures are often about. The protagonist happens to stumble onto something extraordinary that was there all along. It is not really coincidence that all the important stuff happens where the adventurers can make a difference in the outcome. *That* is sort of the point of the adventure and the setting. As the adventurers find and interact with the important stuff close by, you expand the campaign area to include new, even more important stuff.

Gear notes
All relevant gear will have a 'grep' column in its stats. This is the difficulty to grep it assuming the following modifiers, which are taken from chapter 4 and applied to specific items.

starting point: Base difficulty will be based on the gear's mass and type.

refining: Assumed to be a net modifier of +0.

complexity: Based on the assumed tech era of the item, and the relative complexity guidelines.

danger: Based on the nature of the item

time/energy: Assumes the maximum benefit possible for the size and type of item.

standardization: Assumed to be average, for +0.

safe capacity: If applicable, somewhere in the +2 to -2 range.

cost: Represents time and labor. Any special or exotic components required for the grep are extra and the surcharge is whatever the market will bear. This is very likely to be higher for items which require specialized grepping facilities or uncommon complementary skills (like most alien stuff).You will note for some items like armor, it is just as easy and cheap to make a full set as it is the parts, that is just the way the cost numbers work out, but of course you *do* need more of the raw materials.

grep: Special things like totems, soup starter and grep affinity are not included, nor are any alterations for making small items in batches. So, the grep difficulty is less of a fixed and more of a relative comparison.

The gear list has a standard metal-framed pistol (Industrial Era) with a 'grep' entry of 11. This is the base difficulty of 9 for the mass and type of grep, +0 for Industrial Era, +2 more for it being a semi-auto with an Accuracy of 1 (according to the guidelines at page 4.25) for a final difficulty of 11 (its size does not let you get any time or energy benefit).

Grep mundane ranged

name	uses	Accuracy	damage	shots held	weight	cost	grep	armor	hits	notes
Zip gun	11mm bullet	0	3d+2	2	1.0(-11)	11(-13)	9	1d+2	1	1h
Semi-auto pistol	9mm bullet	1	2d+0	10	1.0(-11)	22(-11)	11	1d+2	2	1h
Semi-auto pistol	9mm bullet	1	2d+1	16	1.0(-11)	65(-8)	14	1d+2	2	1h
Heavy revolver	11mm bullet	1	3d+2	6	1.3(-10)	45(-9)	14	2d+0	2	1h
Machine pistol	9mm bullet	0	2d+2	30	1.6(-9)	45(-9)	14	2d+0	2	1h, autofire
Hunting rifle	6mm bullet	4	5d+0	3	4.0(-5)	250(-4)	16	2d+2	2	2h
Assault rifle	6mm bullet	2	4d+1	30	4.0(-5)	700(-1)	18	2d+2	2	2h, autofire
Heavy sniper rifle	12mm bullet	5	7d+0	5	13(+0)	1.4k(+1)	18	3d+0	4	2h
Short shotgun	18mm shotg.	1	3d+1(slug)	4	2.5(-7)	90(-7)	15	2d+2	2	2h
Pump shotgun	18mm shotg.	1	4d+0(slug)	8	4.0(-5)	250(-4)	16	2d+2	2	2h
Heavy machinegun	12mm bullet	2	6d+2	180	50(+6)	2.0k(+2)	17	3d+1	7	2h, autofire
Anti-tank rocket	90mm rocket	1	9d+2	1	8(-2)	175(-5)	15	3d+0	3	2h
Bow	arrow	1	2d+1	1	1.6(-9)	11(-13)	11	1d+1	2	2h
Crossbow	quarrel	2	3d+2	1	4.0(-5)	65(-10)	14	2d+1	2	2h
Ammunition	pistol	-	-	≈60.	1.0(-11)	90(-7)	10+era	-	-	
	rifle	-	-	≈40.	1.0(-11)	90(-7)	10+era	-	-	
	shotgun	-	-	≈20.	1.0(-11)	90(-7)	10+era	-	-	
	heavy MG	-	-	≈15.	10(-1)	350(-3)	10+era	-	-	
	arrow/quarrel	-	-	≈40.	1.0(-11)	11(-13)	9	-	-	

Grep mundane melee

name	damage	type	length	weight	cost	grep	armor	hits	notes
Knife	strike+0	lethal	short	.4(-15)	8(-14)	9	1d+2	1	1h, throwable
Sword	strike+2	lethal	long	1.3(-10)	8(-14)	9	2d+0	2	1h
Two-handed sword	strike+4	lethal	long	3.0(-6)	15(-12)	9	2d+2	2	2h, -1 initiative
Staff	strike+3	half-lethal	long	1.6(-9)	8(-14)	9	2d+0	2	2h, -1 initiative

Grep mundane other

name	damage	type	length	weight	cost	grep	armor	hits	notes
Grenade	4d+2	lethal expl.	-	.4(-15)	15(-12)	9	1d+2	2	thrown
TNT	6d+0	half-leth. expl.	-	1.0(-11)	8(-14)	9	1d+2	2	thrown

Grep exotic ranged

name	uses	Accuracy	damage	shots held	weight	cost	grep	armor	hits	notes
Plasma pistol	special	2	..4d+1[ae]	10	1.0(-11)	16k(+8)	24	2d+1	2	see text
ammo		-	-	50	1.0(-11)	1.0k(+0)	20	-	-	
Plasma rifle	special	4	..6d+0[ae]	20	4.0(-5)	175k(+15)	26	3d+1	2	see text
ammo		-	-	25	1.0(-11)	1.0k(+0)	20	-	-	
Railgun pistol	special	3	4d+0[a]	10	1.0(-11)	5.6k(+5)	22	2d+1	2	see text
ammo		-	-	50	1.0(-11)	1.0k(+0)	20	-	-	
Railgun rifle	special	6	6d+0[a]	20	4.0(-5)	175k(+15)	26	3d+1	2	see text
ammo		-	-	25	1.0(-11)	1.0k(+0)	20	-	-	
Laser rifle	electricity	4	7d+1	10	8.0(-2)	64k(+12)	23	3d+1	4	see text

Grep exotic other

name	damage	type	length	weight	cost	grep	armor	hits	notes
Fusion grenade	6d+1	lethal expl.	-	.4(-15)	90(-7)	14	1d+2	2	thrown

Grep wearables

name	armor	type	covers	weight	cost	grep	notes
Pants	0d+1	flexible	legs(13-16)	1.0(-11)	8(-14)	9	generic clothing
Shirt	0d+1	flexible	torso(9-12)	.5(-14)	6(-15)	9	generic clothing
Jacket	0d+1	flexible	torso+arm(7-12)	1.3(-10)	11(-13)	10	generic clothing
Boots	0d+2	flexible	feet(16-18)	1.6(-9)	15(-12)	11	generic clothing
Synthleather	0d+2	flexible	whole body	6.5(-3)	22(-11)	10	
		flexible	torso(9-12)	2.5(-7)	11(-13)	9	
		flexible	head(5-6)	1.3(-11)	11(-13)	10	
		flexible	arms(7-8)	1.6(-9)	22(-11)	10	
		flexible	legs(13-18)	2.0(-8)	22(-11)	10	
Level 2 vest	2d+1	flexible	chest/abd(10-11)	1.6(-9)	65(-8)	14	
Level 4 vest	4d+2	rigid	torso(9-12)	10(-1)	175(-5)	14	hardened vs. Atomic Era or less
Kevlar helmet	3d+0	rigid	head(5-6)	1.3(-10)	30(-10)	13	
Titanium torso	3d+1	rigid	torso(9-12)	4.0(-5)	65(-8)	13	
Aluceramic torso	3d+2	rigid	torso(9-12)	4.0(-5)	175(-5)	15	hardened vs. Atomic Era or less
Graphinite torso	4d+2	rigid	torso(9-12)	4.0(-5)	700(-1)	18	hardened vs. all
Aluceramic helmet	4d+0	rigid	head(5-6)	1.3(-10)	250(-6)	16	hardened vs. Atomic Era or less
Graphinite bodysock	2d+0	flexible	whole body	3.0(-6)	1.0k(+0)	20	hardened vs. all
Graphinite assault	6d+0	rigid	whole body	25(+3)	1.4k(+1)	18	hardened vs. all
Graphinite scout	4d+2	rigid	whole body	10(-1)	700(-1)	18	hardened vs. all
	4d+2	rigid	torso(9-12)	4.0(-5)	700(-1)	18	hardened vs. all
	4d+2	rigid	head(3-6)	2(-8)	350(-3)	18	hardened vs. all
	5d+0	rigid	head(5-6)	1.3(-1)	500(-4)	17	hardened vs. all
	4d+2	rigid	arms(7-8)	2.5(-7)	350(-3)	18	hardened vs. all
	4d+2	rigid	legs(13-18)	3.0(-6)	700(-1)	18	hardened vs. all
Force field(personal)	7d+0	rigid	whole body	4.0(-5)	32k(+10)	25	hardened vs. all, see text
Force field(vehicle)	11d+1	rigid	whole vehicle	64(+7)	2m(+22)	25	hardened vs. all, see text

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Name | Gender M | Age 26
Background
Goals

Clear all | Durnok | Heal me! | Calc on



	level	roll
Strength	7	2d+1
strike	1d+1	
Agility	10	3d+1
dodge	6	
Awareness	10	3d+1
spot	3d+1	
Will	8	2d+2
tough	2	
Health	8	2d+2
walk	4	
run	6	
sprint	8	
recov	0	
Fate	4	1d+1
luck	1d+1	

1 3 5 7 9
11 13 15 17 19

Wheelman | Survivor | Hunter
Greppie | Doctor | Ganger

head 3-6 d+ | torso 9-12 d+ | arm 7-8 d+ | leg 13-18 d+

Gear

Gear	weight
Casual clothing	-6

Lifestyle | Invested
Savings

Skills	Attribute	bonus	skill roll
Grep	WIL	+0d	2d+2
Proj. weapons	AGL	+0d	3d+1
Brawling	AGL	+0d	3d+1
Mechanic	AGL	+0d	3d+1
Driving	AGL	+1d	4d+1
Pilot(boat)	AGL	+0d	3d+1
Area kn.(roads)	AGL	+0d	3d+1
Horsemanship	AWR	+0d	3d+1
		+	d+
		+	d+

Traits	value
Phys. prime(age 26)	5A/3S
Background	1A
Wealth(+2)	-1S
Adventurous-2	-1S
Minor, lim. Friend	1A
Permits(DC)	-1S

Stam | Hits

	Stam	Hits
1		-0d
2		
3		
4		
5		-1d
6		
7		
8		
9		-2d
10		
11		
12		
13		-3d
+10	14	
+20	15	
	16	
-1	17	
-2	18	
-3	19	
-6	20	
-9	21	
	22	
any	23	
A	24	
S	25	
P	26	

Enc
-1 Str-8
1 Str-6
3 Str-4
5 Str-2
7 Str-0

Exp

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Name | **Gender** M | **Age** 26

Background

Goals

Stam / **Hits** 1 2 3 4 5 6 7 8 9 10 11 12 13 +10 +20 14 15 16 17 18 19 20 21 22 23 24 25 26

	level	roll		
Strength	7	2d+1		carry
strike 1d+1 / kick 2d+1 / throw 1d+1				strike
				throw
Agility	10	3d+1		fight
fight 3d+1 / balance 3d+1 / throw 3d+1 / dodge 6				balance
				throw
Awareness	10	3d+1		cognitive
think 3d+1 / spot 3d+1 / listen 3d+1				sight
				hearing
Will	8	2d+2		toughness
tough 2 / charm 2d+2 / resist 2d+2				charm
				resistance
Health	8	2d+2		speed
walk 4 / run 6 / sprint 8 / recov 0				stamina
				recovery
Fate	4	1d+1		shield
shield 1d+1 / power 1d+1 / luck 1d+1		1 3 5 7 9 11 13 15 17 19		power
				luck

Clear all | Durnok | Heal me! | Calc on



head 3-6	d+	torso 9-12	d+	arm 7-8	d+	leg 13-18	d+

Gear	weight
Casual clothing	-6

Lifestyle | **Invested**

Savings

Skills	Attribute	bonus	skill roll
Grep	WIL	+0d	2d+2
Proj. weapons	AGL	+0d	3d+1
Brawling	AGL	+0d	3d+1
Mechanic	AGL	+0d	3d+1
Driving	AGL	+1d	4d+1
Pilot(boat)	AGL	+0d	3d+1
Area kn.(roads)	AGL	+0d	3d+1
Horsemanship	AWR	+0d	3d+1
		+	d+
		+	d+

Traits	value
Phys. prime(age 26)	5A/3S
Background	1A
Wealth(+2)	-1S
Adventurous-2	-1S
Minor, lim. Friend	1A
Permits(DC)	-1S

Enc

-1 Str-8 | 1 Str-6 | 3 Str-4 | 5 Str-2 | 7 Str-0

Exp

any | A | S | P

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level	roll	mass	dist.	time	qty
-12	-	.8kg	-	-	-
-11	-	1kg	-	-	-
-10	-	1.3kg	-	-	-
-9	-	1.6kg	-	-	-
-8	-	2kg	-	-	-
-7	-	2.5kg	-	-	-
-6	-	3kg	-	-	-
-5	-	4kg	-	-	-
-4	-	5kg	-	-	-
-3	-	6kg	.1m	-	-
-2	-	8kg	-	.5s	x.5
-1	-	10kg	.3m	.7s	x.7
+0	0d+0	13kg	-	1s	x1
+1	0d+1	16kg	.5m	1.4s	x1
+2	0d+2	20kg	.7m	2s	x2
+3	1d+0	25kg	1m	3s	x3
+4	1d+1	32kg	1.4m	4s	x4
+5	1d+2	40kg	2m	6s	x6
+6	2d+0	50kg	3m	8s	x8
+7	2d+1	65kg	4m	11s	x11
+8	2d+2	80kg	6m	15s	x15
+9	3d+0	100kg	8m	23s	x23
+10	3d+1	125kg	11m	30s	x30
+11	3d+2	160kg	16m	45s	x45
+12	4d+0	200kg	23m	1m	x60
+13	4d+1	250kg	32m	1.4m	x90
+14	4d+2	320kg	45m	2m	x125
+15	5d+0	400kg	65m	3m	x175
+16	5d+1	500kg	90m	4m	x250
+17	5d+2	640kg	125m	6m	x350
+18	6d+0	800kg	175m	8m	x500
+19	6d+1	1t	250m	11m	x700
+20	6d+2	1.3t	350m	**15m**	x1k
+21	7d+0	1.6t	500m	23m	x1.4k
+22	7d+1	2t	700m	30m	x2k
+23	7d+2	2.5t	1km	45m	x2.8k
+24	8d+0	3.2t	1.4km	1h	x4k
+25	8d+1	4t	2km	1.4h	x5.6k
+26	8d+2	5.1t	2.8km	2h	x8k
+27	9d+0	6.4t	4km	3h	x11k
+28	9d+1	8t	5.6km	4h	x16k
+29	9d+2	10.2t	8km	6h	x25k
+30	10d+0	12.5t	11km	8h	x32k
+31	10d+1	16t	16km	11h	x45k
+32	10d+2	20t	23km	**16h**	x64k
+33	11d+0	25t	32km	1d	x90k
+34	11d+1	32t	45km	1.5d	x125k
+35	11d+2	40t	64km	2d	x175k
+36	12d+0	50t	90km	3d	x250k
+37	12d+1	64t	125km	4d	x350k
+38	12d+2	80t	175km	6d	x500k
+39	13d+0	100t	250km	8d	x700k
+40	13d+1	125t	350km	11d	x1m
+41	13d+2	160t	500km	16d	x1.4m
+42	14d+0	200t	700km	23d	x2m
+43	14d+1	250t	1k km	32d	x3m
+44	14d+2	320t	1.4k km	45d	x4m
+45	15d+0	400t	2k km	2m	x6m
+46	15d+1	500t	2.8k km	3m	x8m
+47	15d+2	640t	4k km	4m	x11m
+48	16d+0	800t	5.6k km	6m	x16m
+49	16d+1	1kt	8k km	8m	x23m
+50	16d+2	1.2kt	11k km	1y	x32m
+1	+1	x1.3	x1.4	x1.4	x1.4
+2	+2	x1.6	x2	x2	x2
+3	+1d	x2	x2.8	x2.8	x2.8

other adventurer notes

training and experience

starting points A S P

traits

attributes

skills

powers

armor	type	covers	weight		cost		hand	worn	pack
			kg		Cr				
			kg		Cr	-22			
			kg		Cr	-22			
			kg		Cr	-22			
			kg		Cr	-22			

weapons	damage	Acc	shots	weight		cost		hand	worn	pack
				kg		Cr	-22			
				kg		Cr	-22			
				kg		Cr	-22			
				kg		Cr	-22			
				kg		Cr	-22			

gear	armor	hits	weight		cost		hand	worn	pack
			kg		Cr	-22			
			kg		Cr	-22			
			kg		Cr	-22			
			kg		Cr	-22			
			kg		Cr	-22			
			kg		Cr	-22			
			kg		Cr	-22			
			kg		Cr	-22			

Clear gear

heaviest item kg

2nd heaviest item kg

weekly expenses

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