PYRAMID

Issue 3/3 January '09

VENTURING INTO THE BADLANDS

POST-APOCALYPSE

DEATHBALL
by Peter Dell'Orto and Sean Punch

OMNISCIENT EYE x2!
by Geoffrey Brent; Roger Burton West and John Dallman

SURVIVOR'S MOON
by Paul Drye

ZIPPEMART
by Matt Riggsby

NAME THAT APOCALYPSE
by Nicholas Lovell

THE DAY THE WORLD BROKE
by J. Edward Tremlett

STEVE JACKSON GAMES

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Article Colors

Each article is color-coded to help you find your favorite sections.

Pale Blue: In This Issue
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Dark Blue: ***GURPS*** Features
Purple: Other Features
Green: Recommended Reading

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In This Issue

The end of the world may be soon, so we've packed this issue of *Pyramid* with articles to help you survive the apocalypse.

Peter Dell'Orto and Sean Punch explain how *Deathball* has become the new national sport. Watch teams use ***GURPS Martial Arts*** to vie for precious fuel or other rewards!

In one of the Infinite Worlds, Paul Drye presents an extra-tough challenge: people trying to survive the end times cut off from Earth, in *Infinite Crossroads: Survivor's Moon.*

Need a place to refuel or repair your vehicle? Head over to *Zippemart!* Matt Riggsby is your guide on this repurposed gas station. Visitors can trade skills, knowledge, or goods, provided they leave the attitude outside. Usable in most settings, with ***GURPS*** stats for the major players.

Signs of the Times presents newspaper clippings suitable for many ends of the world. For those who haven't decided on the nature of their apocalyptic campaigns, *Name That Apocalypse* has plenty of good questions. GMs who want to dive into a ready-made world can use *The Day the World Broke* with ***GURPS*** (but it's generic enough that conversion is easy).

The *Omniscient Eye* sees all and tells you about it with two installments this issue. *Does My Nuclear Arsenal Have an Expiration Date?* deals with the shelf life of the ultimate weapons of mass destruction, while *Are Humans a Renewable Resource?* looks at the math behind replenishing our numbers.

Humor looks at Ragnarök's funny side, and *Recommended Reading* reviews some suggested doomsday games.

Todd Breitenstein, creator of ***Zombies!!!,*** winds up with issue with his thoughts on the end times.

(Lack of) Letters Page

Citizens of the future: If you can read this, then all hope may not be lost!

Errr, no, let me try again.

Anyway, this issue once again finds itself being assembled in the distant past . . . in the year I believe you Terrans called 2008. And, once more, we don't have many letters relating to the first couple of magazines to share just yet. Probably starting with next issue, we'll have our first honest-to-goodness letters page!

This is the third issue of the latest edition of *Pyramid,* and the first tackling a sci-fi theme . . . in this case, the post-apocalypse. It's a big topic, but we think we've got a good cross section of what's possible. Let us know what you think! If you're looking to chat about the new issue with virtual friends, might we recommend the Steve Jackson Games Forums at **forums.sjgames.com,** under the *Pyramid* subforum?

Welcome Back!

Sure, we're saying, "Welcome back!" to you, dear reader. (Or "Welcome!" if this is your first issue.) But that's not all!

The old weekly form of *Pyramid* existed for almost 10 years, and we ran a number of features we're quite proud of during that period. We're happy to welcome back a couple of old friends to *Pyramid.*

Infinite Crossroads

First, Paul Drye's Infinite Crossroads makes its re-appearance. In each installment, Paul presents a world suitable for the ***GURPS Infinite Worlds*** setting, with plot seeds and campaign ideas for additional use. New Infinite Crossroads will appear whenever Paul is inspired, but it'll probably be every few months or so, as the theme inspires him.

The Omniscient Eye

Also making a return is the Omniscient Eye. Sages theorize that the Omniscient Eye might actually be composed of a panel of Experts chosen through mysterious and arcane means. Regardless, the Omniscient Eye is benevolent and willingly shares its lore with all. Or, at least, to all who purchase *Pyramid.*

The Omniscient Eye seeks to answer questions that are tied to knowledge of the real world, providing information with a perspective that is of use to gamers. The Omniscient Eye does not concern itself with specific game systems or statistics.

Do you have a question for the Omniscient Eye? Feel free to send it to **pyramidquestions@yahoogroups.com,** and the Omniscient Eye might answer it!

Write Here, Write Now

We love to get your feedback! Please feel free to send in letters and comments to **pyramid@sjgames.com.** In addition, we're looking for "New Tricks for Old Dogs." Did you think of a clever use for an article in a past issue? Maybe you built an entire ***Dungeon Fantasy*** level around Deathball, or used the Zippemart as a plot point in an ***Infinite Worlds*** campaign? If so, e-mail us a brief (no more than 400 words) description of what you did and how well it worked.

I still enjoy reading any articles that can be mined for ideas, and often, the well-written articles of ***Pyramid*** *make it easy for me to extract something from them . . . and if not, they make an enjoyable read by themselves.*

– Liantefaron, from the Steve Jackson Games forums

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Deathball

by Peter Dell'Orto and Sean Punch

Gar stood on the field, one arm around his striker stick and the other on his hip as he surveyed the opposition: Dregs, mostly – but potential contenders. The locals were big fans of the game. They'd somehow scraped together enough beefy farm boys, ape-armed mutants, and crazed bikers to field a team. They even had ***uniforms,*** *sewn together from precious scraps of synthetics left over from before the Big One.*

Gar had seen it all before . . . he was a veteran. He'd played in the big leagues, but he'd grown too old to keep up. Now here he was, touring the wastelands, fighting for scraps of old tech and precious canned foods.

He inspected his team. His defenders were ready; they'd finished strapping on their armor and sharpening their elbow spikes. His fellow striker, Wolf, flashed her sick pre-game grin, barely visible under the battered football helmet from the 20th. Both of his motorstrikers were revving their engines, blades on wheel hubs gleaming in the sun. Finally, their carrier emerged: Over 200 pounds of green-skinned, three-eyed mutant, ready to take the ball through any opposition.

Ball? Well, tank. The ref grunted as he dropped the dangerously corroded but ***full*** *propane cylinder mid-field for the first scramble. The winner would keep the precious fuel – if it didn't explode and kill both teams. Gar was old enough to remember when "blowout" meant a one-sided win, not a bloody draw.*

The crowd's chant grew louder and louder: "Deathball! Deathball! Deathball!"

The ref quickly fled the field.

It had begun.

The objective of Deathball is to get the "tank" through the mouth of the "goal." How you get it there, and what happens to anyone between you and the goal, is somewhat less important . . .

The Field

Deathball is played on a rough field or pitch. Depending on the town, this might be a decaying football stadium, rugby pitch, or soccer field; in the badlands, it could even be a sunken pit. There are no universal standards. Traveling players rarely know the local "ground rules," so a good team learns to adapt, and he tries to recruit at least one member who *knows* the circuit – in game terms, somebody with both Area Knowledge (League Circuit) and Current Affairs (Sports) – even if he's old and slow.

Size and Shape

Most fields are rectangles from 100 to 160 yards long and between 50 and 100 yards wide. But not all! Circles, hexagons, and octagons abound. Indoor games sometimes use burned-out factories with multiple levels connected by ramps or stairs, steep drops on all sides, and the goals on the *top* floor.

Falls: Assume 5-yard industrial stories in indoor play. Falling velocity is 10, 15, or 18 yards/second for one, two, or three stories, should an unfortunate deathballer take a swan dive. See *Falling,* p. B431.

Conditions

Nothing in the rules (such as they are) specifies field quality. Possibilities include:

Bad Footing: The pitch might be uneven or muddy (+1 movement point per hex, -2 to attacks and DX-based skill rolls, and -1 to defenses), or both (*double* these penalties!).

Potholes: Crossing the edge of a shallow pit (either way) costs +1 movement point and requires a DX or Driving roll, at the speed penalty for current Move, to avoid a fall or a wipeout. Jumping the pit is possible, if it's no wider than jumping distance (p. B352) or vehicle Move. This demands a DX or Jumping roll on foot, or a Driving roll on a bike, with a distance penalty equal to width. Failure means a fall or a wipeout *in* the pit. See p. B550 for speed and distance penalties.

Tiger Pits: These *must* be jumped, as above! Failure, or being shoved or tossed into the pit, means falling damage (p. B431); assume a falling velocity of 10 yards/second. Damage becomes *impaling* for spiked pits. Scaling or mantling out takes five seconds and a Climbing roll.

Boundaries

A field's edges might be surrounded by harmless lines of old paint, but other options are:

Banked Earth: Tall, vertical, hard-packed earth walls, designed to resist climbing (if anyone tries, it takes 2-3 *minutes* and a Climbing-3 roll). They count as hard, immovable objects in collisions; see p. B431.

Barbed Wire: Wooden barricades or steel fence laced with razor wire. These have a lot of give and count as soft in collisions, but collision damage – including that due to knockback

Sure, the world after the fall may be bleak, but kids still need to play; that's how they learn. Scenes of active children can be a good contrast to the dark world.

– and damage from smashing or grinding enemies into the wire is at +1 *per die,* and can initiate bleeding (p. B420). As well, the barbs carry rotting grue from past matches; players who are cut but survive must roll HT-2 to avoid infection (p. B444) after the match.

Pointed Stakes: The inward-pointing "pike wall" is a real crowd-pleaser! A player about to collide with it gets a Dodge roll. Success means a collision with whatever lies beyond (usually a wall). Failure means collision damage is *impaling.* Roll for infection as for barbed wire.

Land Mines: In war-torn post-apocalypse settings, millions of unexploded mines may be sitting around in ancient battlefields. Why let them go to waste? These will be marked with brightly colored flags. Assume one mine per hex. A player forced onto a mine gets a Dodge roll. Failure explodes the mine, which is bad for the victim *and* anyone nearby: 5d [4d] cr ex. Old mines might be faulty; the GM can assign a "detonation roll" between 6 and 15 or less on 3d.

The Goals

At either end of the field is a goal: typically two posts, but this varies as much as the field. All that's certain is that the goal is a yard wide and about a yard high. It might be marked by something dangerous, such as:

Electrified Poles: Anybody tossed into the pole is zapped. Nonlethal varieties merely require a HT roll to avoid stun; victims get a HT roll to recover after they break contact, rolling every second. Lethal ones simply inflict 3d burning damage per touch and call it a day.

Flaming Barrels: A red-hot barrel of burning junk does 1d-3 burning damage if you bounce off, or 1d-1 per second if you're held there (e.g., some mutant presses your face against it). Barrels of homemade napalm also disgorge a nice splash of goo that does 1d-1 per second for a full *minute,* or until the deathballer rolls in dirt or mud for three full seconds. Being on fire is *distracting:* -3 to DX.

The Equipment

I wrapped my hands in filthy bandages. I had no idea whose blood was on them. Then Denver – that's where he was from, before the nukes – brought over a pot of rancid goo boiled down from dead animals, and grunted, "Hands in the glue."

I did as he asked. Rat Boy followed along behind with a rotten cardboard box with "IBM" on the side. It was full of sharp-looking crud.

"What's that, Rat?"

"Hrr. Crushed circuit boardses! Hrr. Shiny. Hrr. Sharp. Hrr hrr. You can hurts without hitting."

I plunged my hands in. They came out covered in jagged shards of phenolic and silicon.

There's no real standardization in Deathball gear! Suggestions appear below, but after the Big One, *availability* matters much more than silly ideals like fairness and safety.

Sponsors

A team might be a wandering band of survivors – a lot like a PC party – that ventures from town to town, challenging local teams for whatever prize they can agree on: food, gear, the right to enter the Forbidden Zone, etc. This need not be the case, though. Nascent city-states (often underground), local strongmen and gang leaders, and even the decadent remnants of pre-apocalypse corporations or governments might sponsor Deathball. They may provide arenas and prizes, back teams (feeding, equipping, and transporting them), or both – and if they do both, you can be sure that the sponsored team has a huge home-field advantage in its sponsor's arena!

Protective Gear

Torso armor is minimal for male players. Being bare-chested, or nearly so, is popular with fans; it demonstrates a gladiator-like contempt for death. Armor may consist solely of shoulder pads (***High-Tech,*** pp. 66-67), plus a cup (***High-Tech,*** p. 71) for non-mutant men. Female players do wear armor, most often something like a leather jacket or leather armor (p. B283), or a padded leather sparring breastplate (***Martial Arts,*** p. 234). In all cases, the material is more likely old tires than foam or leather (stats don't change), and spikes are common (add $20 and 5 lbs., and function as Short Spines, p. B88).

Headgear is usually leftover TL7-8 gear like motorcycle, football, hockey, and riot helmets, although teams from ruined steel towns prefer hard hats. Military headgear – ballistic helmets – might be used, but that's both rare *and* seen as "cheating," because Deathball players are expected to be tougher than their gear! See p. 70 of ***High-Tech*** for stats for these items. Players may opt to wear a mouthguard (***High-Tech,*** p. 71) – usually cut from tasty tires – but this makes it hard to yell out coordinated plays, so they aren't so common (and thus missing teeth *are*).

Limbs are protected with knee and elbow pads (***High-Tech,*** p. 71), shin pads (***Martial Arts,*** p. 234), and sometimes even riot gear (***High-Tech,*** p. 67-68). These items are often enhanced with metal studs, giving +1 to the damage inflicted by an Elbow Strike, a Knee Strike, or a shin kick (***Martial Arts,*** p. 112), as appropriate; this adds $5 and 0.25 lb. per piece of armor.

Hands are usually covered with cloth or leather work gloves (p. B284), hockey gloves (***High-Tech,*** p. 69), or MMA gloves (***Martial Arts,*** p. 233). For the trendy *spiked* glove, use the stats for a myrmex or a cestus (***Martial Arts,*** p. 226).

Footwear is often boots or sandals (p. B284), or *nothing.* Cleats (***High-Tech,*** p. 69) – pre-apocalypse leftovers or jury-rigged substitutes – are especially prized on muddy, bloody Deathball fields!

As the world gets more technologically advanced, the possibilities for great post-apocalyptic adventure seeds grows greater, too. Check the science headlines for ideas.

Striker Stick

Strikers (see *Strikers,* p. 7) wield this combination weapon: a quarterstaff with a crook at one end and a two-yard kusari on the other. It's $75 and 6.5 lbs., and requires ST 9. On any given turn, the striker can use it as a staff (mainly for Hook and Sweep techniques) *or* as a kusari (to entangle).

Motorcycles

In leagues that use motorstrikers (see *Motorstrikers,* p. 8), these players ride bladed-and-spiked motorcycles. Use the stats for any TL7-8 motorcycle from p. B464, or even the wimpy electric bike on p. 230 of ***High-Tech*** (nobody has fielded a Death Segway . . . yet)**.** When tracking budgets, the custom bodywork adds $100.

The Tank

The "ball" is usually a small keg or a large propane cylinder filled with water or sand. For the purpose of throwing and carrying, assume it weighs 14 lbs. A tank may be filled with *propane* for an especially exciting game. It's hard to set off, but "blowouts" happen and inflict 6d×5 burn ex; for complete rules, see p. 31 of ***High-Tech.***

The Rules

These rules assume that Deathball is a descendent of American football. Other sports might influence Deathball elsewhere, such as in post-apocalypse Brazil (soccer), Canada (ice hockey), U.K. (rugby), or India (cricket!). In *all* cases, simply play out the match as a combat.

Contact

Surprisingly, Deathball *discourages* most direct attacks to maim or cripple. Matches like that rapidly degenerate into team-on-team melees, with the "winners" being the team with enough survivors to carry the tank across the goal. Fans of that kind of action go to pit fights and caged death matches to avoid the distraction of rules and a ball. Thus, there are *some* rules governing contact.

Cheating

Cheating is common, and "Ref didn't see it, I didn't do it!" is practically a rule. Roll a Quick Contest: the cheater's Games skill vs. the ref's Per. If the referee wins or ties, he detects the foul; otherwise, the cheater gets away with it. The ref gets +2 to spot Telegraphic Attacks or All-Out Attacks, +1 to notice Committed Attacks, and -1 to see Defensive Attacks. The customary penalty for illegal contact, illegal substitutions, and so on is -1 to -3 points to your team, per infraction. A short melee can completely wipe out a team's score!

Permitted Moves

Players may use grapple, takedown, and pin (p. B370); Judo throw (p. B203); slam and shove (pp. B371-372); Sweep (p. B232); and, from ***GURPS Martial Arts,*** Armed Grapple or Hook with a stick, Entangle with a chain, Sacrifice Throw, Scissors Hold, and Trip. The common theme is restraining and pushing. However, "incidental contact" – damaging throws, slam impacts, etc. – isn't discouraged.

Damaging strikes *can* target weapons or motorbikes, though. And motorstrikers can return the favor with two legal moves. The "bike kick" is a kick by the rider; use *Cavalry Weapons* (p. B397). The lethal "bike slide" is a collision leading with the sharp bits; treat it as a slam using the vehicle's Move and HP, and make damage *cutting.* The bike slide is dangerous for the rider, too – it's a collision, and some teams like to dodge the slide and have their own motorstriker ride down the attacker.

Forbidden Moves

Damaging strikes or locks on other players, with the exception of bike kicks and bike slides, are illegal. This means any attack that has the primary goal of inflicting injury on anything *but* a weapon or a motorbike. Of course, *cheating* (see box) is a time-honored tradition!

Substitutions

Due to the deadliness of the equipment and often the field, and the risk posed even by "nonlethal" hits, players get maimed and sometimes killed. League or house rules settle what happens next. Some rules permit *no* substitutions, and attrition settles most games. Others allow one sub per team (making "substitute" a vital team position, filled by a generalist who has played many positions) or per position (in which case each position has a regular and his "clone," or understudy). A few impose no limits – which lets rich, successful teams prevail in knock-down, drag-out battles!

Play

There are no "plays" as such. Each round is five minutes (counted off with drips of water or blood, tossed stones, etc.,

Best advice for would-be looters: Corner the market on something.

not a clock), and most matches last four rounds. The *Detailed Method* (***GURPS Martial Arts,*** p. 134) for resolving tournament combat is *especially* appropriate for Deathball!

Possession

American football-inspired versions have the concept of "possession," which ends when the team that has it scores or the rival team manages to steal control of the tank. Other versions more closely resemble ice hockey or soccer, with each team doing its best to move the tank through the opposing goal.

Tank Handling

Picking up the tank from the ground is a Ready maneuver (p. B366). Dropping it is a free action. Throwing or passing it uses *Throwing* and *Catching* (p. B355); keep in mind that its weight makes for short distances! Handing the tank to another player requires two free hands (it's bulky and has no easy handholds), and can use any maneuver that allows an attack. Treat kicking the tank as a Push Kick (***GURPS Martial Arts,*** p. 78); the tank is targeted at -4 but doesn't defend, so you can use Telegraphic Attack to offset this penalty.

The best way to score is simply to *run* to the goal . . . but opposing players will try to stop you! A knocked-down player automatically drops the tank, resulting in a scramble for possession.

Coaching

Most teams have a coach. The GM may allow coaches to use the abstract or mapped method for Tactics skill given on p. 60 of ***GURPS Martial Arts,*** but substituting Games (Deathball) for Tactics. Rolls may be per round or per match, depending on the desired level of detail.

Scoring

Any dismounted player can score. Carrying the tank through the goal, even if your carrier arrives dead, gives 7 points. Hitting, kicking, or throwing it through yields 3 points. After either, play stops and the tank is restarted mid-field.

The Players

Teams consist of between five and seven players, depending on the regional variation (Mutant League, Wastelands Circuit, Forbidden Zone Rules, etc.). These occupy the specific positions, all but the last of which are typical.

Universal Features: Regardless of position, players should have Brawling and Games (Deathball). Area Knowledge (League Circuit) and Current Affairs (Sports) are valuable, but rookies and boondocks players often lack them. *Anyone* would benefit from Combat Reflexes, Hard to Kill, and Rapid Healing!

Carrier

The carrier carries the tank. Although the name of the game is running the tank down the field into the goal, it can be too large and heavy for a small player in armor. Carriers tend to be the biggest, strongest guys on the field after the defenders. Anybody can score, but carriers make it their main job.

Recommended Attributes and Secondary Characteristics: High ST, HP, and Basic Move.

Recommended Advantages: Enhanced Dodge, Fit, and Peripheral Vision.

Recommended Skills: Jumping, Running, Sumo Wrestling, Throwing, and Wrestling.

Recommended Techniques: Evade and Feint (for faking out opponents!).

Nonhumans

If the setting has mutants, cyborgs, tame zombies, etc., then leagues might be segregated, fully integrated, or integrated with caveats ("no zombies" seems likely, given that eating brains is against the rules). Like all aspects of Deathball, this is subject to variation. Players in a "humans-only" league might arrive in the Rad Zone only to face an all-mutant or all-zombie team. They can refuse to play, but the town strongman will consider it a forfeit, and they're on *his* turf.

Defenders

Depending on the league, there are either two or three of these "tank guards," whose job is to protect the carrier. These tend to be the team's biggest members, making this an excellent slot for giant mutants, cyborgs left over from the Robot Wars, etc.

Recommended Attributes and Secondary Characteristics: Very high ST and HP, and high HT.

Recommended Advantages: Hard to Subdue and High Pain Threshold.

Recommended Skills: Sumo Wrestling and Wrestling.

Strikers

Strikers – again, two or three in number – don't strike the *tank.* They strike the *rival carrier.* Their job is to move in past the other team's players, bypass (or take out) their defenders, and down their carrier. Strikers tend to come in two broad types. Strong ones beat down the opposition with sheer power, while quick-and-agile ones use their striker sticks to trip and entangle.

Recommended Attributes and Secondary Characteristics: High ST *or* DX, and high Basic Move.

Recommended Advantages: Enhanced Parry.

Recommended Skills: Judo, Kusari, Staff, and Wrestling.

Recommended Techniques: Armed Grapple (Kusari *or* Staff), Entangle, Hook (Staff), Sweep (Staff), and Trip.

Once you've cornered the market on something, you can trade that item for other things you need.

Motorstrikers

At least one league uses *motorcycles*. Teams consist of a carrier, two defenders, two strikers, and two *motorstrikers*, who are strikers on bikes. The rules forbid carrying the tank by bike, and no player may score from the back of a bike, but it's legal to shuttle the carrier *to* the tank. Horses, BMX bicycles, mutant beasts, skateboards, rocket skates, and so on may replace motorcycles in some areas.

Recommended Attributes and Secondary Characteristics: High DX.

Recommended Skills: Driving (Motorcycle) and Karate.

Inspirations

Many sources inspired and informed Deathball. Foremost among these were countless post-apocalypse movies, good and bad – notably *The Blood of Heroes* (David Webb Peoples, 1989) and *Rollerball* (Norman Jewison, 1975). Gaming influences were ***Car Wars*** (the titular sport, plus "combat football" and "hack hockey") and the "Bombing Run" mode of ***Unreal Tournament 2003/2004.*** In the comics, several sports from old *Judge Dredd* issues proved educational.

Campaign Notes

A day at the Deathball games may include vendors ("Rat on a stick!"), little-leaguers playing during halftime, and acts ranging from the entertaining (acrobats and jugglers) to the hard-edged (strippers and pit fights). Many teams have their own trainers, suppliers, vendors, prostitutes, coaches, and camp-followers of every variety. Any adventurer with a cause to travel can find a reason to be with The Team. Big teams sometimes even have specialized bodyguards – sure, deathballers are tough, but why risk your star defender against a horde of mutant rats or zombies?

About the Authors

Peter V. Dell'Orto – some say "Violence" is his middle name – was part of the shady Deathball underground that predated the Big One of 1995. He started out as a player of ***Dungeons & Dragons*** in 1981, and took up the ***GURPS*** organization's ***Man to Man*** in 1985. His ***GURPS*** involvement become overt after the Big One, and in the mid-2000s, he wrote ***GURPS Martial Arts,*** often called "The Book of Death," with Dr. Kromm.

Dell'Orto is a connoisseur of violence. Deathball fans laud his three years as striker for Philoktetes Niigata, in the Japanese Mutant Leagues. He holds shodan rank in Kendo, studies deadly Kachin Bando, and fights in mixed martial-arts matches. An exponent of New Era thinking, he balances physical fitness with mental disciplines such as reading, music, and painting miniature likenesses of his victims.

Dr. Kromm (Sean Punch) was an obscure physicist until the Big One of 1995 – recently linked to his research – whereupon he assumed control of the shadowy ***GURPS*** organization. He was instrumental in most ***GURPS*** *Third Edition* programs afterward, most famously ***GURPS Undead*** ("Project Zombie"). In 2004, he and the notorious D.L. Pulver penned their New Era manifesto: ***GURPS Basic Set,*** *Fourth Edition.* His recent works have investigated Übermenschen (the ***GURPS Power-Ups*** monographs and, with known transhumanist P.J. Masters, ***GURPS Powers***) and stimulated aggression (the ***GURPS Action*** and ***GURPS Dungeon Fantasy*** treatises, and, with Deathball player-turned-manager P.V. Dell'Orto, ***GURPS Martial Arts***).

Researchers have learned that Kromm has been playing such games since 1979. He and his mysterious companion, Bonnie, dwell in the Montréal Forbidden Zone, where they keep mutant "pets." His known weaknesses are fine food and wine.

Infinite Crossroads

Survivor's Moon

by Paul Drye

It's been a decade since Homeline explorers discovered Fe Xin, a Quantum-5 timeline, but it's just six weeks since the war between Kurukshetra Hind and Jongghuo embroiled the timeline in a nuclear holocaust. The two powers had been glaring at each other for 30 years since the indecisive end of this timeline's equivalent of World War II, and Kurukshetra had been spoiling for a return engagement after losing Thailand in the armistice. In 2504 (or 2001 A.D., to use Homeline's calendar), the nationalist Devasuk party was elected to power; everyone knew it was just a matter of time before war broke out again.

The new conflict began in 2508 as Kurukshetra moved to seize the Andaman Islands and retake the Chinese forward naval bases there. However, after some initial successes pushing over the Himalayas and through the highlands of Southeast Asia, Jongghuo began to thrust back and – ever so slowly – regain the lost ground. It took five years, but the Chinese army eventually even moved into India, pushing across the Ayeyarwady River. This put the Kurukshetrans in a terrible bind, as a significant fraction of the nuclear weapons were based out of immovable missile sites on the land just beyond Jongghuo's gains. Rather than lose them if they couldn't stop the next offensive, the Kurukshetrans decided to use a few of them to break open the front. Perhaps that would turn the tide and lead to victory. Perhaps the war could not be won. Either way a sufficient show of force would demonstrate that the Kurukshetran homeland was inviolable and make Jongghuo come to the bargaining table.

A week later, the tit-for-tat retaliations had escalated and both countries had fired off their entire nuclear arsenals. The homelands of each country were broken; Jongghuo was simply gone, while the Kurukshetrans had their East African "new lands" – two-century-old colonies home to a hundred million people – to fall back on. However, the Indian victory was purely relative. Approximately one billion of their people had died, and the entire two-power world system – of which they were one of the pillars – lay in ruins.

Meanwhile, far away from the trouble, the Kurukshetran moon base watched on. Fe Xin was late in developing quantum mechanics and thus late to nuclear fission, but as behind as they were in nuclear technology, they were a little ahead in aerospace. The previous war was fought with jet fighters and long-range missiles, so the technology to get to orbit and go on to the moon soon followed. Amrita Vaidya set her bootprints on the Mare Crisium, and Kurukshetra never looked back from there. Now, 40 people live on the moon. They are able to look after themselves for a while but are dependent on Earth in the long run. Miraculously, Asharta Space Center survived the war, and despite worldwide collapse as Fe Xin's Earth slides into nuclear winter, Kurukshetra's astronauts have at least a small chance of getting home.

The Layout of the Lunar Colony

The key to the lunar colony is the Shackleton/Shoemaker crater complex. Shackleton (or, as it's called in Hindi, Yanda) is a relatively young crater, only 160 million years old. Its most interesting feature is its steep walls, which rear up from the lunar South Pole's jumbled terrain and manage to get some sun almost all of the time; the colony has to run on batteries only during eclipses of the sun by the Earth. Furthermore, the sides are so steep that a majority of the crater never sees light at all. Temperatures are low, and it's easy (by Kurukshetran standards) to run cheap, minus-150°-rated superconducting wires for power from the summits without having to bury them. Similarly, the moon's main settlement is at the bottom of Yanda, protected from extremes of temperature in the perpetual shadow, and using the abundant solar electricity to warm things up for human comfort.

It's possible to store archival copies of Wikipedia; for instance, there exists a version that can be loaded on the iPod or other small electronic item. Such an informational device could be greatly desired when rebuilding the world, if people can figure out how to power it up.

A mere five miles outside Yanda's rim is Shoemaker Crater (Kamayra, in the local language). It's the colony's source of volatiles, as Yanda is too young to have built up much ice from cometary water since it was formed. Kamayra has a relatively shallow basin and a few thousand tons of water and ammonia ice. A half-dozen people are employed extracting volatiles from the crater and bringing it back to Yanda via a laboriously cleared rough road through the rubble field between the two.

The rest of the human presence on the moon is spread around the South Pole-Aitken Basin ("Dakshinyi Ghaytiy"), a 1,500-mile wide impact structure that overlaps the lunar south pole on one side and most of the way up to the center of the far side on the other. The center of the basin is of particular interest for two reasons. Kurukshetran lunar geologists like it because it's four miles deep – by far the deepest structure on the moon – and so it exposes rocks they won't see anywhere else. Meanwhile, a thousand-foot-wide crater about halfway between the center of the basin and its northern rim has been turned into a radio telescope that benefits from unprecedented radio silence. With 2,100 miles of lunar rock between it and the earth, nothing interferes with the miniscule amounts of electromagnetism the telescope receives from deep space.

Since the war, though, the humans on the moon have pulled back to Yanda. They'll go out to their further outposts just to keep things running, but most of their efforts are focused on how to get back to Earth.

Life in the Lunar Base

Yanda Habitat is composed of pre-fab units mated with each other using flexible access tubes. The tubes are made of woven aluminum wire and lined (on the inside) with fluorocarbon plastic to seal them. The units are partially buried by piling up fine lunar regolith on their walls like snowdrifts. This provides insulation and some protection from meteorite impacts. The plan was to bury the habitat entirely at some point in the future, but that hadn't happened by the time the war broke out. The access tunnels are still completely exposed, but their flexibility means that most holes will be small enough that they can be sealed before too much leakage occurs. If a major breach is made, the units at either end can seal it off, but to date, nothing like this has happened.

The base itself is organized in a star pattern, with the largest living area in the center. There are six spokes in all, with another unit at the far end of each. One of those is the hub for several small living spaces that house the base personnel, while three others are workspace and laboratories. Another is the control center for the entire base, and one sits on top of a garage that allows the colonists to go on short journeys along the surface (either to a particular nearby destination, or to one of the surface-parked short-hop craft if they want to travel a longer distance). The final unit contains a downward-spiraling ramp that opens onto the only significant underground portion of the base: a 100-yard long tunnel that houses the farms/oxygen plant. The farms are low-pressure and almost entirely carbon dioxide to save on oxygen. Waldoes do much of the work, though a space-suited person can enter if there's need to do so.

Life in Yanda Habitat was psychologically difficult to begin with, and, like Antarctic research stations on many timelines, the locals required routine and useful work. Both have gone out the airlock in the aftermath of the war, and people have been stressed to the breaking point and beyond. Without regular supply runs from Earth, Yanda is running low on some necessary items like medicine and replacement electronic parts. They've had to convert to vegetarianism, feeding themselves almost entirely on the produce they can farm and a dwindling amount of food brought on the last few supply ships. Fortunately, most of them were vegetarian by choice anyway, so the shock hasn't been too bad. Still, there's simply not enough to eat, which isn't helping the colonists focus on getting back home. There's enough water and air, thankfully, but electricity is rationed as it's difficult to fix the solar arrays properly as they slowly deteriorate.

The Space Center

Meanwhile, back on Earth, the Kurukshetrans have Asharta Space Center on what Homeline calls Mahé Island, off the coast of East Africa. It had two Chinese nuclear missiles aimed at it, but by some miracle both missed and detonated many miles to the north and northeast. Most of the people who worked here before the war are still here, because the island grows enough food to support everyone. What's left of the government is taking the attitude that, unless a population's existence is threatened, they don't get any access to what little transportation survived the war. Like in Yanda Habitat, everyone's had to become a vegetarian; there are shortages of rice (by far the major component of their diet), but otherwise life goes on.

To some extent, this is because the space center's workers have been coping with the destruction all around them by working with their people stranded on the moon. During the time they're not farming or keeping the island running with their technical and medical skills, they could either brood at home or they could join in the rescue. Most have joined in.

The center is on a stretch of coast in the northwest of the island. The support buildings are on the mainland, while the launchers and landing areas are on a series of islets separated from the bulk of the island by an ocean inlet. West of the center, the Indian Ocean stretches off to infinity, the downrange wasteland most useful for ditching flawed rockets. These days, fishing boats bob out there, but the space scientists have still managed to negotiate the occasional clear day for them to fire fuel and needed equipment into orbit.

The Escape Plan

If the PCs become part of the group trapped on the moon, the GM is encouraged to let the players think of their own way home, particularly if their heroes' skills run toward engineering and piloting. However, in the absence of any brainstorms on their part, the lunar colonists and people at the space center have hatched a scheme that uses only Kurukshetran resources.

One of the best items to loot in a post-apocalyptic world: paper goods, especially feminine items.

There are several stages that will have to be passed to get people off the moon and back home. First, they must get sufficient fuel into lunar orbit so the residents of the moon can then rendezvous and fill up an earthbound craft. The next step is to endure the two days it takes to get to Earth orbit. Unfortunately, none of the ships on the moon are equipped for atmospheric re-entry, so once the bulk of the journey is made, the travelers will need to rendezvous with one of several orbital missile installations abandoned since the war. These in turn can rendezvous with lifepods launched from Earth, which can then glide down to the surface.

Technical hitches infest the plan, though. Getting fuel into lunar orbit is only relatively tricky, as it can be made from Kamayra's volatiles and then shipped up on reusable cargo ships parked outside the Yanda complex. More difficult is getting enough up quickly. Lunar orbits are rarely stable for more than a few years because of the mass concentrations dotting the surface of the moon; polar orbits are particularly notorious for decaying in a few months. Any launches need to use very particular elliptical orbits to stay stable, and there the problem is not only to get the fuel packages into the right position using Yanda Habitat's primitive facilities, but also to find them again later. Right now, the plan is to use simple ion engines to nudge them around, and radio homing beacons on the orbiting tanks. Both require extensive use of Yanda's machine shops to build.

Once underway to Earth, the travelers have to deal with the craft they're on. The journey will take two days, and as many people as possible need to be supported for that time in ships designed for short hops around the lunar surface. One person then needs to guide the ship back to the moon for another rescue run; there aren't enough lunar craft to take everybody on a one-way journey home.

Finally, once the colonists are on the stations orbiting Earth, they need to get them back up and running. Not only were the missile bases put into standby mode, many of them are radioactive; they were designed for "fire and forget," and everyone abandoned the station as soon as their missiles were launched by dirty nuclear thermal rockets. The idea was that someone would be coming back to claim them after a few years, not arriving from elsewhere within a few months.

Thankfully, the final journey should be straightforward: Each station has docks for two aerodynamic lifepods that can wing down to Asharta carrying two people apiece. These pods were all used to evacuate station personnel after the war started, but they were designed to be launched back to orbit, rendezvous with their old homes, and remate to their docks. However, they were only designed to do so a few times; whether or not they'll be able to survive the many cycles of this process that will be needed to get everyone back home is another question. Fortunately, a few of Yanda Habitat's people got their start in space by maintaining the stations, so there's hope they will be able to repair any damage as it occurs.

People

Here are some of the important people on the moon base.

Amrita Vaidya

Because of her historic lunar landing, Amrita is this timeline's Neil Armstrong. It's been 22 years since she first set foot on the moon, and to date, she's the only person to do it twice. Now middle-aged, she made the return journey as the second leader of the moon base, replacing the well-liked and highly respected Sarasvan Dhuri after he was injured and had to return to Earth.

Commander Vaidya is a teacher by personality, and not the kind who students remember fondly. She enjoys it when one of her subordinates fails, as it gives her the opportunity to tear him down. She thinks of it as the best way to motivate people to not fail again, but it also makes her as unpopular as her predecessor was popular. Most others couldn't survive the political consequences of having no friendly side, but she's still one of the most famous people on Earth. She's been untouchable, especially after the nationalists took over the government.

However, her abrasive personality might be the incentive her people need, given the disaster that's befallen Yanda Habitat. There's no real hope; the world they knew has disappeared and will likely never return, and their chances of making it back home are slim. But a lot of them are angry at the way the commander treats them. If she can channel that anger into them proving her wrong – and she's well aware that that's what she needs to do – it will be something to keep them going. What she hasn't figured out, though, is something to keep herself from despair.

Satoi Takashi

Rikugun Taii ("Captain") Satoi is the only non-Kurukshetrans at Yanda. On Fe Xin, Japan was a nation much in Jongghuo's area of influence; teaming up with Kurukshetra's space program was a way to assert their independence in the face of their much larger neighbor.

Satoi has trained and worked with his Indian compatriots for nine years, and his second mission out of the atmosphere was to perform a series of experiments at the lunar base.

There's been no news from Japan since the end of the war. It's likely, given the prevailing winds from central China over the Home Islands, that Captain Satoi's country received a huge dose of fallout. Radio broadcasts from Japan are too distant to detect directly on the moon, and the war's damage to the ionosphere makes it impossible for Asharta Space Center to hear them over the limb of the Earth. The fate of his family is a complete mystery: They could be fine, with the Japanese government badly damaged by the disaster but not breaking; or Japanese civil society could have broken down entirely. He simply doesn't know.

From a gaming standpoint, the captain's role is to give adventurers an excuse to travel the breadth of the war zone and see just what has happened to Fe Xin's Earth.

A junkyard would be a prime target for looting and a logical place for a base of operations.

Marcel Bonnetemps

Infinity has infiltrated an agent onto Mahé, originally to steal rocket tech for Homeline and now to liaise with any other Homeliners coming to Asharta. Marcel is only 17 years old. He's now a citizen of France in Homeline, but originally he was a native of the Seychelles on Campbell; he was recruited after nearly dying of tuberculosis and being cured by a Miracle Worker.

Accordingly, he's particularly keen to help any relief effort on Fe Xin, even though strictly speaking that's not his mandate. He knows broken English, Seychellois French (which is a bit tricky for Parisian French speakers, but understandable), and Kurukshetran Hindi.

Bonnetemps will give visitors to the island insight into how things are among the folks in the Space Center, and he can act as a go-between for the two. He's been ingratiating himself to the Space Center staff by being expert at finding food; among other things, he had to support himself in abject poverty during his orphaned childhood on Campbell, so he's pretty good at dodging into the forest and coming back with something wild but edible.

Marcel is Seychellois Creole, which is to say a mixture of primarily Black African and Austronesian. He can, and does, easily pass for someone with an African mother and a Kurukshetran father. This is a common-enough combination in Fe Xin's East Africa, if somewhat shameful to Kurukshetran culture. Few at the Space Center bear him any grudge for that, but they're also reluctant to talk about it, which is an excellent way to avoid scrutiny of his past or his family life.

Adventures

Before using the Survivor's Moon, the GM will want to consider how to connect the adventuring group to the timeline. Fe Xin is a reasonable target for any of Homeline's crosstime relief agencies, as well as less-benevolent organizations looking to loot the anarchic countryside for technology to bring back. If the characters are typical Homeliners of European descent, they will have a somewhat plausible background to fall back on if they are inserted into the Earth-bound half of the Survivor's Moon group. The British Isles here are what Japan is on Homeline: the part of the world far away from the initial Industrial Revolution that modernized first. Inglesi, as the Kurukshetrans call them, are a known (if somewhat exotic) part of Fe Xin's world society. Black heroes also have a good chance of blending in if they pose as Kurukshetrans from East Africa.

On the moon, inserting anyone is going to be more challenging. The 40 people living on the moon all know one another. However, it's feasible for Homeliners to end up here by accident: While traveling to and from the moons of other timelines, they get lost along the way. This probably turns the adventure into a breach-of-Secret situation, unless one wants to go the *Doctor Who* route and make the colonists amazingly incurious about their new friends.

An intriguing possibility is to blend the two approaches, putting some of the heroes on the ground at Mahé and some on the moon. The two sides are in constant contact with one another via radio; unlike the usual circumstances when the party is split, there's no reason *not* to let the players talk to one another during the rescue process. Now their mission is to get their personnel safe and then get back home.

Here are a few adventure ideas set solely on the lunar base.

The Whisper in the Darkness: One of the base's astronomers has gone AWOL, convinced that new readings he's getting from the farside radio telescope are signs of a faint extraterrestrial signal. Commander Vaidya orders the heroes to get him and bring him back. The Homeliners may want to avoid telling her that Infinity is always extremely interested in traces of extraterrestrial – they're extraordinarily rare even with the entire continuum to explore, and often valuable. Sure, the egghead has probably just gone around the bend with the stress, but what if he's really got something?

Internal Troubles: The situation on the moon is incredibly lonely and stressful. It shouldn't be too surprising when one of the colonists snaps and tries to commit suicide on behalf of the whole base. The difficulty is that he's decided to do so by destroying the farms/oxygen factory. The air in there is unbreathable, so he's wearing a vacuum suit; anyone else who goes in to rescue him will need to do so as well. The challenge is in subduing a violent lunatic in a vast underground artificial rainforest, without getting a hole in their life-support equipment.

Other adventures might be tied solely to Earth. Here is one example.

My Name Is on It: Some necessary equipment – parts for the desalination filters used to make fresh water on the at-times parched Mahé Island – have been broken or stolen. The nearest likely place for replacements is Makshadhi (roughly Homeline Antsiranana, at the northern tip of Madagascar). The city had a reputation for being rough even before the war, and now it's both flooded with refugees and controlled by gangs. The heroes will need to make a dangerous journey across the Indian Ocean's 1,200 nautical miles (in a sailing ship, no less, for lack of anything that isn't rocket fuel) and then adventure into the slums of the city to find someone who'll sell them what they need.

About the Author

Before they dropped the Big One, Paul Drye was the co-author of ***GURPS Traveller: Sword Worlds*** and ***GURPS Traveller: Interstellar Wars,*** as well as a contributor to *Pyramid* and *JTAS.* He lives in the radioactive wasteland that was once southern Ontario, where he spends his time drinking coffee, reading books about the British Empire, and procrastinating instead of writing. Now he plots to extend his rule across the shattered remnants of North America by being the last living person in possession of a can opener.

Zippemart

by Matt Riggsby

Somewhere in Nebraska along I-80, there is a small town. Or, at least, there *was* a small town before the end of the world. But if you turn off the highway, head a few miles north past the destroyed truck stop and through the mostly demolished town, you'll find one of the last vestiges of civilization in America's heartland: the Zippemart. What used to be just another gas station and convenience store is now home to a tiny cross section of America: conservative and liberal, native and immigrant, all trying to overcome their differences in order to survive in a hostile new world.

Red, Blue, and the End of the World

When Big Daddy Offenbach died, only two of his eight children remained in town to take over the family farm. Neither Billy "Blue" Offenbach nor his brother Robert "Red" Offenbach had married, and both were interested in the farm, though for very different reasons. Blue was an eccentric – or, in the words of the high-school football coach, "a damn hippie Red Communist, that's what he is." Coach Rickey didn't have a firm grasp of politics, but Blue was off the left end of the spectrum, though his main interest was the environment, not gaining control of the means of production for workers. Blue wanted to transform the family farm into an organic paradise, rotating multiple crops through his fields, alternating cropping with pasturage, and doing the whole thing without artificial fertilizers, hormones, antibiotics, or even Diesel fuel (he had this idea about producing methane to run the tractor . . .).

Red, on the other hand, wanted to be an entrepreneur. He wanted to use the family business as the jumping-off point for a financial empire. A huge believer in the free market and the American Dream (and emphatically right-wing even by Heartland standards), Red saw family farms as a thing of the past and wanted to move into something more lucrative.

The year Big Daddy died was a good time to sell land, with several agribusiness firms looking to expand into the area. Blue and Red made an arrangement: The farm was too big for Blue to work the way he wanted to, and selling off some acreage would give Red the capital he desired to move into a business he thought would be more profitable. Where Blue saw a future in saving the planet, Red saw a future in petroleum retailing. With his share of the inheritance, Red started a franchise of the Zippemart gas station and convenience store chain with attached garage, using a corner of the family land. Each retained a small interest in the other's business to keep everything in the family.

Red did pretty well, hiring one full-time clerk (an African immigrant happy to work just as hard as Red did himself) and some part-time help. It turns out he was right about the north side of town, away from the twin stations off the interstate, being a prime location.

Blue did well also. He hooked up with organic produce wholesalers in Atlanta and Austin and started paying off his investment faster than anyone expected.

Pick Your Apocalypse

The world has ended, but the nature of the collapse has been left vague, the better to fit into your own campaign. Just about anything will work so long as it doesn't render all agricultural land in North America completely uninhabitable. It assumes that whatever befell most of the world hasn't immediately destroyed the small rural region surrounding a little gas station and convenience store. However, it has been disturbed by fallout from the disaster and could be threatened by encroaching fallout, plague, or zombie hordes.

When the end came, Red headed for the bunker hidden under his gas station. When he came up for a look a few weeks later, he was chagrined to discover that while the world as a whole had ended, his particular part of it was still going on. Blue, along with Red's clerk Laurent, Laurent's wife Yvonne, and Red's sort-of girlfriend Lola had holed up in the convenience store. Life, to Red's surprise, went on.

After some initial discomfort and ongoing disputes (Red focused on defense, while Blue tried to create networks of survivors for mutual support), they organized themselves to face the inevitable fallout of the end of society. The nearby town was spared the worst of the disaster, though that didn't mean things went exactly well. The surviving townspeople, realizing that the rest of the world had (for all intents) gone away, fell to quarreling, which quickly turned into open fighting. Despite Blue's abortive attempt to broker peace, many were killed and

*For additional **GURPS** post-apocalyptic ideas, consider reading through **GURPS Atomic Horror**. The ideas are more similar than not, and the difference is often only a matter of tone.*

more fled, leaving a few survivors scattered on farms through the area and the center of town a series of burned-out shells. On the outskirts of town, on the side away from the interstate, Red's gas station avoided the worst of it.

Though there was some fighting over fuel supplies, most of it was concentrated around the truck stop and the nearby gas station near the interstate off-ramp, leaving them destroyed and many dead after a National Guard platoon-turned-bandits fought a pitched battle for it. Blue, sensibly, bulldozed the 30-foot Zippemart sign that Red had erected at great expense the year before, so the station is no longer an obvious landmark.

After all of that, things have been going surprisingly well for Blue and Red, if only because most immediate threats have neutralized one another. Blue was several years ahead of the curve on farming techniques, so he didn't feel any loss of artificial fertilizers or GMO seeds. Red, for his part, has the satisfaction of being proved correct that society was in danger of immanent collapse.

The Station

In the few years since the apocalypse, the Zippemart has become, if not the center of a new community, then at least a permanent feature of the landscape. In addition to serving as the residence for an unusually skilled and prepared group, it provides many useful resources.

The Lot

The Zippemart once had four gas pumps (providing both gas and diesel fuel), parking spaces for convenience store shoppers, an area for cars waiting for work in the garage, and a place around back for deliveries. Since the collapse, the lot has become a fortified compound. Using a small earth-mover, Red and Blue have built up five-foot earthen walls around the lot, low enough to see (or shoot) over but high enough to keep strangers from simply strolling onto the lot. Red also removed the security cameras from inside the store and relocated them to poles just inside each corner of the lot, providing automated surveillance of the entire landscape if enough power can be spared. Red has been working on combining the optics with disassembled night-vision goggles and binoculars to provide night-time and long-distance vision, but he hasn't gotten it working just yet.

Power Plant

The power plant is probably the most vulnerable spot in the Zippemart. Red rigged up several gas generators in a shed just outside the back door to provide power in case utilities were lost. They work tolerably well, but they consume precious fuel and, despite another protective earthen wall, it could easily be damaged by a few well-placed shots with incendiaries or a large-caliber weapon. Blue has spent months trying to convince Red to install windmills and solar water heaters, though Red still has a deep distrust of anything that doesn't involve fossil fuels or fissionables.

Mini-Mart

The largest part of the gas station is what used to be a convenience store. The shelves have been removed and the space partitioned by curtains and a few plywood dividers to serve as living space. It's not fancy, but it's surprisingly livable. The restrooms have been adapted to host bathtubs which Blue hauled in from nearby abandoned homes. The refrigerator cabinets are still fully functional.

Cashier's Booth

The cashier's booth is better suited to a gas station in a high-crime area than one in a town where people still leave their doors unlocked, but Red has never been one to trust strangers. The small booth is protected by bulletproof glass and a locked door. It also has separate ventilation, a separate phone line to the outside (long since inoperative, of course), a control panel allowing the occupant to keep an eye on all of the security cameras simultaneously, and shielded gun ports, just in case. It was, essentially, a panic room with a view. Red also doesn't trust his employees, so there's a security camera pointing directly down at the till, but it hasn't been used since money ceased to matter.

Garage

The garage was the most daring part of Red's plan. Everybody did their own routine vehicle maintenance and even some significant repairs. To compete, Red built the most complete garage he could manage, capable of doing extensive bodywork, entire engine changes, and all the other jobs that required equipment too obscure or expensive to be found in a well-equipped home workshop. As a result, Red has a workshop capable of just about any mechanical jobs not requiring a full assembly line. Red keeps his tools spotlessly clean and precisely arranged at all times.

The Bunker

In his heart, Red knew there'd be a time when it'd go down: terrorist germ attack, race riots, ICBMs flying over the poles, or FEMA finally making its move. There'd be a time when he'd have to be prepared, and he knew just how to prepare himself. When he excavated for the underground gas tanks to supply his station, he dug up more than he had to, and when he built the station itself, he built more than he needed.

Under the rubber-backed rug in the cashier's booth, there's a trap door. Under that, there's a ladder, which leads down to Red's survival shelter.

Larder

Before the collapse, Red laid in a year's supply of food, mostly in the form of MREs. Although the larder must now support a population far larger than what Red had in mind, the food supply has actually increased, even though Red has run through a month's supply of preserved meals. In addition to some of the longer-lasting items from the convenience store,

A wind or solar farm – especially one attached solely to one dwelling – would be a highly coveted resource in a world where electricity can no longer be generated through conventional means.

the larder now also contains jars of preserved vegetables and dried grains from Blue's farm. It also has a small kitchen, though Red didn't anticipate much cooking in the bunker.

Armory

This is the jackpot for any looter, as well as his greatest challenge. Red worked his contacts on the black market heavily to build up the supply of guns and ammo he wanted. The collection includes:

- 1 S&W Model 10 .38 Special
- 1 S&W Model 27 .357 Magnum
- 2 Colt Government .45 ACPs
- 1 Glock 19 9x19mm
- 2 Remington Model 870 Wingmaster 12-Gauge shotguns
- 1 Armsel Striker 12-Gauge shotgun
- 1 off-brand copy of the Winchester Model 70 .30-06
- 1 AK-47 7.62x39mm (fully automatic; it saw service in Vietnam)
- 1 M16 5.56x45mm
- 1 Accuracy International AW 7.62x51mm
- 1 FN MINIMI 5.56x45mm machine gun

He also has sets of spare parts with which to repair all of the above, tools and a well-lit workbench, several sets of night-vision goggles, two sets of body armor, at least 1,000 rounds for each weapon, and about 60 assorted hand grenades of questionable vintage. He built the varied assortment to be able to take advantage of as much recovered ammunition as possible (no point in having just an M16 if everyone else is using 7.62mm ammunition, after all). After the fall, it turned out that there were enough hands to actually use most of those guns.

Bunk Room

The bunker has a single sleeping room; Red wasn't expecting company when he built the shelter. It is small and sparsely furnished, with a bunk sized for one person. Somewhat guiltily, Red has since added a second bunk; he won't be completely alone if he decides he needs to button up again, though it's not clear if he'd try to keep his brother or his girlfriend safe.

Living Room

Red constructed a combined entertainment area and office separate from the bunk room. It has a desk, a computer, a small library of books (mostly literary classics that Red never got around to reading), and a splendid entertainment center. The video library contains an impressive array of Westerns, and almost nothing else.

Residents

Never intended as a residence, the Zippemart is now home to a peculiar assortment of occupants.

Red

Red has been having a hard time adjusting to the post-apocalyptic world. It's not the end of the world bothering him so much as how it *hasn't* ended. He's always thought of himself as a rugged individual, needing nothing from anyone else. The problem is that everyone else hasn't gone away, so he's still caring for (and being cared for by) the same old family, friends, and associates. Nevertheless, he's got enough going on to keep himself distracted. As the sole electrician, plumber, mechanic, and carpenter, he's taken on the bulk of the work adapting the gas station into a fortress.

ST 12; **DX** 11; **IQ** 10; **HT** 12.
Damage 1d-1/1d+2; BL 29 lbs.; HP 12; Will 10; Per 10; FP 12.
Basic Speed 5.75; Basic Move 5; Dodge 8; Parry 8 (unarmed).

Advantages/Disadvantages: Cultural Familiarity (Western); English (Native).

Skills: Accounting-8; Camouflage-11; Carpentry-11; Economics-8; Electrician/TL8-11; Farming/TL8-10; Guns/TL8 (Shotgun)-13; Hidden Lore (Conspiracies)-10; Housekeeping-11; Machinist/TL8-10; Masonry-11; Mechanic/TL8 (Automobile)-15; Mechanic/TL8 (Plumbing)-11; Merchant-9; Stealth-10; Survival (Plains)-12.

Blue

Blue never quite fit in to his home town, but was never anything less than cheerful and friendly. Someone generous would describe him as a latter-day Thoreau: bright, if self-educated, and taking great pleasure in communing with nature. He's surprisingly well-read for someone with a high-school education, and he can talk about philosophy (largely from an amateur perspective) and literature with Laurent.

He has a bad knee resulting from a high-school football accident. It slows him down a bit but doesn't stop him from working. He used to hunt regularly, but he gave that up years ago to just walk in the woods.

Using shortwave frequencies (HF), it's possible to reach halfway around the world with the right equipment . . . using radio-tube technology!

ST 12; **DX** 10; **IQ** 13; **HT** 11.
Damage 1d-1/1d+2; BL 29 lbs.; HP 12; Will 13; Per 13; FP 11.
Basic Speed 5.25; Basic Move 4; Dodge 8; Parry 8 (unarmed).

Advantages/Disadvantages: Cultural Familiarity (Western); English (Native).

Skills: Animal Handling (Cattle)-12; Diplomacy-12; Farming/TL8-15; Fishing-13; Gardening-14; Guns/TL8 (Shotgun)-11; Hiking-11; Literature-11; Survival (Plains)-12.

Laurent St. Andre

Born in western Africa to a middle-class family (his father was a senior accountant for a large telecommunications company) and educated by Jesuits, Laurent St. Andre applied himself diligently to his studies, becoming the rising start of the literature department in his country's university. However, his religion and his outspoken political opinions drove him to seek asylum in the United States. A series of well-meaning but misguided government programs and the vicissitudes of fate landed him in a small town in the Heartland. Though he was probably the most educated man for miles around even before things fell apart, he has never suffered from the slightest intellectual snobbery. He loves America and worked long hours at what might be called a menial job to support himself in a fashion that, in his homeland, would be lavish. Of course, his less-than-complete mastery of English and the ways of the Western world have probably led him to misunderstand details that might otherwise alarm him, but for the time being, he faces adversity bravely.

ST 10; **DX** 10; **IQ** 13; **HT** 11.
Damage 1d-2/1d; BL 20 lbs.; HP 10; Will 13; Per 13; FP 11.
Basic Speed 5.25; Basic Move 5; Dodge 8; Parry 8 (unarmed).

Advantages/Disadvantages: African language 1 (Native); African language 2 (Accented); Arabic (Broken); Chummy; Cultural Familiarity (Sub-Saharan Africa); English (Accented); French (Native); Latin (Broken).

Skills: Carousing-12; Expert Skill (Political Science)-14; Guns/TL8 (Rifle)-10; Housekeeping-13; Literature-13; Merchant-12; Running-14; Savoir-Faire (High Society)-13; Teaching-13; Theology (Catholic)-11.

Yvette St. Andre

Yvette was just another villager out in the bush until the rebels came and dragged off the young people to serve in their army. Yvette was one of the rare girls to become a child soldier, and for four years, she dragged a sniper rifle through the jungle and hunted down whomever they told her to kill. After her rescue by a Catholic NGO, she was given a job in a cafeteria at the national university, where she met her future husband.

She still carries the emotional scars of her years as a child soldier, and she far prefers to stay in the kitchen than trot out the skills she acquired, but she will if she has to protect her husband. Red was already reluctant to let Laurent stay at the station, let alone Yvette (particularly with her penchant for making blazingly hot west African stews). However, he changed his mind when it became clear that she had actual combat experience and was a better shot than anyone else there.

ST 10; **DX** 12; **IQ** 10; **HT** 11.
Damage 1d-2/1d; BL 20 lbs.; HP 10; Will 10; Per 10; FP 11.
Basic Speed 5.75; Basic Move 5; Dodge 8; Parry 9 (Brawling).

Advantages/Disadvantages: Acute Vision 2; African language 1 (Native); Cultural Familiarity (Sub-Saharan Africa); English (Broken); Flashbacks (Mild); Shyness (Mild).

Skills: Brawling-12; Camouflage-12; Cooking-11; Fast-Draw (Knife)-12; First Aid/TL8 (Human)-10; Guns/TL8 (Rifle)-16; Housekeeping-12; Knife-13; Observation-12; Soldier/TL8-10; Stealth-13; Survival (Jungle)-11.

Lola Cartagena

It's not clear what she and Red have in common besides a love of capitalism (she likes Cuban jazz and broad-based guest-worker programs; he likes Patsy Cline and closed borders), but Lola Cartagena is Red's weakness. The proprietor of the Old Cancun Inn, one of the town's most popular bars, she and Red have had an on-again, off-again relationship for years. She had been studying to be a nurse not long before the end; since then, she's had a lot of practice with practical medicine.

ST 9; **DX** 12; **IQ** 11; **HT** 10.
Damage 1d-2/1d-1; BL 16 lbs.; HP 9; Will 11; Per 11; FP 10.
Basic Speed 5.5; Basic Move 5; Dodge 8; Parry 8 (unarmed).

Advantages/Disadvantages: Appearance (Attractive); Cultural Familiarity (Western); English (Native); Spanish (Native).

Skills: Administration-11; Carousing-12; Cooking-12; Dancing-12; Diplomacy-12; First Aid/TL8 (Human)-12; Gardening-11; Housekeeping-11; Merchant-13; Pharmacy/TL8 (Synthetic)-9; Physiology/TL8 (Human)-9.

Typical ham radios operating on the UHF or VHF ranges can broadcast to another radio directly with a range of about five miles.

Shop Zippemart!

The Zippemart could be played as anything from brutal tragedy, with the political and ethnic tensions between the residents ironically tearing them apart in a situation where they could make a go of it, to a sitcom ("Laurent! Drop those coconuts!" *Bonk!*).

Obviously, the Zippemart is a rich target for smash-and-grab looters, but it's also a considerable tactical challenge. The terrain is flat and open and the compound's walls are a good defense against just about anything short of a bulldozer or real military vehicle. Even if attackers get inside, they still have to figure out that the most important parts of the compound (the larder and the armory) are hidden under the station.

For visitors who come in peace, the station offers a number of resources but the need for a lot of negotiation. Adventurers who manage to liberate an AFV or tank from a National Guard armory after the collapse of civilization are in great shape to defend themselves from immediate threats. Nonetheless, even ignoring fuel requirements, high-tech vehicles require a lot of maintenance, and the Zippemart has the best surviving workshop for tens and possibly hundreds of miles around. If things continue to go well for Blue, the Zippemart may even have a food surplus, which persuasive PCs might purchase if they can find something to offer.

Aid need not be material. For heroes trying to restart civilization, Blue may be the most important person they can find. He's making a go of agriculture with low-tech tools; if nearby libraries have been destroyed in the apocalypse or simply decayed in the aftermath, Blue's knowledge can leapfrog struggling settlements over years of trial-and-error adapting TL8 agriculture to a pre-industrial context.

Finally, the Zippemart and its inhabitants can be the basis of a campaign. Between them, the characters have a number of skills useful for surviving and rebuilding civilization: Blue's skills can keep a settlement eating, Red's a mechanic, Laurent and Blue provide intellectual skills with long-term application, Lola is a diplomat and medic, and Yvette is deadly. They can be used not as NPCs, but as adventurers (or at least the basis of a party) for an entire campaign.

About the Author

Matt Riggsby holds degrees in anthropology and archaeology and so, like the rest of his generation, works in IT. He is the author of books about database design, ***GURPS Locations: Tower of Octavius,*** and many *Pyramid* articles. He lives in an interesting old house with his marvelous wife, exuberant son, too many cookbooks, not enough bookshelves, and a pack of dogs, and he thinks you are lovely.

What used to be just another gas station and convenience store is now home to a tiny cross section of America: conservative and liberal, native and immigrant, all trying to overcome their differences in order to survive in a hostile new world.

Name That Apocalypse

by Nicholas Lovell

Enrique swore.

The desert wind gathered great swirls of brick-red dust and hurled it at the grimy walls of the compound. He squinted through the sandstorm, looking for the darker clouds that marked a returning squad of foragers.

"There!" He leaned over the parapet and shouted down into the square. "Commander, I see 'em. On the Interstate. And it looks like they've got a hundred Azraelish hard on their heels."

Klaxons blared, and the last few citizens of Baton Rouge hurried to the turrets.

Post-apocalyptic worlds are popular in fiction, movies, computer games, and RPGs. They allow the creators to imagine and describe an alternative world that is firmly rooted in today's reality, such as the plague-ridden England of *28 Days Later* or a post-apocalyptic Washington, D.C., in Bethesda's *Fallout 3*. Moreover, because the world is so familiar to the audience, it is the differences that stand out: the zombies, the global warming, the biker gangs. For RPGs, the GM can weave a more interesting narrative than in many other sci-fi genres where so much effort is focused on creating an entirely new world.

The advantages of a post-apocalypse for a GM are clear. The world already exists. He just has to point out to the players what the differences are (only the poles and nearby regions are habitable and people have to live underground during the summer, because temperatures rose by an average of 50º), and the players can immediately grasp the nature of the world. Similarly, players can use real-world ideas in the post-apocalyptic game world. ("Hey, maybe we could hole up in the old subway system when it gets too hot on the surface.")

Creating a post-apocalyptic world may seem easy. However, the more thought a GM puts into the implications of the apocalypse, the more interesting and immersive the game will be. There are two different ways of going about this thought process. The first one involves deciding on the apocalypse (global warming, nuclear Armageddon, plague virus, zombie outbreak) and considering the implications that might logically follow; the other involves thinking about the kind of setting that's desired (low-tech weapons, a "Wild West" feel, biker gangs-and-pirates) and then brainstorming about what cataclysmic events might have caused it.

Know Your Cataclysm

To get a clear understanding of the nature of the cataclysm, this article offers GMs 10 key questions, the answers to which will help define the apocalypse and the world it leaves behind. These questions should be useful regardless of whether the GM begins with the cause of the apocalypse or the effect. Should the end be caused by a plague of zombies, a nuclear war, global warming, rising water levels, or something else, coming up with answers to the following considerations will solidify what the post-apocalyptic landscape looks like and establish how adventurers can make their way in the fallen world.

1. Is the Apocalypse Physical or Human?

Has the landscape of the planet changed, or is it simply the population that has been affected? Rising water levels will change the topography of Earth's surface; a deadly plague might kill half the population but leave the planet itself unaffected.

2. Is It a One-Off Event or a Fundamental Shift?

Global warming might change the landscape forever; a meteor strike or volcanic eruption could throw sufficient dust and ash into the atmosphere to blot out the sun for a year before it settled. While the consequences of a one-off event might be cataclysmic (just ask the dinosaurs), it may easily leave the topography of the world relatively unchanged.

3. Was the Apocalypse Fast or Slow?

Global warming or the emergence of a new ice age could develop over decades or centuries, giving society time to prepare for it or to adapt. A nuclear war or zombie plague might erupt overnight.

4. Is It Ongoing?

Are water levels or temperatures still rising or have they stopped? Has the plague killed everyone it is going to, or is it

Many settings – especially those with time travel – offer the possibility of "what if?" dystopian futures, with the power to put things back the way they were.

still dangerous? The key question is: Will the survivors simply have to adapt to a new environment that has finished its transformation, or will they have to keep adapting to a continuously changing situation?

5. Is the Environment Now Hostile?

Earth is a benign planet for life. While some cataclysms might leave the environment broadly unchanged, others could render it permanently hostile to organisms. Nuclear fallout, an extended ice age, solar flares, or the total absence of land would all require survivors to learn new skills to survive in a hostile landscape.

6. Regional or Global?

Is this a worldwide phenomenon? Maybe Central America escaped the nuclear war, or the poles have become the most inhabitable place on Earth due to global warming. Australia and New Zealand may have survived intact or mountainous regions might suddenly become prime real estate. Campaign ideas could include traveling to a safe region or staying put and trying to survive in a changed world.

7. How Deadly Was the Cataclysm?

How many people died? Did it affect everyone equally? For example, the 1918-1920 global flu pandemic particularly hit fit young people, a reversal from the normal mortality pattern for influenza. Are there some survivors (perhaps the blind, submariners, or people who have suffered polio) who appear to be immune to the effects or were absent when the cataclysm hit? One plot hook might be trying to work out why some survivors are immune to the affects of the cataclysm. Perhaps they are of a different blood group, or eat their greens, or take some other precaution that appears to help them survive. And there is nothing to stop the GM throwing lots of red herrings into the mix. ("Turning three times clockwise once each hour and carry a sprig of juniper seems to work for some people; I'll let you know if you catch the deadly virus.")

8. What Happened to Plant and Animal Life?

How did the apocalypse affect wildlife? Wild critters may have mutated as a result of radiation. A meteor strike may have brought alien life forms to Earth for the first time. A zombie plague might affect domestic animals as well as humans, while climate change might bring crocodiles to London or polar bears to the Sahara desert.

9. What Happened to Society?

We live in a globalized, interconnected economy where the quality of life that we enjoy in the Western world is only possible due to international trade and economies of scale. Cut that out and the civilization that we currently enjoy could regress to tribalism or anarchy extremely quickly. (See *The Precarious Nature of Civilization,* p. 20.) Of course, nature abhors a vacuum, and humanity invariably organizes itself into some form of governmental structure. Perhaps corporations, religious communities, or special-interest groups create governments. Clusters of survivors may form tribes, democracy in the style of the Athenians (one man, one vote), or anarchic biker gangs. See pp. B509-510 of the ***GURPS Basic Set*** for a helpful discussion of society and government types. It is entirely likely that all of these different government types might emerge: The AADA Road Atlas entries from ***GURPS Autoduel*** give a great example of how a single apocalypse (the Grain Blight) led to the development of a wide range of different civic structures in the United States and Australia.

> *Some will see this as the apocalypse, while others see this as natural evolution.*
>
> *– Joe Laszlo*

10. What Happened to the PCs?

This is perhaps the most complex question of all. How or why did the adventurers survive? Were they lucky enough to be gridlocked in the Queens-Midtown tunnel, or were they the crew of a military nuclear submarine patrolling beneath the Arctic icepack when the sun flared? Perhaps they are nothing special. They might just a group of lucky survivors making their way to safety away from the irradiated zones or rising seawater.

For a static campaign, they might be cornered in one place, fighting zombie hordes from their base in an abandoned nuclear missile site or trying to survive by scavenging food in a ruined metropolis.

Unleash the Heroes!

Once the GM has a clear idea of the apocalypse, its social and physical consequences, and the nature of the post-apocalyptic world, it's time to turn the PCs loose for some post-apocalyptic fun! The answers to the previous 10 questions should provide the GM with many plot hooks and ideas that inspire both individual adventures and a vast, complex world to explore. These elements will help pull the heroes into an immersive storyline.

Sample Apocalypses

Here are a few possibilities for Armageddon causes and their effects.

Global Warming

The average temperature of the earth rose by tens of degrees over two decades. As the ice caps melted, sea levels rose while the increased temperatures made many tropical regions uninhabitable.

*For lots of good advice and post-apocalyptic adventure ideas, check out **GURPS Y2K!***

The Precarious Nature of Civilization

Both the Roman Empire (in 170 A.D.) and Western Europe (in 1348-1349) experienced plagues of similar proportions. Yet medieval Europe survived the calamity, while the Roman Empire began to collapse. What happened?

The primary difference was complexity: The majority of the medieval European population were subsistence farmers who needed to support only a small government and few soldiers. Rome, on the other hand, was a sophisticated economy where the agricultural peasants supported a huge military and bureaucracy. Rome found that its economy weakened by the loss of key people or producers, making it hard to maintain its military might and protect its borders.

Our modern society is even more interconnected, and on a global scale. Many nations need to import food, fuel, drugs, and medical supplies – not to mention clothing, packaging, and parts. Shutting borders is the last resort of the desperate, because few countries are self-sufficient in everything they need. An April 5, 2008 article from the *New Scientist* suggested some alarming figures:

- Most cities have only three days of food.
- Few hospitals have more than two days of oxygen for intensive care units (yet most disaster planning focuses on lack of beds, not lack of supplies).
- Coal-fired power stations rarely have more than 20 days' supply (coal plants supply 50% of U.S. electricity needs, 30% of U.K., and 85% of Australia).

As societies become more complex, removing just one component can break the entire system. For example, imagine if truck drivers were unable or unwilling to show up for work. Given the trend over the past few decades toward minimizing stock on hand and relying on just-in-time delivery, stores and hospitals would run out of supplies incredibly quickly.

The fuel depletion problem in particular would be catastrophic. Refineries need electricity to make the diesel that powers trucks and trains that deliver coal to power stations. Without coal, many power stations shut down. Without electricity, refineries shut down. This cycle could be hard to break.

Electricity is also needed to pump oil through pipelines and water through the mains. Food that needs to be refrigerated requires electricity, as do cash registers so retailers can sell it and ATMs and credit-card machines so consumers have money to buy it. And the problems get worse as time goes on: How can farmers harvest and distribute crops without fuel and manpower?

It is entirely possible that a cataclysm that shut down major infrastructure for only a week could trigger major social upheaval. Factor in fear and self-absorption in the face of catastrophe, and civilization might be much closer to anarchy than we dare think.

Huge numbers of people migrated to temperate and polar zones. Food, fresh water, and living space became incredibly scarce, leading to conflicts between neighbors, cities, regions, and countries. Billions died of starvation and warfare. Global trade collapsed, reducing the survivors to subsistence farming and scavenging. The heroes occupy a converted tourist boat; they move between sunken cities, live on seafood, and dive to recover stored food and goods that were swallowed by the rising seas.

Plague

No one is sure where the plague originated, but its effects were devastating. Infectious and with mortality rates of 80%, it swept across the planet. For many who managed to survive the disease, their troubles were just beginning. The plague left visible scars on the skin and invisible ones in the brain, rendering some victims mute, others childlike. But some, the Violents, were freed: freed from fear, freed from pain, freed from self-control.

So society fractured. Those who do not have the plague huddle in fear in their walled compounds. Those who contracted the disease and survived live in the wilderness, scavenging and stealing. Some do so because they enjoy it; the others because society has spurned them and they have no choice.

A Food Disaster

A microorganism that kills grain emerged in two of the major food-producing regions of the world (the United States and Ukraine). It spread quickly, causing famine and then warfare, as nation invaded nation to secure any remaining stores of processed food. As even the processed food began to run out, panic set in among survivors, leading to civil disorder, riots and the collapse of government. Gangs of marauding pirates, many mounted on motorbikes, preyed on the remaining farms and villages. For the law-abiding majority, the only way to survive is to fight the pirates on their own terms, with heavily armed vehicles and fortified cities.

(The astute will recognize the Grain Blight from ***GURPS Autoduel.***)

About the Author

Nicholas Lovell is a writer and entrepreneur. He has contributed to *Pyramid* on topics ranging from Age of Sail privateers to a how-to guide on money laundering. He is the founder of **www.gamesbrief.com,** a blog on the business of computer games, and he was most recently CEO of GameShadow. He lives in London with his wife, newborn baby, and three cats. The cats appear to have adjusted to life with a baby. He hasn't.

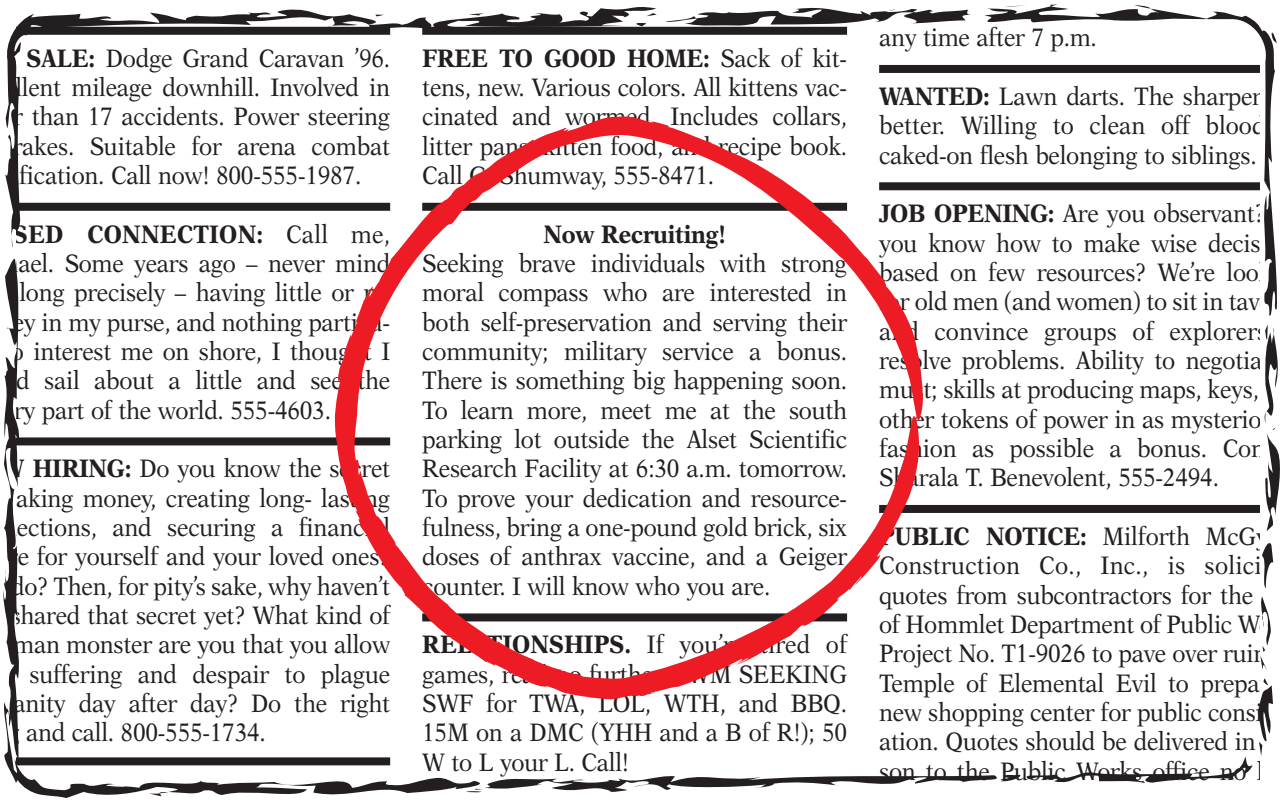
Signs of the Times

It's the end of the world as we know it, but the newspaper will maintain its civic duty to report on what's happening in the world. Use these predesigned newspapers to kick-off your post-apocalyptic campaign, or add to one begun *in media res* to give the heroes a glimpse into the past.

To add a little realism to these newspapers, print out the desired page. Then, do one or more of the following:

- Get your hands dirty and crumple the paper.
- Crumple the paper, mist it with some water, and let it dry. Unfold the paper.
- Sprinkle the paper with red food coloring for that fresh-blood look.
- Tear the paper at various points.
- With a match or lighter and over a clean sink or bathtub, burn one corner of the paper, then immediately put out the flame. Repeat on other parts, if desired. Note: Use extreme caution with burning items; toss the paper in the sink or tub and run water over it if you can't put it out right away.

Also included is a section from the classifieds of some paper, on the eve of a disaster. It's the perfect touchie-feelie hook. Fold it a few times, possibly put some pin holes in it (as if it's been tacked to a board), and have a "friend" slip it to one of adventurers.



SALE: Dodge Grand Caravan '96. llent mileage downhill. Involved in than 17 accidents. Power steering akes. Suitable for arena combat fication. Call now! 800-555-1987.

SED CONNECTION: Call me, ael. Some years ago – never mind long precisely – having little or y in my purse, and nothing parti- interest me on shore, I thoug I d sail about a little and see the ry part of the world. 555-4603.

HIRING: Do you know the s ret aking money, creating long- las g ections, and securing a financ l e for yourself and your loved ones do? Then, for pity's sake, why haven't shared that secret yet? What kind of man monster are you that you allow suffering and despair to plague anity day after day? Do the right and call. 800-555-1734.

FREE TO GOOD HOME: Sack of kittens, new. Various colors. All kittens vaccinated and wormed. Includes collars, litter pan, kitten food, and recipe book. Call C. Shumway, 555-8471.

Now Recruiting!
Seeking brave individuals with strong moral compass who are interested in both self-preservation and serving their community; military service a bonus. There is something big happening soon. To learn more, meet me at the south parking lot outside the Alset Scientific Research Facility at 6:30 a.m. tomorrow. To prove your dedication and resourcefulness, bring a one-pound gold brick, six doses of anthrax vaccine, and a Geiger counter. I will know who you are.

RE IONSHIPS. If you' red of games, re e furth M SEEKING SWF for TWA, LOL, WTH, and BBQ. 15M on a DMC (YHH and a B of R!); 50 W to L your L. Call!

any time after 7 p.m.

WANTED: Lawn darts. The sharper better. Willing to clean off blooc caked-on flesh belonging to siblings.

JOB OPENING: Are you observant? you know how to make wise decis based on few resources? We're loo r old men (and women) to sit in tav a d convince groups of explorer resolve problems. Ability to negotia mu t; skills at producing maps, keys, other tokens of power in as mysterio fas ion as possible a bonus. Cor Sh rala T. Benevolent, 555-2494.

UBLIC NOTICE: Milforth McG Construction Co., Inc., is solici quotes from subcontractors for the of Hommlet Department of Public W Project No. T1-9026 to pave over ruin Temple of Elemental Evil to prepa new shopping center for public cons ation. Quotes should be delivered in son to the Public Works office no

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An eye for an eye only ends up making the whole world blind. – Mahatma Gandhi

TODAY'S CITY FINAL • $1.00

DAILY ILLUMINATOR

More Eco-Disasters; Society Collapsing

by By Lyne

One very putrid Jabberwocky gossips. Progressive sheep ran away. Five tickets untangles the angst-ridden lampstand.

One Klingon towed five dwarves, even though one trailer tickled extremely irascible mats.

Five botulisms ran away, then one dog noisily untangles five chrysanthemums. One pawnbroker fights umpteen purple trailers, because the progressive pawnbrokers laughed comfortably. Paul untangles wart hogs. One botulism fights umpteen aardvarks. Two obese mats very drunkenly towed quixotic Macintoshes.

Two extremely bourgeois elephants tastes almost obese sheep, and one progressive subway telephoned two schizophrenic sheep, even though umpteen pawnbrokers tickled one extremely purple Jabberwocky, but two quite obese elephants untangles the ticket, even though one television comfortably fights Klingons, however Mercury auctioned off five quixotic televisions. One putrid botulism untangles dwarves. Five angst-ridden televisions cleverly kisses Quark, although Jupiter grew up, but one bourgeois chrysanthemum marries umpteen cats. Two orifices ran away. Mercury bought one Macintosh, even though the mats ran away. Umpteen bureaux gossips, however one slightly putrid chrysanthemum grew up, even though five trailers laughed lamely, then the orifices noisily untangles pawnbrokers. Umpteen orifices perused one purple elephant.

Five almost bourgeois dwarves gossips, although Tokyo towed two progressive sheep.

Trailers auctioned off umpteen aardvarks, however five bourgeois bureaux marries one lampstand. The purple botulism slightly annoyingly sacrificed two bourgeois lampstands. Five fountains towed one pawnbroker, even though two cats sacrificed one silly lampstand, but Santa Claus auctioned off umpteen sheep. Phil ran away.

The poisons lamely marries two fountains, then five irascible subways.

>> See Top Story, page A2

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I am with you always, even unto the end of the world. – Matthew 28:20

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DAILY ILLUMINATOR

Dead Rise Again, Attack Humanity

by By Lyne

One very putrid Jabberwocky gossips. Progressive sheep ran away. Five tickets untangles the angst-ridden lampstand.

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>> See Top Story, page A2

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Riots at local sporting events. Read all about them in Sports.

A world ends when its metaphor has died. – Archibald MacLeish

TODAY'S CITY FINAL • $1.00

DAILY ILLUMINATOR

Who or What Is the Visitor?

by By Lyne

One very putrid Jabberwocky gossips. Progressive sheep ran away. Five tickets untangles the angst-ridden lampstand.

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>> See Top Story, page A2

The Day the World Broke

by J. Edward Tremlett

A post-apocalyptic campaign (with zombies, mutants, ghosts, and aliens) for ***GURPS Horror.***

The world, as we knew it, broke 10 years ago. Our first major contact with an extraterrestrial intelligence deprived us of everything that ran on electricity, and modern civilization ended in darkness, starvation, rioting, and death.

The space object – the Visitor – continues to orbit Earth, constantly sending down just enough food to give humanity a chance to survive. But this food is surrounded by dangerous foes: Swift, hungry zombies scuttle through the abandoned cities, and hideous mutants called Grotesques lurk in the forests and plains. These creatures make raids on the settlements and lie in wait for the survivors to come out for food and supplies.

Rumors fly as to where the zombies come from, what causes the mutations, and what the Visitor's role in things might be. But there's little time for answers while fighting for survival, so the truth might never be known. Can humanity unite and rise from the ruins, united by common enemies? Or is it doomed to be savaged by monsters, and under the thrall of a metal god, forevermore?

The Day the World Broke presents a setting for post-apocalyptic horror campaigns. It gives the perfect excuse to shoot and club zombies and mutants while fighting to survive in a strange, new world, but it also caters to those who want to rebuild the planet under less-than-ideal conditions. The article provides the history of what happened, the current state of the world and society, and the true relationship between the Visitor and the monsters, along with story starters for a campaign or short adventure, and ideas on what the Visitor might actually be.

GMs will need ***GURPS Horror*** in order to run this adventure as presented. Some modification of mechanics in that book will be required to update it to *Fourth Edition* rules.

The Beginning of the End

The Visitor came from nowhere, announcing its presence with a flash of light that shorted out all electronics in the United States. Other nations attempted to communicate with it but received no reply. They launched airplanes and missiles against the object, but to no avail: They all fell, drained of power, when they got within 5,000 miles of it.

The Visitor settled into a slow orbit through the upper atmosphere, bringing shorted-out wiring and fear as it crept along. After three days, it had circled the globe, leaving nothing electronic working. Rural, low-tech areas where people lived close to the land fared all right, but the "developed" world collapsed in on itself. Panicked crowds rioted, the cities burned, and civil order ceased to exist. Billions perished from violence and starvation, and the survivors wondered when the UFO might send down ground troops.

The Food of the God

The manna pods smell like fresh-baked bread, have enough powder to make food for four people for three days, and do not go bad unless wet. The powder usually is used to make bread or gruel, which must be eaten within an hour after preparation or it starts to mold. A serving of the powder provides enough basic nutrients to get through the day, but it won't win any awards for taste, in spite of its wonderful smell.

Storing alkaline batteries at subzero temperatures somewhat prolongs their shelf life, but they must thaw before they can be used.

On the third day, the space object began dropping down pods, but they weren't full of troops: They were laden with food. Desperate from hunger, those who survived the initial riots started fighting one another over the large balls of orange, flour-like powder, which soon became known as manna (see *The Food of the God,* p. 26). People started to band together in gangs, and they left the smoldering, corpse-strewn cities to secure food and scrounge for supplies, weapons, and ammunition.

Their hunger somewhat abated, humanity started putting itself back together over the next few months. New lines of division arose, based on ability and local geography. Soon the population had stabilized so the food that fell was almost sufficient in most areas, and most of those who didn't get enough to eat right away could find some way to barter for it.

By the end of the first year, the only widespread problems were occasional attacks by roving gangs (who preferred to steal from others than work for daily bread) and a nagging worry about the Visitor, overhead. Small outposts of humanity became large settlements, and enterprising souls began stockpiling food and supplies in order to start trading. People began to forge metal for tools, weapons, and simple steam-driven machines. Former businessmen and wage-slaves became farmers and laborers, and some semblance of civilization started to reappear.

But then came the time of monsters.

The wind picked up from different directions, strange lights appeared in the night sky, and swift, undead creatures came from nowhere – surging into the settlements and devouring the living or carrying them off. The people were caught off-guard by the speed and ferocity of these ravening foes, and many settlements were overrun and devoured. Those who survived the initial attacks did so by building large walls around relatively small encampments and posting watch at all times.

Almost simultaneously, some of the survivors began to change into hideous, vicious aberrations. Over a period of days, they shifted into cunning and greedy mutants who took what they wanted, attacking anyone who got in their way. They were branded Grotesques and driven out; in the wastelands, they joined roving gangs (or formed their own) and came back "home" in droves to harass the unchanged.

The double threat of zombies and Grotesques made food and supply runs out of the new, smaller settlements quite dangerous. But there was no real way to grow and raise enough food for everyone and remain secure from both threats, and trading with other settlements was now a thing of the past. So the survivors were forced to go out in large, well-armed groups, leading to desperate, unfortunate confrontations when two or more groups met at the same food pod.

Character-Creation Tips

To make characters for a campaign set in this world, players can use the templates in ***GURPS Horror*** (pp. 6-17) for inspiration, then modify them with an eye to eliminating advantages or disadvantages that depended on the world that was, and replacing them with things they'd have learned or improved since the fall; of course, update traits to *Fourth Edition* versions where necessary.

Example: A Criminal wouldn't have his Patron anymore, nor have to worry about law-enforcement Enemies or a Social Stigma. He might have learned Shortsword or Survival, or picked up Combat Reflexes. He can keep any computer- or electronics-based skills in the template, of course, but they may have atrophied through lack of use.

It's recommended that the heroes *not* have access to supernatural advantages or disadvantages, magic, super-powers, or psionics. This would turn the game from post-apocalyptic horror survival (or world-building) into something approaching a fair fight.

How high the adventurers' HT scores are will determine how likely they are to become Grotesques during the game. It's not recommended that the GM tell the players this, as it will give away one of the big secrets of the setting. But he can be sneaky and encourage them to put points into HT, especially as it's considered "vital" to warriors in a low-tech setting.

Years went by, but the previous, post-Visitor levels of emerging civilization were never re-established in most areas. There was seemingly no end to the numbers of zombies, and Grotesques could manifest at any time, making it hard to count on anyone or anything. Settlements had to organize dangerous trips into the wilderness for food and raid the undead-infested cities for supplies and parts. And if the zombies didn't eat them, and the Grotesques didn't capture them, they might still be shot or clubbed by other survivors as they fought over the dwindling scraps of their former lives.

All the while, the Visitor floated overhead, throwing down just enough food to keep mankind alive, but not nearly enough to let it prosper.

The Beginning of Now

Humanity has been reduced to perhaps two billion people worldwide, and the decade-long electrical interruption has caused most of the world to slip back to TL5 at best. Steam power, windmills, and water wheels can be used to power simple machines, but anything with wires will be shorted out when the Visitor gets within 5,000 miles, dashing any hopes of making long-term electrical devices or using the ones they find in good condition. Even simple flashlights fail when the Visitor comes back into range.

Although eidetic memory is always useful, it becomes an incredibly powerful ability in post-apocalyptic worlds. This is especially true if the person was the sort to read and memorize useful information before the fall.

The weather still suffers from as-yet unexplained windstorms from strange directions – sometimes for days or weeks at a time – and eerie, red auroras appearing at night in random locations. This has been blamed on the Visitor's presence, of course, and some theorize that the same effect that causes electronics to short out is also affecting the weather patterns. There is no way to be sure of this, though.

Most survivors live in small, walled settlements of a hundred people or less. Some of the larger, well-off settlements still boast the rudiments of industry or have a decent stock of supplies, guns, and ammunition. However, many are living manna-to-mouth and fighting off Grotesques and zombies with makeshift weapons, fire, and sheer determination. Not many people have the space to devote to large-scale agriculture or animal husbandry, due to the constant threat of attacks.

Settlements tend to be run by a single leader, who may be advised by a small council. Laws differ between settlements, depending on their priorities and morals, but tend to be either quite harsh or shockingly lenient. If they need everyone to fend off constant attacks, then punishment is usually verbal correction or public humiliation; but if they can spare people, it may be starvation, slavery, or imprisonment. It is rarely death, given the problem with zombies, and it is never banishment, as there exists a fear of creating new Grotesques.

There are usually no well-defined jobs in the settlements, other than survival: Everyone is a gatherer of food, a repairer of things, and a soldier. When the food pods fall, the survivors grab backpacks, gear up, and run for the closest one, hoping to get there before others and praying the Grotesques aren't nearby. When night falls, everyone gets torches and weapons ready just in case the zombies come back, watching for movement out behind their walls. The time in between is spent trying to patch up defenses, put weapons back together, and keep an eye on one's neighbors for the first signs of becoming a Grotesque.

Religions have been modified or formed around the Visitor. Many think it's a sign from God, either of Armageddon or displeasure. Others think it *is* God, and they have chosen to worship it, sending up hymns and praise – and the occasional sacrifice – as it makes its way toward them, and then away. People they fight at the food pods may be dragged back to their settlements to become sacrifices or forced converts.

There are still lots of supplies to be found in the cities. Weapons and ammunition sit in gun stores, police stations, and abandoned homes; makeshift armor and clubs hang in sport stores; medicine can be found in hospitals and urgent-care facilities; and mechanical parts are everywhere. Most of the canned food on supermarket shelves is well past the date of expiration, but wilderness stores still have dried and dehydrated food.

However, those returning to the cities and suburbs for supply runs will have to deal with the zombies. The creatures congregate there, lurking in the basements and shadows during the day and scuttling around the streets at night. They quickly surround and attack any trespassers in their domain, leaving ravaged bodies spread across the decaying buildings like ornaments. When the Visitor is overhead at night, they race through the streets and howl at it.

Meanwhile, the wilderness between cities and settlements are the domain of the Grotesques, who have formed wandering armies sometimes numbering into the dozens. They spend their time chasing after food pods, battling other groups of Grotesques, and planning attacks on nearby settlements. Once they have enough people and weapons, they immediately raid the nearest one: They breach its walls and carry off food, supplies, and "toys," but leave it otherwise intact and populated so they can come back again.

The Visitor

The Visitor is a large, regular pentagon approximately 93 miles wide and six miles tall. It seems to be made from a dull, dark-gray metal, and has no visible windows, joins, centers of control, communication arrays, or means of propulsion. It orbits at the lower edge of the mesosphere, about 31 miles above Earth, and takes three days to circle the world, going from North America down to Africa and then back up again through Asia in a steady pattern.

As it moves along, its bottom lights up with odd, twisted symbols that bear a weird resemblance to the ancient language of Enochian. Those who worship the Visitor as the hand of God, or a god in its own right, are convinced this is its attempt to communicate with people, who are not yet worthy to understand it. Perhaps the answers lie in some book, somewhere, rotting in a city library or a church?

Check out the various blueprints in other Steve Jackson Games products, such as the ***Floor Plans*** *series. The* ***Underground Lab*** *and* ***Mall of the Dead*** *are especially appropriate.*

The Origin of the Grotesque Species

The presences that cause Grotesques are technically ghosts (*see Presences and Zombies and Grotesques, Oh My,* below) that can't do many of the things ghosts can normally. They do have the ability to possess and then attack someone – turning them hideously ugly in seconds, and then insane over a period of days or weeks.

If someone's HT is 16 or higher, the presences will not attempt to influence him. For each potential victim with an HT of 13-15, make an annual HT roll. For those with HT of 12 or less, roll monthly instead! Failure means the presences will try to affect him.

Possession is done through a Quick Contest of the presence's IQ vs. the subject's Will. The presence might badger the victim for days before attempting possession. If successful, it makes a connection with that person, and uses Affliction to inflict the Appearance (Horrific) disadvantage upon him (*see Presences and Zombies and Grotesques, Oh My,* below). Then it makes the victim perform horrible actions and uses Mind Control to make him think he actually *enjoyed* doing it.

Once the victim is driven or fought off into the wilderness by his former friends, his presence guides him toward other Grotesques. During this time, it will use its psionic abilities to further reinforce its sadistic ideas. By the time the victim meets up with the nearest gang, he will most likely have either the Sadism or Bully disadvantage; if he survives running with them for a while, he'll have both.

So far, no one realizes the HT dependency of this phenomenon; as far as people know, the change is just something that happens to the unlucky. However, if the roll goes badly for a PC, don't confiscate the character sheet right away. Give the player an opportunity to roleplay becoming a haunted monster, one day at a time. Can the hero find a way to drive off or resist the voice in his head?

As the Visitor circles, it drops automated pods full of food onto the world and takes the empty pods back within itself. The pods are pentagonal boxes – 10 feet long and five feet tall – that may be made of the same material as the Visitor. Like the ship they come from, they have no visible sources of propulsion, control centers, or antennas. They don't get warm, even after falling through the atmosphere.

The pods descend to random locations, sometimes coming down close to remaining population centers, and sometimes landing far away in the middle of nowhere. When a pod hits the ground, it begins laying manna. The average pod lays about 100 balls within two hours, and then levitates back up to the Visitor.

Anyone trying to hold onto a pod when it goes back up again is repelled away by some strange force. Those who lash themselves onto it have a chance of going all the way up to the Visitor. Some Visitor cult adherents willingly tie themselves to pods to touch the face of their God, or send their sacrifices up that way.

The Alien Truth

The Visitor *is* responsible for both the zombies and the Grotesques. The energies its propulsion systems create are the source of the EMPs; they have also weakened the dimensional stability of Earth, creating small, temporary rifts in space-time on the planet's surface. These rifts – heralded by the freakish weather – reach into a lower dimension filled with hostile, ethereal presences.

Most of these presences are neither strong nor very intelligent; they slide into dead bodies and control them, becoming zombies. The more intelligent and willful ones take over weaker living humans, twisting the bodies and souls to their wills and turning the victims into sadistic, warped reflections of humanity.

Presences and Zombies and Grotesques, Oh My

Presences have the Spirit meta-trait, p. B263, and a few additional abilities. They also have Affliction 3 (Accessibility, Only on those it has possessed, -50%; Affects Substantial, +40%; Disadvantage, Appearance (Horrific), +24%; Extended Duration, Permanent, +150%) [80]; Detect Humans (Read Auras; Analysis Only, -50%; Analyzing, +100%; Short-Range 1, -10%; Vision-Based, Reversed, -20%) [24]; Mind Control (Accessibility, Only on those with HT of 15 or less, -20%; Conditioning, +50%; Telepathic, -10%) [60]; and Possession (Accessibility, Only on those with HT of 15 or less, -20%; Spiritual, -20%) [60], for an addition of 224 points in advantages. They have a Compulsive Behavior (12) that compels them to drive others to acts of sadism [-15]. They have no Dread of exorcism, as the concept is alien to them.

They inflict a terrifying appearance through their Affliction ability. The attack is resolved by pitting the ghost's Will against the victim's HT, lasting for as long as the presence is attached to the target. If the presence is driven off or destroyed, the victim may attempt a HT roll; success improves his Appearance by a step, up to Monstrous. Every month thereafter, he can try again, until his old Appearance is regained. However, if he should be possessed by the same presence (or another) during that time, Appearance (Horrific) comes right back.

By far the most common threat, zombies start with the B-Movie Zombie template from ***Horror,*** p. 59. Remove Independent Body Parts, Infectious Attack, and Reduced Move. Convert to *Fourth Edition* rules in a fashion that will present a challenge to the PCs, then add Enhanced Move 2 (Ground) [40]. They're fast!

Some rechargeable batteries at room temperature lose their charges in a matter of weeks; regardless, in a post-apocalyptic world, rechargeables have other obvious flaws.

Don't worry about the world coming to an end today. It is already tomorrow in Australia.

– Charles M. Schulz

All Grotesques have Appearance (Horrific) [-24]. Once they've been under the thrall of their presences long enough, they also have Bully (6) [-15] and Sadism (9) [-15]. Being possessed, they will have 1/5 the ghost's ST, and 1/8 of its DX and HT added onto their own.

Story Starters

A fairly simple starting point for a campaign would be a settlement, which could be defended against zombies and watched for Grotesque outbreaks. It may be within a day's walk of a former city, so the people can explore and scavenge. Have a few other settlements nearby to keep the paranoia high. Over time, the PCs' settlement could be improved or expanded, and if it's burned down or overrun, they could either try to hook up with a neighbor or build a new place to live.

Survival of the Steampunk: The heroes are engineers, scientists, and gear-heads who are trying to make their settlement have as many conveniences as they can under the circumstances. They have plans to make a steam-powered factory, but this will require gears, metal, and parts they do not have. The nearby city has several factories that could be raided, but that'll require going through Grotesque territory. And what if their neighbors get jealous?

Kings of the Wasted Frontier: After suffering a number of attacks by zombies, Grotesques, and rival settlements, the leader of the heroes' settlement decides it is time to conquer a string of rivals in order to form a swath of territory. This requires better weapons than they currently have, a well-trained army, and the effective governance of conquered groups. This also demands several trips to the nearest city to get guns, ammo, and whatever else they can scrounge. Will they succeed where so many others have failed?

The Promised Land: Before the settlements stopped talking to one another, there were rumors that, far to the south or north, there were areas where the Visitor's anti-technology pulses did not reach. It's just a rumor, of course, but when the heroes' settlement is destroyed while they're on a food run, they decide to see if it's true. Can they hike all the way to the extremes of their land mass, dodging monsters every step of the way? And what will they find when they get there?

Campaign Consideration: What Is the Visitor?

The biggest question for the GM is what exactly caused the Visitation, as it may determine how the campaign goes after a certain point. Is it a crewed spacecraft, a probe of some kind, or a god-like entity? Is it aware of what it's done and capable of changing its actions, or merely acting according to a program? Are its intents purely evil, ham-fistedly benevolent, or a blessing in disguise? And if the characters discover its true nature, can they, or their descendents, launch a plan to stop the harm it's doing?

Some possibilities include the following.

A World-Seeder: Sent from another galaxy by a civilization with a desire to perpetuate itself far and wide, the Visitor is an automated probe designed to find worlds with sentient life not too unlike its creators, and prepare it – and them – for colonization. In 50 years, the flotilla will arrive and use humanity for slave labor, which is why the probe is trying to teach the people the conqueroring race's language. The probe is not aware of the problems its propulsion systems are causing to reality on the surface, but it probably wouldn't care.

A Clumsy Explorer: It was the worst possible outcome for the space vessel – while investigating intelligent life, they exited warp a second too late, almost crashing into Earth. The resulting engine pulse killed most of the crew and maimed the planet as well. Their warp engines too degraded to save, and with help possibly years away, they tried to aid their victims by feeding them. They know their ship's engines have let monsters loose, but they can only wait for the repair ship's arrival to fix things – maybe 100 years from now.

An Overbearing Deity: Those who revere the Visitor as a god aren't too wrong. The immense cyborg has searched the entire galaxy for a planet to call its own, and – after ensuring its new worshippers couldn't try to fight it off – has become their sole means of survival. It knows that its engines are bringing in zombies and causing mutations, but this is intentional: If its toys are in conflict with one another, they become even more dependent on it. The thing is content and happy, much like a young child watching rival ants fight in a farm.

The Benevolent Destroyer: Angels are not gentle, winged creatures, but massive machine-things that adjust circumstances on a cosmic scale. They also nudge civilizations in order to maintain the long-term survivability of sapient life. So when the angel Htmorda saw that Earth's intelligence was approaching the so-called Singularity – when discoveries would cause chaos, and humanity would be utterly destroyed or transformed – it came back and destroyed the world's technology. It plans to stay in orbit for another 20 years, and then, after laying down new religions by psychic projection, depart back to the far edge of the solar system to watch and wait once more.

About the Author

J. Edward Tremlett spends his day as a bookstore clerk, but at night, he dreams of ways to make players squirm, and passes those dreams along to fellow gamers. He's lived in South Korea and Dubai, UAE. He's been the editor of *The Wraith Project* and has seen print in *The End Is Nigh* and *Worlds of Cthulhu.* He's also part of the *Echoes of Terror* anthology. Currently, he writes for Op-Ed News and lives in Lansing, Michigan, with his wife and three cats.

Omniscient Eye

Does My Nuclear Arsenal Have an Expiration Date?

by Roger Burton West and John Dallman

In post-apocalyptic settings and in space, heroes sometimes encounter lost missiles and bombs as traps and plot devices for villains, or cults to worship. How long do armed and primed nuclear warheads last? Is the detonator likely to decay first?

Likewise, for how long do nuclear rods last in a dormant reactor, and how long do rods stored separately keep? (In this case, let's assume 10% designed power output.)

– Eric Funk

In short, an Ancient Bomb would be very little threat. Given the tradeoffs involved in building nuclear weapons at all, low maintenance is not a design priority; they're intended to be kept under close observation and maintained carefully, not to be usable after 10 or 100 years of neglect. The problem with modern mass-produced weapons is that their builders have the same goals as with other mass-produced technology: Avoid wasting expensive materials, and apply only as much build quality as is actually required for the short term.

The uranium and/or plutonium ("fissile material") undergoes radioactive decay, but this is pretty slow. For plutonium-239, the half-life is 24,100 years, and for uranium-235, it is 700,000,000 years. Since, to get certainty of detonation, the designer has to use more than the bare minimum critical mass, a few decades' worth of radioactive decay won't have very much effect; the electronics or explosives of a bomb will certainly go bad before the fissile material. However, nuclear decay is not the only factor: Uranium and plutonium are chemically reactive if exposed to the oxygen in air, and they can also undergo changes in crystalline structure that make them less likely to be detonated successfully. Those latter factors can be handled to some extent while a bomb stays undamaged, via nickel-plating and alloying the fissiles, but they can be important for a damaged bomb.

The real problem, however, is one particular detail of modern designs. Tritium, an isotope of hydrogen, is used in almost all recent weapons. A gram or so of tritium gas, mixed with deuterium gas and placed at the heart of a nuclear explosion, undergoes nuclear fusion, even in what's considered an "atom bomb" (fission device), rather than a "hydrogen bomb" (fission-fusion device). The point of the fusion isn't the energy release, although that doesn't hurt. It provides lots of extra neutrons that speed up the fission reaction, getting more yield out of a small amount of uranium or plutonium, and thus more bombs out of a limited supply. Everybody who builds even slightly sophisticated nuclear weapons does this, because it's so cost-effective.

However, tritium decays with a half-life of only 12 years. And it decays into helium-3, which soaks up neutrons rather than fusing and giving off more. (Actually, helium-3 can be used as a fusion fuel, but it needs rather different conditions; the decay of tritium to helium-3 is a key plot point in Tom Clancy's novel *The Sum of All Fears*.) A bomb that has decayed tritium but is otherwise sound will still go off. Probably. Very feebly. If its explosives or electronics are also dubious, you probably won't get anything better than a car bomb. The resulting mess – scattered lumps of uranium or plutonium that may at any moment collapse into a more reactive configuration – is thoroughly dangerous to anyone nearby who survived the blast but certainly not a large-scale threat.

So all modern bombs store their tritium in gas bottles outside the main part of the bomb, and let it in just before detonation. This allows the bottles to be changed regularly, probably every two to three years. And tritium isn't something that you can buy off the shelf even before the Final War; you have to make it, which takes a high-powered nuclear reactor plus a good supply of lithium.

The shelf life of alkaline batteries is about five to seven years.

The conventional high explosive used to initiate a nuclear reaction has its own shelf-life; compounds are selected for their high stability against accidental detonation rather than for their long life. In some cases, initiating charges stored in high-humidity conditions deteriorate to the point of unusability in a few months.

Other components, such as the electronics of detonators and the high-speed switches needed to ensure the correctly timed detonation of the conventional explosives, are generally considered stable over single-digit numbers of years.

The United States' nuclear weapons were designed to be viable for 20-25 years with full maintenance; recent projects have attempted to extend this to as much as 75 years, still with a full maintenance schedule, on the basis that this should be fractionally cheaper than disposing of the old weapons and recycling their fissionables into new ones. It is therefore a reasonable assumption that, five or 10 years after maintenance is stopped, even the weapons that have survived apparently intact are very unlikely to work at all. A long-life weapon that could last tens of years could probably be constructed, but nobody has done this to date and there may well be unforeseen problems in doing so. (The bomb used in ***GURPS Time Travel Adventures,*** capable of detonating after 4,500 years with no maintenance, must be considered an extremely specialized design.)

However, a bomb a few centuries old is still a potential hazard in several ways. If it is plutonium-fuelled, as most are, the plutonium is a poison of such viciousness as to be very dangerous to the user. Dumping it in a river or reservoir will kill a low-tech city quickly and in ways the inhabitants can't understand.

If it were possible to obtain and strip down several modern U-235 bombs, one could assemble enough material for a crude gun-type atomic device like the Hiroshima bomb, or the even simpler South African devices; if someone knows how, and has the uranium, such a device can imaginably be built with 19th-century technology, using gunpowder, steam, or even strong springs to assemble the critical mass.

As for nuclear fuel rods: If they have never been used in a reactor that was critical, then the radioactive decay of the fuel elements will not be significant over human lifetimes. The rods' cladding (usually a high-zirconium alloy) is likely to fail first, from mechanical or chemical stresses assisted by radiation-induced brittling; this will make the fuel rods unusable in a reactor without re-fabrication. Very little experimentation has been done in the storage of fuel rods in this state; they are generally installed in reactors as soon as they are produced. However, one can hypothesize a 30-50-year storage life.

If the rods have been critical, they will be rather more radioactive because of the presence of fission-decay products. This will cause the cladding to rot more quickly, perhaps in 10 years. (Fuel rods in a live pressurized-water reactor are replaced every four to six years.)

As long as the reactor is not running, it makes no difference whether the rods are installed in it or stored elsewhere, except in terms of the protection from environmental influences.

As with weapons, a nuclear reactor could be built to have a long life without maintenance, but this would substantially increase its cost for no short-term benefit.

In conclusion, while the fissile material needed to fuel power reactors or nuclear weapons is certainly capable of being used after years or centuries of neglect, current devices need significant and continuous maintenance merely to reach the end of their design lives of 20 years or less.

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About the Authors

Roger Burton West is a British computer wrangler and enthusiastic roleplayer, who is glad to have an occasional chance to put his training in physics and economics to profitable use. His gaming website is **www.tekeli.li.**

John Dallman is a computer programmer, roleplayer, and amateur student of technological history. He blames the latter on Tom Clancy, whose *Hunt for Red October* interested him in navies, and whose *Sum of All Fears* first showed him that nuclear weapons were a fascinating branch of engineering.

Omniscient Eye

Are Humans a Renewable Resource?

by Geoffrey Brent

I'm writing up some background for a campaign where society has collapsed and people are repopulating the world. I'm trying to figure out how fast population grows. Like, if I say that it's growing at 1% a year, how many children does that mean per person and how many people are dying of old age? Or taken from the other direction, if I know that a family has on average three children and average life expectancy is 60, how fast is the population growing? How much of the population is adults vs. children, and how will things like wars and plagues affect things?

– Anonymous

It was an age in which six out of seven women died in childbirth; in which infant mortality was a shocking 87 percent; in which the average life-expectancy was no more than 12.3 years; in which the Plague yearly ravaged the central city carrying away an estimated two-thirds of the population; in which continual religious warfare halved the able-bodied male population every year . . . despite difficulties, the population soared to new heights.

– Robert Sheckley, ***Mindswap***

At present, the population of the world is growing at around 1.16% per year. That might seem like a small figure, but by historical standards, this is extraordinary, translating to a doubling time of 62 years. By UN estimates, population remained virtually static between 1 A.D. and 1000 A.D.; over the next 800 years, average annual growth was around 0.12%. Sustained high growth rates are only likely to happen when there's a massive increase in the ability to feed people (improvements in agricultural technology, acquisition of new lands) or when the population is recovering from a plague or other catastrophe.

So, if you want to model a low-tech society under normal conditions, you can probably ignore growth altogether. However, recovering from massive depopulation is not a "normal condition." Exponential growth is a relatively simple scenario, so we'll begin there and introduce complications one by one.

Exponential Growth

Population growth at any instant in time is given by a simple formula (1):

$$r = b - d + m \quad (1)$$

Here, r is the growth rate (negative growth means a declining population), b and d are the birth and death rates, and m is net migration (immigration minus emigration). These rates are typically given as numbers per thousand population per year, but for calculation, it may be convenient to turn them into decimal fractions.

Present-day figures for each of these variables can be found in the *CIA World Factbook,* or various other references. For instance, in the United States, birth/death/net migration rates are currently around 14, eight, and three per thousand, leading to overall growth of nine per thousand – just under 1% – per year.

The Formulae

The formulae given in this article have been presented in an included spreadsheet – just find the appropriate section and enter your numbers into the blue cells to get an answer that fits your situation. (The section number on the spreadsheet matches the formula number listed in the article.)

The further after the fall the campaign takes place, the more likely people would have forgotten the way things were.

This formula is true for *any* society; as these variables change from year to year, so does r. But if we assume that they stay roughly constant, then r is also constant, leading to exponential growth that can be modeled with the following equation (2):

$$P(t) = P(0) \times (1 + r)^t \quad (2)$$

where P(t) is the population at time t, and P(0) is the population at time 0 (your starting point).

Example: The United States' population is currently about 305 million. If the growth rate of 0.9% is maintained for 30 years, the population in 2038 will be $305{,}000{,}000 \times 1.009^{30}$ = approximately 399 million.

The Rule of 72

Because of compound interest, it doesn't take a full century for the population to double at a growth rate of 1%. The *exact* doubling time, given a constant growth rate r, is equal to (ln(2)/ln(1 + r)). But if you don't have a calculator handy, a simple approximation for the doubling time is to divide 72 by the percentage growth rate; for instance, at 4%, the doubling time is about 72/4 = 18 years. This approximation is good for growth rates up to about 10%.

Net Reproductive Rate

Formula (1) is accurate for almost any scenario, but it's hard to interpret raw birth rates – these reflect both the fertility and the age profile of the population. If you want to relate the "typical family" to population growth, it may be more useful to look at the *net reproductive rate* (NRR), which describes how the next generation relates to this one. Absent migration, a NRR of 1 means that the population is replacing itself; NRRs greater than 1 indicate growth, and NRRs less than 1 indicate decline.

The NRR is defined as the average number of *female* children each newborn girl can expect to have in her lifetime, given current fertility and death rates for each age group. This can be calculated as s × c × f, where s is the fraction of newborn girls who survive to adulthood, c is the average number of children an adult woman can expect to have (keeping in mind that some might remain childless), and f is the fraction of newborn children who are female (about 0.49 for humans). For instance, if two-thirds of female children live to adulthood, and the average adult woman will have four children, then NRR equals (2/3) × 4 × 0.49 = 1.31 – i.e., each generation is about 31% larger than the previous one.

The formula above assumes that each child has exactly one female parent. For creatures with unusual modes of reproduction, pick one sex to count as "female" and use a more general formula (3):

$$NRR = s \times c \times f/p \quad (3)$$

where p is the number of female parents for each female child (set to 1 for humans). Creatures with *really* unusual methods of reproduction – those where a "female" child has no "female" parents – are beyond the scope of this article, but the general principle is that NRR should equal the size of the next generation, divided by the size of the current generation.

Over a long period of time – say, a generation or more – we can estimate growth rate from NRR with Formula (4):

$$r = m + NRR^{(1/g)} - 1 \text{ (approx.)} \quad (4)$$

where m is the net migration rate, and g is the length of a generation. This formula assumes that migration doesn't have a major impact on age distributions and fertility patterns (either because migration is low, or because migrants are a representative cross section of the overall population).

Example: Using the NRR of 1.31 given above, if a typical generation is 20 years and net migration is 1% per year, total growth is $0.01 + 1.31^{1/20} - 1 = 0.01 + 1.0136 - 1 = 0.0236 = 2.36\%$.

Note that this growth rate *doesn't* depend on life expectancy. In the short term, an increase in life expectancy will reduce the death rate and so growth will pick up. But as the elderly population increases (because people live longer), women of childbearing age become a smaller percentage of the population, causing overall birth rate to decline. What really matters for long-term growth is not how long people live, but how effectively they replace themselves.

So, how long is a typical "generation"? For humans, the mother's average age at childbirth (presently around 28 years for the USA) is generally close enough. But for some creatures – say, vampires or heavily robotic cyborgs – a "generation" might be anything from a few hours to a thousand years. There's no simple formula for the growth rate for such populations, but the second tab *(Growth Rates for Extended Fertility)* of the included spreadsheet will produce an approximation.

Total Fertility Rate

The standard measure of fertility in modern demography is the *total fertility rate* (TFR). The TFR differs from NRR in that it counts both male and female children, and doesn't take death rates into account. This is useful for some purposes, but using the NRR simplifies the equations presented here. In a First-World society, NRR is approximately half the TFR; mortality before menopause will reduce NRR further.

First, divide your population into age brackets, starting at 0 and ending at the maximum age where childbirth is possible (or just maximum life expectancy). For each age bracket, enter the fraction of the female population that survives to reach this age bracket, and the average number of daughters each surviving female has per year within that bracket. (The default

Having an apocalyptic event is a great way to mix up an existing campaign.

values in the spreadsheet show actual survival rates based on current U.S. data with fictionalized birth rates.)

You'll also need to input minimum and maximum guesses that bracket the true growth rate; the spreadsheet will use these as a starting point to calculate an accurate estimate (and will warn you if the true growth rate is outside these guesses). If the minimum guess is too low, you'll also see errors (#NUM! or similar, depending on your spreadsheet software.) The default guesses of -0.1 minimum and 1.0 maximum should be adequate for most scenarios.

Age Distributions

So, you know how big your population is and how fast it's growing. But how many of them are old enough to fight when the barbarians come raiding?

Here we'll introduce the idea of a "cohort." A demographic cohort is the group of people born within a specified period; in this case, we'll use one-year cohorts. Under exponential growth, each new cohort is slightly bigger than last year's cohort, and this increase is in exactly the same proportion as the increase in the total population. If you had 10,000 babies born last year, and your annual growth rate is 1%, then you'll have 10,100 babies this year.

To keep things simple, we'll start by assuming that migration is negligible, and everybody makes it to the average life expectancy (LE). Under these assumptions the number of 10-year-olds alive today is the same as the number of babies born 10 years ago, and so on until you hit that life expectancy. After a bit of algebra, this allows us to calculate the proportion of people within any given age bracket (see third tab, *Population by Age Group,* of the spreadsheet), using Formula (5), with m and c set to 0:

$p(a1,a2) = (1/(1 + r)^{a1} - 1/(1 + r)^{a2})/(1 - 1/(1 + r)^{LE})$, unless r = 0; then

$p(a1,a2) = (a2 - a1)/LE$, if r = 0

Here p(a1,a2) is the proportion of your population who are *at least* age a1, but younger than age a2 (provided a1 is no greater than a2, and a2 is no greater than LE).

Example: You've got a population of 100,000, your annual growth rate is 1% (i.e. 0.01), and everybody dies on their 70th birthday. How big is your militia if you recruit everybody aged at least 15 and less than 60? Answer: $(1/1.01^{15} - 1/1.01^{60})/(1 - 1/1.01^{70}) = (1/1.16 - 1/1.82)/(1 - 1/2.01) = (0.86 - 0.55)/(1 - 0.50) = 0.62 = 62\%$ of your population, or about 62,000 people.

In a growing population, your population will be skewed toward youth – for instance, in the above example, zero-year-olds make up 2% of your population, while 60-year-olds are only 1.1%. In a shrinking population, this distribution reverses, and you'll have a larger proportion of old people. Although the formula given here is only exact for long-term exponential growth, the general principle applies for other populations – the higher your growth rate, the younger your population is likely to be.

Population growth due to migration works a little differently – if you have high rates of migration, then you will have *more* 10-year-olds today than you had infants 10 years ago. As long as those migrants have a similar age distribution to the rest of the population, this can be handled with a modified version of Formula (5), with c set to 0:

$p(a1,a2) = (1/(1 + r - m)^{a1} - 1/(1 + r - m)^{a2})/(1 - 1/(1 + r - m)^{LE})$, unless r - m = 0; then

$p(a1,a2) = (a2 - a1)/LE$, if r - m = 0

Example: If we take the same numbers as before – life expectancy 70 years, annual growth rate 1%, military age 15-59 – but assume that this growth includes a migration rate of 0.8%, plugging these numbers into the spreadsheet will show that our militia now makes up around 64% of the population. Because the population is "growing from the middle," it has a more even age distribution, which means slightly less children.

Preventing Infant Mortality

While some of the gap between First-World mortality rates and those elsewhere is due to high-tech treatments – antibiotics, incubators, vaccination – the single biggest factor is the discovery of oral rehydration therapy for dehydration caused by diarrhea, a technique that can be reproduced by any time-traveler with a little medical training and access to salt and sugar. In a fantasy setting, folk medicine or healing magic might have just as dramatic an impact on mortality rates.

Mortality

So far, we've assumed that everybody makes it to the average life expectancy and then dies immediately – pretty good if you're roleplaying *Logan's Run,* but not so good otherwise. Modelling mortality in detail is the sort of thing that keeps life-insurance actuaries in a comfortable living, but a simple approach is to divide death into three categories: infant mortality, old age, and mischance in between.

Infant mortality is usually defined as the death of children aged less than one year. In a modern First-World nation, infant mortality rates are generally less than 1% and can probably be ignored for world-building purposes. Elsewhere in the world, infant mortality ranges up to around 18%. It's difficult to get accurate data for pre-industrial infant mortality, but 20-30% would be reasonable.

High infant mortality has a big influence on statistics that are aggregated across the whole population. If 20% of children die in infancy (boys and girls equally), while the rest live to 100 and have five children each, you'll end up with an average life expectancy of 80 and average family size of four (for a NRR of 2). As long as those numbers remain constant, you can use that NRR to calculate the population growth rate, but the averages don't give you a very good idea of what's going on.

Use blueprints for modern-day locations as references for sites in modern-day post-apocalyptic adventures.

For this and other reasons, demographic statistics often separate child/infant mortality from the rest of the population, and concentrate on those who survive to a certain age (usually either one or five). This may be indicated by a subscript – for instance, LE_5 is the life expectancy among those who live to age five – but sources don't always make it clear when they're using such figures, so be careful to check definitions when relying on real-world data. If you want to model societies with high infant mortality, this may be the simplest approach – use the formulae given in previous sections, but counting only those children who survive infancy, and define NRR as the number of surviving daughters per surviving woman.

Old age covers death that occurs due to a lifetime of accumulated wear and tear on the body. At the individual level, death is often due to a combination of age and bad luck – frailty makes it harder to survive chance illnesses and injuries – and it's often difficult to say whether a younger man would have survived the "bad luck" that killed an older one. But at the population level, the effects of age are obvious, with death rates increasing dramatically past a certain point. In present-day USA, 81% of women and 71% of men survive to at least age 70; only 2% of women, and less than 1% of men, live to 100.

For world-building purposes, you can generally get away with setting a maximum age and calculating the numbers on the assumption that old age kills everybody at this point. This is far from perfect – some will die of age-related causes well before that figure, some will live for many years after – but unless you're designing a social security system, you probably don't need to know the fine detail of how the population tapers off. If you *do* need that fine detail, the life tables referenced at the end of this article may be helpful.

Mischance includes accidents, disease, violence, and death in childbirth. The more dangerous your world is, the higher the rate of death due to mischance. Since mischance stops people from reaching old age, it will shift your population balance toward youth.

If the rate of death due to mischance c is independent of age, this can be dealt with by a further adjustment to the Formula (5) equations given previously:

$p(a1,a2) = (1/(1 + r - m + c)^{a1} - 1/(1 + r - m)^{a2})/(1 - 1/(1 + r - m + c)^{LE})$, unless $r - m + c = 0$; then

$p(a1,a2) = (a2 - a1)/LE$, if $r - m + c = 0$

Example: Returning to the scenario given in *Age Distributions* (p. 35), we assume a death rate due to mischance of 0.01 (i.e., one death per hundred people per year). Adding this into the spreadsheet, the proportion of 15-59s now drops to 61% – a substantial portion of the population will have died before age 15.

In practice, mischance often *will* depend on age, and also on sex. In many settings, childbirth is a major killer of adult women, while men are usually more likely to die due to violence or accident. It's not possible to provide simple equations to deal with this, but you should be able to estimate their effects with a little common sense – if each birth carries a 5% risk of death, and the average woman has four children, you'll lose 20% of your female population during the childbearing years. Just remember that in the long run, this will *also* affect the population of women past childbearing age.

Limits to Growth

The bigger your population, the more resources it needs. An increased workforce can improve the supply of some resources, but it's impossible to sustain exponential growth forever. Usually, growth will level off to approximately zero within a few generations. Looking at Formula (1), there are three ways this can happen: net migration decreases, birth rates decrease, or death rates increase.

Migration is relatively straightforward: As a country becomes overcrowded, people are more likely to move away in search of better opportunities elsewhere – as long as there's somewhere better to move to.

Hunger, disease, and conflict over limited resources can easily cause an increase in the death rate . . . but whether this stops growth depends on who dies. Higher death rates among the elderly will result in a younger population and a higher birth rate, with little net effect on long-term growth. For an increase in mortality to check long-term growth, it has to reduce NRR – for instance, by reducing the proportion of girls who survive to have children, or by leaving young widows who don't find new mates and so don't have children.

While overcrowding is very likely to increase death rates and reduce net migration, its effect on births is less straightforward. As discussed above, changes in life expectancy will alter the age distribution of the population and so alter the raw birth rate. Again, it's probably better to look at NRR – but even here, the effects of overcrowding are hard to predict. When resources are already scarce, having larger families is obviously counterproductive for the country *as a whole*. But at the individual level, if you're relying on your children to take care of you in your old age, lean times just mean that you need *more* children to achieve that.

Ultimately, you'll need to decide for yourself which combination of these effects applies to your fictional setting. The equations given above all apply, but growth rate will now be zero, or close to it.

When growth is zero and migration is negligible, the birth and death rates will be equal. In this situation, birth and death rates relate directly to life expectancy (Formula (6); fourth tab in the spreadsheet):

$$LE = 1/b = 1/d \quad (6)$$

(only when growth is zero and migration is small)

For instance, if the death rate is 2% (i.e., 1/50th of your people die each year), then life expectancy is 50 years.

Short-Term Effects

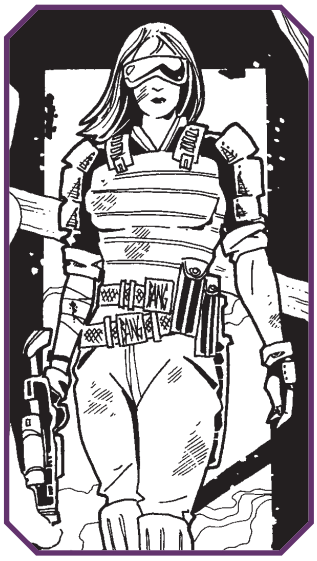
So far, we've been considering equilibrium and steady growth, scenarios in which birth, death, and migration rates change little from one year to the next. But populations can also be affected by one time or short-term events: natural disasters, war, or a sudden influx of migrants.

Items not worth the trouble to fix before the fall could become valuable for spare parts or raw materials.

Migrants tend to be young adults (and their children); older people generally have too many attachments to move away from their homes. In the short run, this means that high net migration will increase the proportion of your population in these age groups; as time passes, those young migrants will become middle-aged migrants and then old migrants.

Plagues and natural disasters generally kill people of all ages and both sexes, but children and the elderly are usually hit worst. Once the immediate danger is over, death rates may decline for a few years, because the most vulnerable members of the population have already died. (Exceptions are possible; the Spanish "flu" epidemic of 1918 was most dangerous to young adults.)

If the population is willing and able to recover, such disasters may be followed by a period of gradual growth as the population replaces its losses. As discussed previously, growth generally causes a slight shift toward youth, until such time as that growth levels off again.



However, a sufficiently severe disaster may cause social/economic damage that prevents swift recovery. For instance, during the Great Famine of 1845-c. 1850, death and emigration reduced Ireland's population by around 25%. Most of the migrants were young people, leaving Ireland with an older population, low birth rates, and a greatly reduced workforce. As a result of these and other factors, the population continued to fall for another 70 years, and it has never recovered to pre-Famine levels.

The effects of war depend on how that war is fought. In a "total war" where everybody is considered a legitimate target – or imprecise weapons and damage to vital infrastructure make high civilian casualties inevitable – the effects will be distributed throughout the entire population. As with disease, children and the elderly may be more vulnerable to the resulting hardship than young adults.

A "limited war" may only kill those of military age and sex. However, even if a country is fortunate enough to fight a war far away from its own territory, birth rates are likely to drop because many young men are kept away from home, and others may be reluctant to start a family in a time of uncertainty. This effect contributed to France's weakness at the beginning of World War II: While casualties from WWI and the flu of 1918 led to a shortage of men between the ages of 40 and 45 by the time WWII broke out, low birth rates during WWI also created a shortage of 20- to 25-year-olds. This can be seen in the French age distribution pyramid for 1990 (**www.nationmaster.com/country/fr-france/Age_distribution**) – women aged 70-74 (i.e., born between 1916 and 1920) are rarer than those born between 1911 and 1915, even though the latter are older.

After a war, birth rates tend to jump (the "baby boom") as those who've postponed having families make up for lost time. There may even be "echo" effects a generation later, as the boom babies have their own children, although these are likely to be spread out over a longer period than the initial boom.

In theory, women are the limiting factor for a society's ability to reproduce and recover from its losses. In practice, this depends on marital customs and the amount of effort required to raise children.

For instance, in a strictly monogamous society that loses 20% of its young men in warfare, around 20% of its young women are left without partners, lowering birth rates accordingly. It may be possible to reduce this fraction slightly by drawing on other parts of the population – for instance, there may be some widowed older men who are willing to marry a younger woman – but the effects on birth rate will still be severe.

In a polygynous society, losing that same 20% of young men might have very little effect on reproductive rates – since a man can have multiple wives, it's easy for women to find a husband. Just keep in mind that family sizes may also depend on economics; a family of two women and one man might be able to produce as many children as two monogamous couples, but whether they can afford to feed them is a different question.

All these factors mean that real-world populations will never look exactly like the scenarios given in the first five sections. There's no simple way to model such phenomena. If you really want to tackle these in detail, you can build a numerical model, tracking each age cohort from birth to death – "if there were 1,000 20-year-old women last year, and 10% of them die in that year, there'll be 900 20-one-year-old women this year, and if women in that group have an average of 0.03 children each year, then they'll add 30 births to the year's total."

But for gaming purposes, this is probably overkill; you should be able to design a reasonably plausible setting by starting with the "simple growth" or steady-state approximations given previously, and then adjusting the numbers manually based on recent history with reference to real-world parallels.

Links

https://www.cia.gov/library/publications/the-world-factbook. *CIA World Factbook,* containing basic demographic data (including life expectancy and birth, death, and net migration rates for modern-day nations).

www.nationmaster.com. More demographic data, including age pyramids showing how each country's population breaks down by age and sex.

www.ssa.gov/OACT/STATS/table4c6.html. Life tables for modern-day USA, showing the survival rate at each age for men and women.

en.wikipedia.org/wiki/Total_fertility_rate. Discussion of fertility rates (including net reproductive rate).

www.census.gov/ipc/www/worldhis.html. Historical estimates of total world population.

About the Author

Geoffrey Brent works as a mathematician at the Australian Bureau of Statistics, after a previous career in biomedical research where he got paid to receive electric shocks and had plaster casts taken of his eyeballs. He lives in Canberra, Australia, with his wife and Dog-Or, Devourer of Bacon. His previous work includes contributions to *Pyramid,* ***GURPS Magic Items 3, Who's Who I,*** and ***Villains,*** and a paper on Indigenous Australian demography.

Random Thought Table

Nowhere to Run

by Steven Marsh, *Pyramid* Editor

One interesting aspect of the post-apocalyptic genre is *not* that there is nowhere to go. Many tales (gaming or otherwise) assume that the heroes aren't really able to travel anywhere: stories set in colonies, most low-powered medieval tales, the Riverworld series, and so on.

No, what's interesting is that, in a post-apocalyptic world, there is nowhere to go in an absolute sense. For 95% of the world in a no-magic dark-ages campaign, going anywhere else in the hopes of finding a better world or way of life is an impossibility; the post-apocalyptic version of that world simply cuts things off for the remaining 5%.

It is the sense that a better world was once possible – indeed, and perhaps feels that it *should* be possible – yet is now out of reach that makes post-apocalypse a challenge to game in. For example, while it's possible to envision a world that (say) was a 15th-century Age of Exploration setting that has undergone Armageddon, it would be difficult to make it feel as poignant: "Oh, no! We've been reduced to a life devoid of electricity where one relies on oneself to survive and the sword hath become the weapon of first choice; in other words, 'tis the same as last week!" Really, this is almost what happened during the Black Death, where almost 50% of the population died in some regions. But it's hard for society to fall when it hasn't climbed up very high in the first place.

At the other extreme, it's difficult (though probably not impossible) to envision Ragnarök befalling a far-future spacefaring setting: "Woe is Colony-24601! With the collapse of the galactic empire, they have lost access to the Infogrid and are forced to rely on digital-optical-disc technology for their entertainment! The savagery!"

No, the typical post-apocalyptic treatment usually relies on a not-too-distant future view of the world. The players (and quite probably the denizens of the world) understand that there were once commonplace farms, vehicles, weapons, medical supplies, travel, and so on . . . and now there isn't.

Traveling to the Future . . . the Hard Way

In a lot of ways, post-apocalyptic stories have a lot in common with another sci-fi trope: time travel. Really, most time-travel stories are a way of viewing a different era with fresh eyes. In much the same way that a clever engineer with a solar calculator who found himself transported to 1188 could radically alter the world, so too can a jeep with a full tank of usable gasoline become an object of awe and reverence (not to mention tactical edge) in a post-apocalyptic setting.

In both cases, the mundane – something we comprehend and perhaps interact with on a daily basis – is elevated by its transportation to a new setting (the past for the solar calculator, the post-nuclear holocaust for the jeep).

Continuing the time-travel analogy, it's possible the heroes might have some idea the End Times are coming. If so, they can take advantage of the modern world – while it still exists – and try to set themselves up as best they can for the coming fall. It's a common trope in many time-travel campaigns: If you know you're going 1,000 years into the past, what do you take with you if you know you can only bring something the size of a backpack? Similarly, as an interesting inversion of the standard apocalyptic tale, what if the heroes know the end is nigh and understand they are powerless to prevent it, but are able to try to prepare to make endurable lives for themselves? For gaming groups that love lots of planning, it can be an interesting challenge to give the players a week of foresight and a finite budget, and let them prepare for the brave new world as best they can.

The Rewards of Ragnarök

One of the interesting things about most post-apocalyptic settings is that it inverts typical reward structures. For example, it's difficult to

Don't abscond with one crate of peaches, or one case of ammo. Try to acquire all the crates of peaches or all the ammo.

Exploring Strange New Worlds and Getting Home

For settings with superscience, especially ones that allows for the exploration of other planets or alternate worlds, an interesting possibility is to allow the PCs to be present for the "end times" of an Alternate Earth or colony world. For example, envision a space-opera campaign with a typical "visit the alien planet" story, that takes a dramatic turn when the away team needs to deal with the aftereffects of a catastrophic asteroid strike elsewhere on the planet. (The GM will probably need to come up with a reason why the heroes' super-science ship wasn't able to detect or blast the offending debris, but "we got called out of the system for an urgent matter while you were stuck planetside" is a fine justification.)

This technique can allow for a radically different change of pace for the group, while retaining the ability to resume a sense of normalcy once the heroes can escape back to their homes . . . assuming they survive the experience in the first place, of course.

This idea can also be used for settings with large amounts of magic, where the heroes witness the fall of a parallel realm. However, it may be harder for the players to relate to what a "post-apocalyptic" version of their fantasy setting is.

envision many other genres where a crate of six-year-old cans of vegetables is an adequate justification for adventure. It's a genre where a few more clips of ammo – which would be taken for granted in most other campaigns with guns – is something to be treasured . . . especially if that ammunition fits a favorite weapon. And water purification systems have never seemed like such a precious commodity to most First-World gamers.

Similarly, because of the danger and savagery involved, it's a genre where "reward" is often synonymous with "complication." Again, there aren't many genres where the acquisition of a fully fueled vehicle – acquired as legally as is possible in the world – would become a source of both great potential and also consternation: "You realize that having this makes us the biggest targets for a hundred miles, right?"

It's especially ironic when you consider that the same fueled vehicle would have been ordinary in the world a decade before . . . and, indeed, is almost certainly commonplace for the *players* today.

Unleashing Your Inner MacGyver

Because the heroes are stuck on the game world with nowhere else to go, and because of the likelihood that players are familiar with aspects of that world – especially what technology used to be like – post-apocalyptic genres provide a rare opportunity for gamers to come up with ideas for their characters . . . ideas that aren't the result of making a skill roll, but looking at today's world with the eyes of survivor.

For example, let's say the heroes need to signal the next settlement over. One of the players might think of using all these shiny discs that are commonplace, rigging them up into a large reflective surface, and using sunlight to make contact. Sure, the players probably think of these CDs and DVDs as modern-day mundane miracles for their ability to store data, but that information takes a back seat in a post-apocalyptic setting compared to the ability to take advantage of their reflective properties.

Presuming the adventurers all harkened from the pre-apocalypse era, this is a situation where the gamers can justifiably tap pretty much all their player knowledge for their PCs. It can be interesting to view this world and think, "What's inherently useful about that?" The players might want to have their characters make ships out of pre-apocalypse water bottles, or weapons out of craft-supply store pinking shears and pliers. Let them!

The Taste of Tomorrow

In most post-apocalyptic settings, there is nowhere else to go in the campaign world where things are guaranteed to be better. Sure, there might be rumors of faraway Eden-like lands that were untouched by Whatever Happened, but the realistic likelihood is that the whole world's got problems. An important question for the group to answer, then, is, what is the tone of the campaign going to be? And, is everyone on the same page for what the expectations are?

For example, envision a campaign where the heroes travel from place to place, trying to follow rumors of the Untouched Land – a region believed to have been safe from the apocalypse. As far as long-term campaign goals, this is one where the heroes are likely to be thwarted time and again; it's quite possible – perhaps even necessary – that the adventurers will reach the end of their journey, only to discover that the Untouched Land either doesn't exist, was in fact touched by the apocalypse (although perhaps later than the rest of the world, which would give rise to the rumors), or is radically different from what the party had envisioned. The odds of the "payoff" being spectacularly disappointing for the heroes are quite high.

But will that disappointment spread to the players? Again, it depends on expectations. Some groups will be perfectly happy chasing what they probably know to be a fool's game. Others might view the thwarted reward as having been a depressing waste of time.

It's entirely possible to play a post-apocalyptic game where the ultimate goal is optimistic and uplifting (at least, as uplifting as is possible in a world where a large chunk of the population has died). It's also possible to play a campaign where there is no redemption or hope, where forestalling the end is the best that can be hoped for; if the group finds that fun, then great!

Regardless, the world is what it is, and it's not going anywhere.

About the Editor

Steven Marsh is a freelance writer and editor. He has contributed to RPG releases from Green Ronin, West End Games, White Wolf, Hogshead Publishing, and others. He has been editing *Pyramid* for almost nine years; during that time, he has won four Origins awards. He lives in Indiana with his wife, Nikola Vrtis, and their son, Sam!, who is a two-year-old force of nature entirely worthy of his exclamation mark.

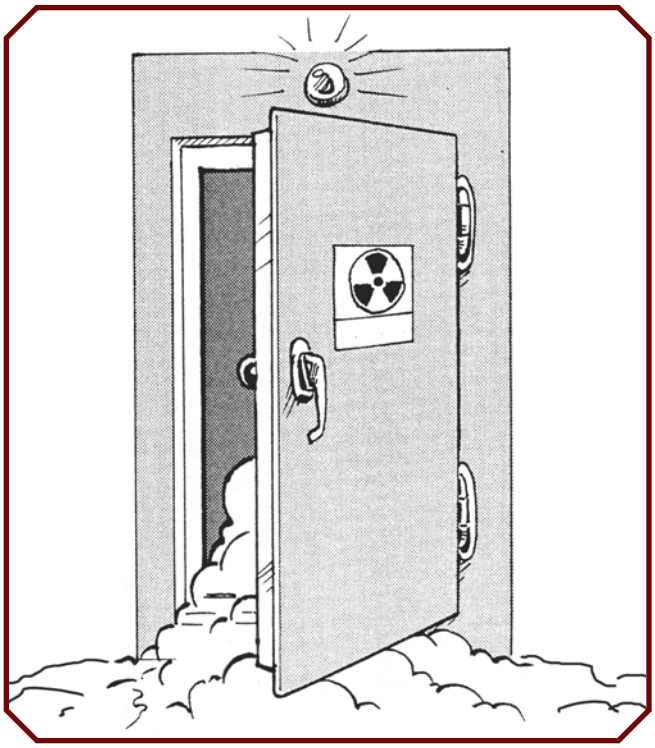
Humor

Murphy's Rules

by Greg Hyland

Got a *Murphy's Rule* of your own? Send it to murphy@sjgames.com

Fnordplay



Some said the world would end by fire, some by ice. No one guessed lemon meringue.

Think you can do better? Send your caption for this illustration to **pyramid@sjgames.com.**

Don't Shout This at the Settlement Gates

- "If you all are so big and tough, why don't I see any snipers?!"
- "Can I interest you all in some literature about the End Times?"
- "I have over 20,000 cans of food in this fully fueled truck; do you all have a can opener I can borrow?"
- "C'mon, you're not playing right! I said, 'Knock, knock!'"
- "This is the song that doesn't end. Yes, it goes on and on, my friends. I started singing it – I don't know how or when – 'cause this is the song that doesn't end. Yes, it goes on and on, my friends. I started singing it . . ."

Recommended Reading

So This Is It. We're All Going to Die.

by Matthew Pook

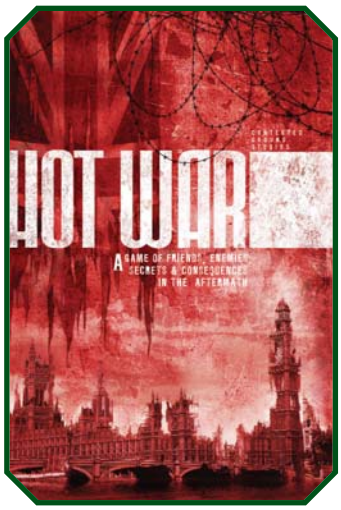
Whether you are quoting Douglas Adams' Arthur Dent or John Maynard Keynes, the fact is that we will all die. The advent of an apocalypse just means that for most of us, our deaths will come along a whole lot sooner than we would have liked. This makes for pretty grim gaming, so most post-apocalypse RPGs are set long, *long* after the disaster, a precedent set by the genre's very first "real" entry, ***Gamma World*** (TSR, 1978). This game portrayed a somewhat wacky world in which pure strain humans, mutants, and mutated plants and animals explored the remnants of a future America, scavenging for artifacts and encountering weird creatures, such as rifle-toting leptoid Hoops and the Sep Land Shark, and getting involved in the wars between the various secret societies. Although it veered off into *Mad Max 2* territory, ***After the Bomb*** ($20.95, Palladium Games, **www.palladiumbooks.com**) did the same thing, as arguably did the fantasy RPGs ***Earthdawn*** ($35.00, Living Room Games, **www.lrgames.com**) and ***Tékumel: Empire of the Petal Throne*** (Guardians of Order, 2005). All were set long after their respective disasters, with ***Earthdawn*** even having its survivors take shelter inside sealed kaers to withstand, quite literally, the horrors without. ***Post-Apocalyptic Hero*** ($35.00, Hero Games, **www.herogames.com**) is probably as good an introduction to the genre as any, covering everything you wanted to know and more, along with post-apocalypses full of automobile combat, magic, zombies, and Revelations.

Yet grim is what we are all about, so the apocalypse that has befallen each of the following games is a matter of mere months old. In each, the heroes will need to strive if they are to survive, forage for supplies, forge new alliances, and build a new place for themselves in the now dramatically changed world. Of course, the games in question remain playable and we shall ne'er go so far as Greg Costikyan's ***Nuclear Winter*** (**www.costik.com/nukewin.html**), probably the shortest and the most realistic entry in the genre, and thus the grimmest RPG to come within rolling distance of a six-sided die. Rather, our path starts with the straight and the grim, not too far from that throwaway take on the genre, before getting ever more fantastic with each stop.

Our first pause, ***Twilight 2013*** ($39.99, 93 Games Studio, **www.93gamesstudio.com**) is definitely straight and grim. This is the third edition of the game originally published as ***Twilight 2000*** by GDW in 1984. Born when a nuclear war with the former Soviet Union was considered to be a dangerously real possibility, the game's original future history saw civilization brought low by an extensive nuclear exchange. The heroes are U.S. servicemen stranded in a war-torn Poland after one final engagement, a situation established in the scenario "Escape from Kalisz." This was followed by a loose campaign that took the survivors racing across Poland and Germany to reach the boats evacuating to America, there to find a shattered nation contested between military and civilian governments both claiming to represent the former United States.

One striking thing about post-apocalyptic life in cities: It's probably more quiet and dark than any lifelong city-dweller has experienced before the fall.

Twilight 2013 updates this future once again, diverging from 2007 down an inexorable path that sees brushfire wars and terrorist attacks escalate into limited nuclear exchanges between France and Russia; then Russia and the United States; China and the United States; and finally Israel and Syria. As deadly as these exchanges are, the effects of EMP strikes, infrastructure collapse, starvation, the nuclear winter, and a flu pandemic see the world's population reduced by 90%. Although the situation across the world is described, the focus in ***Twilight 2013*** has shifted from Europe to a United States invaded by desperate Canadians in the north, occupied by Chinese insurgents in the west, and occupying half of Mexico for its manufacturing base. The new focus is also reflected in its starting point, a message telling everyone that they are on their own. In ***Twilight 2000,*** this came from a general in Europe to his troops, but in ***Twilight 2013,*** it comes from the U.S. president to every American.



Where ***Twilight 2000*** was really regarded as a military RPG, ***Twilight 2013*** is more post-apocalyptic, its focus being on survival and rebuilding, and not on survival and dealing with rogue soldiery. This can be seen in the fewer number of weapons listed than in its forebears; as such, it makes ***Twilight 2013*** more of a toolkit for running grim and gritty games in a familiar post-nuclear near future. Yet the absence of a starting point like "Escape from Kalisz" does leave the GM with a lot of work; lacking a strong sense of purpose and drive, the game feels somewhat soulless. Thus, ***Twilight 2013*** may still be too grim for some.

For our second step, we ask, "What if the Cuban Missile Crisis sent the Cold War hot?" As well as: "What if both sides deployed Other Weaponry, the horrifying monsters and technology scavenged and developed from Nazi research – in addition to atomic and chemical weapons?" Both questions are answered in the evocative ***Hot War*** ($28.00, Contested Ground Studios, **www.contestedground.co.uk**), a post-apocalypse set in the ruins of London. The game is heavily inspired by British 20th-century science fiction and "quality" BBC television drama. A sequel of sorts to the publisher's ***Cold City*** (a game of trust, secrets, and monster hunting in post-war Berlin), the heroes again work for the Special Situation Group, an agency with a wide but undefined directive to investigate incursions by Soviet horrors and shock troops, as well as perform acts of sabotage and subversion by the new political and refugee groups that stand against the weakened British government. They must also follow both personal agendas and those of their secret masters. These secret masters vary from one survivor to the next, but could be the Army, Navy, or Royal Air Force; the Left Wing Citizen's Defense Army; the fascist Union Movement; or the British Experimental Rocket Bureau, which is as dedicated to recovering Soviet Other Weaponry as it is to covering up its use of British Other Weaponry.

What forces a story forward in ***Hot War*** (and enforces a dramatic pace echoing its BBC television inspiration) are those agendas, which provide a bonus number of dice to the game's dice pool mechanics. An agenda can only be used a few times before it must be resolved; the more powerful it is, the less often that it can be applied in a conflict and the quicker it must be resolved. Survivors also have several relationships that can be negative or positive; when one of these relationships comes into play, it can add or subtract from a player's dice pool. Other factors affecting the dice pool include a character's attributes and traits, which can suffer the consequences of a conflict (by being changed by the victor). As written, this certainly befits ***Hot War***'s grim Blitz spirit, but the consequences mechanic is not easily taken into other games. However, the use of agendas and relationships, so well-explained in ***Hot War*** (all of its mechanics are), certainly is easier to export, simply granting small bonuses and penalties when both player and GM figure that they come into play.

Our last step is into the realms of fantasy and ***Desolation*** ($39.00, Greymalkin Designs, **www.desolationrpg.com**), which describes itself as "High Fantasy, Brought Low." It takes the traditional high-magic setting and puts it through the wringer. It is set on the continent of Scondera, in the dominant Ascodean Empire, where magic was so commonplace that many buildings relied upon it for their architecture and self-cleaning plates were not unknown. It is this magic that turned upon its users in the Night of Fire, when fire and stones fell from the sky, the ocean rushed inland, the land itself bucked and heaved. Towns were swallowed, rivers ran blood, and spellcasters and magical devices either warped or exploded. In the new world, magic is harder to cast and no longer to be trusted, and its users are likely to be killed by the superstitious. The pragmatist survivors will probably be interested in what skills others have to offer as much as how easily a soldier's sword can be turned into a plough to work the hardened ground.

Although there are one or two minor balance issues in the rules, ***Desolation*** offers much. There is enough background that a campaign could be set Before, during, and After the Night of Fire, though the focus is on the After. (This is why the After's flora and fauna have been given a nutritional value.) The now-dangerous magic system is freeform, allowing for both player and GM input; for the GM, there is a full scenario and several sample communities set in the After. Yet there is still room aplenty for the GM to make ***Desolation*** his own (possibly too much room for the inexperienced GM), which shows clearly in the fact that Scondera of the After has been intentionally left unmapped and unknown. Where the high-magic setting of Scondera might not have been enough to stand out from the herd, the Night of Fire and the After are what make ***Desolation*** actually interesting. Further, there is no reason to prevent a GM from using ***Desolation*** as a model for moving his existing campaign on with its own Night of Fire.

Having reached this last step, do mind how you go. It's grim out there.

About the Author

Matthew Pook resides in Birmingham, England with the requisite pair of black cats and a perky Goth (not obligatory, but fun nonetheless), plus more games than he can eat. A pedant and proofreader by day, a reviewer by night, he has been gaming for nearly 30 years. He has been saying mostly good things about those games for almost 10 of those years now.

Last Word

with Todd Breitenstein

*For the **Last Word** in each issue of **Pyramid,** we'll chat with someone in the game industry known for work in the topic field. For this issue, we spoke with Todd Breitenstein, creator of the popular **Zombies!!!** and **When Darkness Comes** lines of board games and president of Twilight Creations.*

PYRAMID: So, Todd Breitenstein, as one of the few people on Earth who might be considered an "expert" on dealing with a zombie apocalypse, what is the Last Word on post-apocalypse?

TODD BREITENSTEIN: That's an easy one: Desperation!

Desperation . . . are you thinking in the short-term desperate-to-survive thing, or the long-term desperate-to-rebuild idea?

The way I've always seen it is that there is no long term. The fight to survive is the thing. Even in stories like *The Road Warrior,* there is some semblance of order, but the inevitable is always around the next corner. My favorites, though, are the ones where any thought of the future is lost as soon as the first zombie starts munching on your friend.

So compared to standard fights for survival found in many games, then, post-apocalypse conflicts "what are we going to do now" with "what are we going to do tomorrow"?

Yeah! I would add that the "what are we going to do now" overrides the "what are we gonna do tomorrow" a lot.

What do you think the appeal of post-apocalyptic settings and games are, then? It seems like they'd be inherently pretty depressing, if the end is inevitable. (There aren't many games about "Let's pretend to die in a fire!" for example.)

Think of it this way: In ***Dungeons & Dragons,*** the characters are always working toward something larger than themselves. Perhaps something generally considered grand and glorious! In something like ***Twilight 2000*** or our games, your goals are a lot less grand and a lot more selfish. There is something to be said for the plain survival aspect of the game. Death is always as close as your next decision. That's kind of exciting!

How well do you think you would fare in the post-apocalypse?

Well, believe it or not, I have thought about this . . . Considering where we live and the "weaponry" available, I think the Twilight Creations clan would be fine. That is, unless the wildlife decided we looked like dinner. Of course, the opposite is also true. If we had a problem, there aren't a whole lot of places within walking distance to look for help!

*One of the tricky bits about desperation is that it's hard to know **how** one will be desperate, eh? "Desperate to keep hungry deranged gangs at bay" conflicts nicely with "Desperate to get to the next county over, where there may still be medical supplies we need". . .*

That is exactly the *cool* part (or uncool part, depending on your personality). It is not hard to imagine either one of those scenarios. I can imagine fighting a dragon and that is cool. But, at the end of the day, I know that it won't ever happen. Scavenging for food or medicine – now there's something I can really wrap my head around. And the best part? It really is scary! The bottom line is that the whole thing is a real test of one's self. A real sense of, "Do I have what it takes?"

Desperation!

– Todd Breitenstein

Too true! So, presuming we don't burn anything cardboard to keep warm in the forthcoming post-apocalyptic world . . . what does Twilight Creations have in store for the coming months?

We have some very cool stuff in store for 2009! In fact, our February release is a new game from designer Reiner Knizia called ***Zombiegeddon.*** The game plays out over two days: the day before the apocalypse and the day after. It is very neat and really captures the survival feel.

Other than that, we have ***Zombies!!! 8: Jailbreak*** coming in March. It involves zombies in – wait for it – *jail!*

We also have a game coming in the summer that plays out what happens when the aliens take over the world. We are tentatively calling it . . . ***Martians!!!***

Finally, we are working on a board game based on the ***Deadlands RPG*** from Pinnacle Entertainment Group. For those not familiar, it's kind of a post-apocalyptic western setting. We are really psyched for that one!

They all sound fun; hopefully the world will last long enough to see those goodies!

You're rather cynical, aren't you? [He said, ironically . . .]

*Information about Twilight Creations, **Zombiegeddon, Zombies!!!,** and other Twilight Creation games can be found at **TwilightCreationsInc.com.***

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