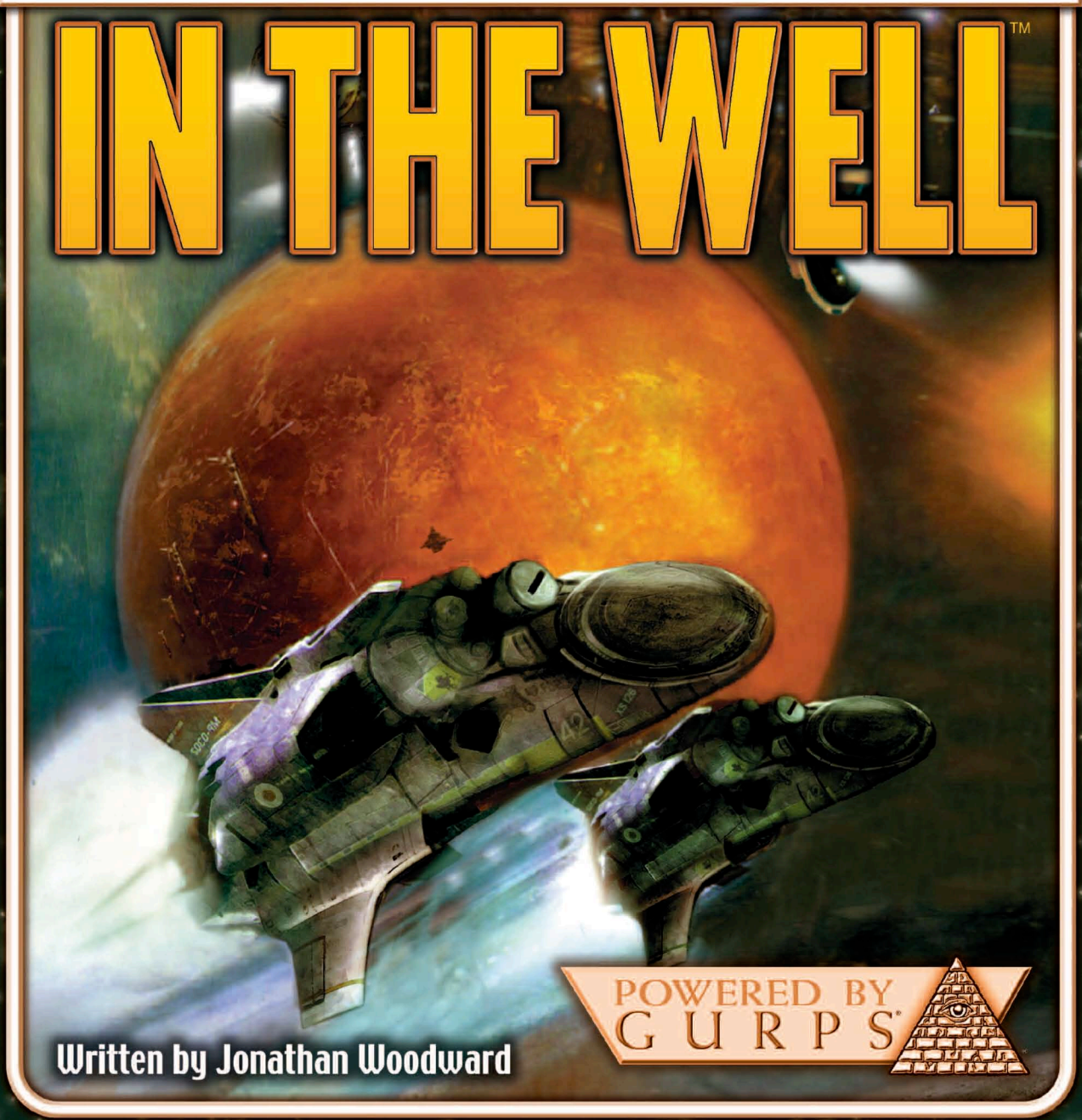
TransHuman™ Space

IN THE WELL™



Written by Jonathan Woodward

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STEVE JACKSON GAMES

TRANSHUMAN SPACE™

IN THE WELL™

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Author's Dedication: To Herbert N. Woodward

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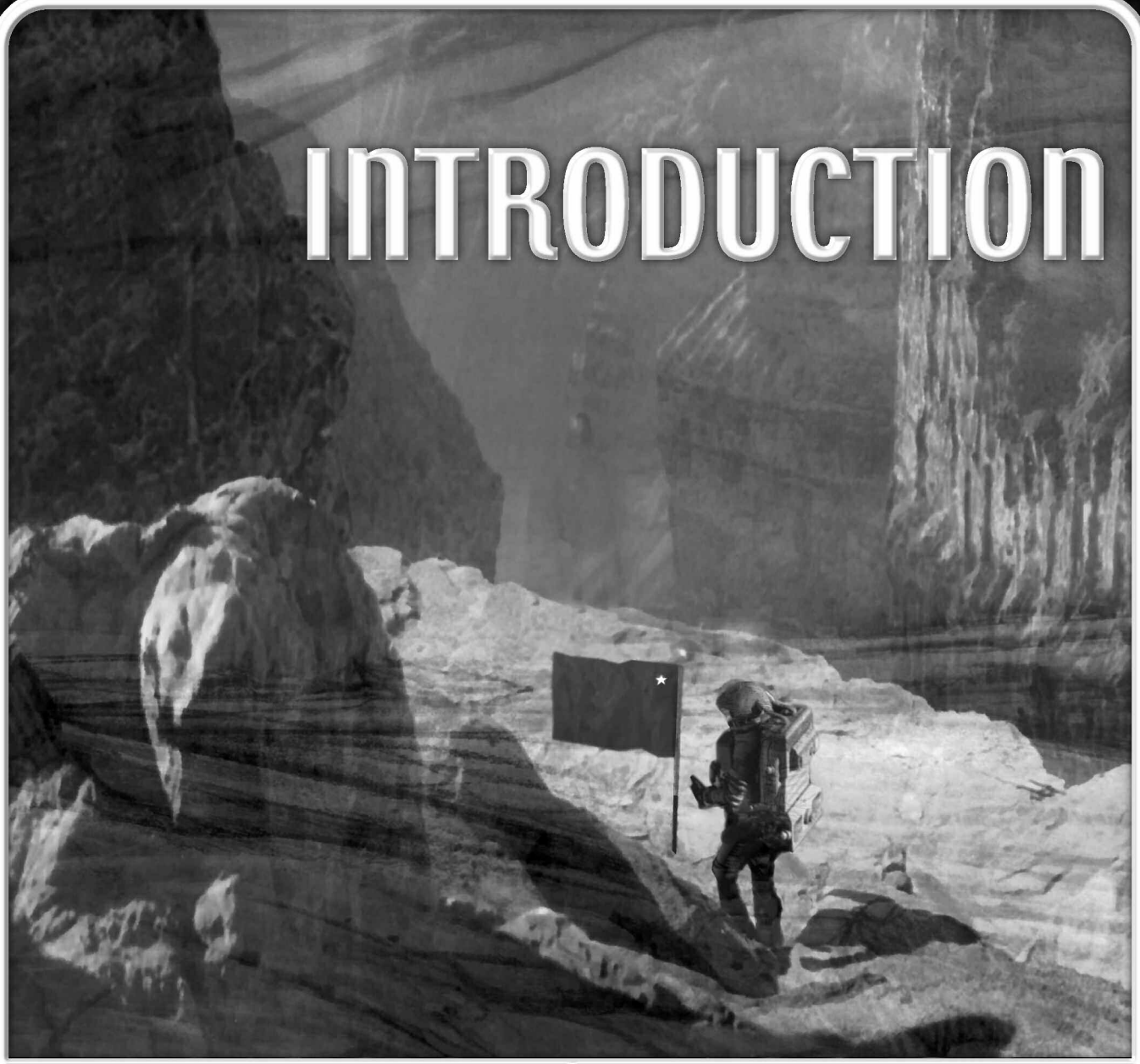


"I'm cycling the door. There, it's open. It's a beautiful day – the sky is a marvelous burnt pink. I'm stepping onto the 'porch' now. Everything looks in order. I'm turning around to check the lander – yes, it looks fine.

"I'm stepping off the porch now . . ."

CRUNCH.

"My, that was loud! Oh . . . that wasn't what I planned on saying. Ha! I suppose it works: 'One loud step for mankind.' Ha!

"As a representative of my family, the People's Republic of China, and the United Nations, I claim this planet for humanity. May we all work together for peace and understanding on Mars."

The inner solar system. Four planets huddle around the Sun. Each is radically different from the others. One is humanity's home, rich in life. One is an airless rock, dense and seared. One is covered in choking clouds. One is a cold, dry desert.

Transhuman Space: In The Well covers the inner solar system, excluding Earth and Luna. This is the part of the System where travel times are short and solar energy is abundant. Nations, corporations, and individuals thrive here, trading, digging, discovering, and fighting.

The main focus is on Mars, the most heavily populated planet besides Earth itself. Mars is dominated by the Chinese, who were the first to land, and the first to colonize in force. Second place is held – barely – by the United States, who lost the Mars race thanks to computer error, and never fully recovered. A hundred other nations and organizations have footholds on the Red Planet, and it's considered by many to be the most exciting place in the System.

Venus and Mercury are also discussed here. Both are lightly populated, but more explorers and opportunists arrive every day. Mercury is rich in metal and energy, and is home to heavy industry at the cutting edge. Venus is good for nothing but hiding and research – but that's changing, as solar shades move into orbit and terraforming begins. Finally, a thousand asteroids and habitats circle the sun inside the orbit of Mars.

In addition to being a gazetteer of the inner solar system, ***In The Well*** includes a dozen new racial packages for transhumans, hardware from rock pitons to armored personnel carriers to cargo zeppelins, strange gengineered beasts, and adventure seeds. This is the heart of the solar system. Enjoy.

About the Author

Jonathan Woodward is a part-time freelance writer, and full-time computer professional. He is the author of ***GURPS Ogre*** and co-author of several books for White Wolf Publishing's ***Trinity*** science-fiction roleplaying game. In addition to roleplaying, he is a ruthless comic-book annotator and noted Legophile. He is not currently a transhuman, but plans are afoot. He lives in Massachusetts.

About Transhuman Space

The ***Transhuman Space*** series presents a unique hard-science and high-biotech universe to roleplay in. Set in the solar system in the year 2100, it is a setting rich in adventure, mystery, and the exploration of the possibilities of existence. The core book is ***Transhuman Space,*** written by the line's creator, David Pulver. It presents an overview of the solar system of 2100. ***Transhuman Space: In The Well*** is the sixth book in the series. Steve Jackson Games is committed to extensive support of the ***Transhuman Space*** setting; future titles will detail the Deep Beyond outside Mars orbit, the varied societies of the homeworld itself, and much more.

About GURPS

Steve Jackson Games is committed to full support of the ***GURPS*** system. Our address is SJ Games, Box 18957, Austin, TX 78760. Please include a self-addressed, stamped envelope (SASE) any time you write us! Resources include:

Pyramid (**www.sjgames.com/pyramid/**). Our online magazine includes new ***GURPS*** rules and articles. It also covers ***Dungeons and Dragons, Traveller, World of Darkness, Call of Cthulhu,*** and many more top games – and other Steve Jackson Games releases like ***In Nomine, Illuminati, Car Wars, Toon, Ogre Miniatures,*** and more. *Pyramid* subscribers also have access to playtest files online!

New supplements and adventures. ***GURPS*** continues to grow, and we'll be happy to let you know what's new. For a current catalog, send us a legal-sized or 9"×12" SASE – please use two stamps! – or just visit **www.warehouse23.com**.

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

Gamer input. We value your comments, for new products as well as updated printings of existing titles!

Internet. Visit us on the World Wide Web at **www.sjgames.com** for errata, updates, Q&A, and much more. ***GURPS*** has its own Usenet group, too: rec.games.frp.gurps.

GURPSnet. This e-mail list hosts much of the online discussion of ***GURPS.*** To join, e-mail majordomo@io.com with "subscribe GURPSnet-L" in the body, or point your web browser to **gurpsnet.sjgames.com**.

The ***Transhuman Space: In The Well*** web page is **www.sjgames.com/transhuman/inthewell/**.

Page References

Rules and statistics in this book are specifically for the ***GURPS Basic Set,*** *Third Edition.* Any page reference that begins with a B refers to the ***GURPS Basic Set*** – e.g., p. B102 means p. 102 of the ***GURPS Basic Set,*** *Third Edition.* Page references beginning with BIO indicate ***GURPS Bio-Tech,*** those beginning with CI indicate ***GURPS Compendium I,*** those beginning with S refer to ***GURPS Space,*** *Third Edition,* those beginning with TS refer to ***Transhuman Space,*** and those beginning with VXi refer to ***GURPS Vehicles Expansion 1.*** The abbreviation for *this* book is ITW. For a full list of abbreviations, see p. CI181 or the updated web list: **www.sjgames.com/gurps/abbrevs.html**.

1 THE HISTORY OF MARS

"It's never going to happen."

"You are not sure of that. The debates continue. Perhaps not this year, perhaps not next. But it will happen."

"We need it now! Humanity needs the escape valve, another world to go to. We've got our eggs in one basket; it's only a matter of time before some madman releases a neo-plague and kills Earth off."

"Humanity is already scattered throughout near-Earth space. They would go on."

"Living in a tin can? With a dead planet outside the window? They'd go mad. And quickly. We need another world, a living world."

"You know I've never agreed with that argument. I still think you two are missing the point. Terraforming Mars needs to be started now, or we'll have too much invested in the 'minimal impact' model we're currently stuck with. And I don't just mean financially. Politicians hate to change their mind; every one who backs the preservationist side is effectively lost to us forever."

"So how do we get them over to our side? We've been trying to convince the eggheads for months, but they're hung up on the areological record and stuff."

"Why convince them? Terraforming is easy. Mars wants to live again; a few bacteria, a few CFCs, and she'll be tropical before you know it."

*"Do it **without** permission?"*

"Sure, why not?"

2001–2024: Robot Explorers

As the 21st century dawned, it was clear humans would be on Mars before too many more decades passed. The United States, the European Union, and China all had various manned missions on the drawing boards. They ranged from trillion-dollar campaigns incorporating moonbases, orbital construction yards, and massive hundred-person "space arks" all the way down to simple, cheap four-person missions.

The initial steps were made by robots. The first probes to arrive at Mars in the 21st century were American, including both orbiters and landers. The surface was mapped down to one-yard resolution. The landers discovered enormous beds of permafrost under the surface, and even frozen *lakes* under the sands of the northern plains. Areology rovers discovered veins of nitrates, uranium, and gold. Mars began to look more and more like a prize worth the effort.

America's manned Mars mission had problems from its initial conception. The *fastest* ways to get to Mars involved existing equipment and technology – and thus were very unpopular with the aerospace industrial complex, which saw Mars as an excuse for massive spending on new technologies and new equipment. Years of debate passed before a compromise plan was finalized in 2010. Typically, it had all the weaknesses of its sources and few of the strengths. Nevertheless, according to the best NASA analysts, it would put Americans on Mars before anyone else possibly could.

Then the Europeans put in their two cents. The European Space Agency (ESA) could not economically sustain its own Mars project, so it offered to assist with the American mission, so long as Europe had representation on the crew. The U.S. President of the time, Henry Vaskers, was weak in foreign relations. He saw this as an excellent opportunity to score points for the next election, and welcomed the Europeans with open arms. A third of the compromise plan was scrapped, and the European contribution (largely consisting of orbital infrastructure) was shoehorned in. The ungainly undertaking was called the Horus Project, and a launch date of 2018 was set.

It quickly became clear the date would not be met. In 2013, telescopes discovered a terrestrial planet orbiting 61 Virginis. Spectroscopes indicated oxygen and water vapor in its atmosphere – strong evidence for macroscopic plants and animals. The possibility of microscopic fossils on Mars began to seem anticlimactic as well as unlikely, and political support for the manned Mars mission slumped. The 2018 date was pushed to 2020, then quietly moved to an unspecified date in the mid-2020s. In 2015 the Europeans withdrew from the Horus Project, claiming that it was far too expensive and overly complex, but also citing the United States' lack of enthusiasm. In need of a partner (both for financial and public-relations reasons), the Americans approached Russia. Seizing the opportunity for a moment in the spotlight, the Russians provided their heavy-booster expertise and skilled technicians and scientists.

From across the gulf of space, intellects vast and cool and unsympathetic regarded the unspoiled Mars with envious eyes, and slowly and surely drew their plans against it.
– Negative Growth graffiti

In 2014, China sent its first Mars probe, *Zhenchayuan* ("scout"). With typical secrecy, the launch was not announced until the week before, and the exact payload of the probe was never revealed to the rest of the world. It included an orbital component and a trio of rovers. It arrived at Mars the following year, and the first rover was sent down to a spot halfway between Pavonis Mons and Hebes Chasma. Between the rover on the ground, and the cameras in orbit, the Chinese found a site rich in water and other necessities of life at about 0° north, 95° west. The second rover was sent down, and the two robots began (in a small way) to prepare for future robots and, someday, people. They leveled landing pads and placed guidance beacons. They did thorough surveys of the area, and some rudimentary mining, though more complex preparations would have to wait for more complex visitors.

Simultaneously, the third rover was dispatched to Phobos. It landed at 0° north, 240° west, the spot on Phobos that always faces Mars. (As with Luna, the Martian moons are tidally locked.) Like its siblings, it scouted out a good landing site and prepped it for the future.

Disaster

"I don't think people can understand the despair. We'd struggled and schemed to get accepted for the mission. We'd trained 20 hours a day. We'd traveled for months. We'd compromised so much for the dream.

"Then, one computer bug, and we're stuck. Not just 'within sight' of our destination; it damn well filled half the sky. You could reach out and touch it. Before the accident, we all spent hours staring out the windows at it, looking at the features we'd memorized over the years, astonished and delighted that they were real. Look, Marineris! Look, Hellas! They're real! We're going to go there!

"After the accident, nobody looked out the windows. It was too much to bear. There were a half-dozen unsuccessful suicide attempts. One of the crew was stopped as she was about to step out the airlock. She was wearing her suit, but she was going to get down to the surface one way or another. If it had to be as ash, so be it."

– Stefina Ivanova, ***Horus 1 Revealed***

With *Zhenchayuan* a complete success, China sent more robots. Not all worked perfectly, but each was relatively expendable and built on the work of its predecessors. This long-term endeavor was called the Yongyuan Project ("eternity"). By the middle of the 2020s, China's robot bases on Mars and Phobos were mining water, manufacturing fuel, and building domes.

What little progress was being made on the Horus Project also involved robots. Throughout the late 2010s and early 2020s, the United States – and other nations and corporations – dropped thousands of robots on Mars, ranging from truck-sized rovers to mechanical insects. Many of them, like the Chinese robots, were scouting and base-building devices. Some, however, were created specifically for *tourism.* Though speed-of-light limitations made two-way teletourism difficult, the lure of being able to look through a robot's eyes as it explored caves and craters unseen by humans proved irresistible to many. These tour-bots slowly rebuilt support for manned interplanetary travel, and brought money into the Horus Project's budget.

By 2020, teletourism and the possibility that the first human on Mars might *not* be American had restored public support for Horus. In 2021, project leaders set a final launch date for 2024, and moved forward strongly to meet it. China did not alter its plans in the slightest. The United States and Europe saw the "first person on Mars" issue as one of national prestige. The Chinese were far more pragmatic. Being first on Mars would be nice, but the purpose of the Yongyuan Project was not glory, but control of Mars and its resources.

2024–2026: Flag and Footsteps

The *Horus 1* was launched in late 2024. It carried a crew of 40, half American, half Russian. Of the crew, 20 were strictly backup, and would not be going down to the surface unless something catastrophic happened to the first 20. The *Horus* was of largely American construction, and included two ungainly manned landing craft and a flotilla of automated landers. Its journey to Mars was uneventful, and it arrived in 2025. The members of the prime crew boarded their lander, and undocked from the main spacecraft. Then, their control software hiccuped. The backup computer noticed the hiccup, and attempted to return to a default "safe" condition – docked with the *Horus.* Unfortunately, the default landing bay had not been set properly for this lander, and the autopilot tried to dock in the bay already occupied by the other lander. Both landers were crippled, and three members of the prime crew were killed in the crash. The American-Russian mission had no way down to the surface. A quick review of their consumables revealed disturbing truths. The mission plan counted on half the team being down on the surface, growing food in Martian dirt and extracting oxygen from Martian air. With 37 people stuck in the *Horus,* supplies would run out much faster. The first option was to wait for a rescue and resupply mission – which would almost certainly be Chinese. The second option was to head back to Earth *immediately,* on a minimum-time orbit, which would require dumping all extraneous equipment. Within a week, the *Horus* was on its way back, and tons of surveying and colonizing equipment were left in Mars orbit.

In the Beginning

"The world was untouched, a new thing. You could walk for thousands of miles, and see no signs of man, for none had been there before. The color of the ground was a profoundly alien thing, a mix of rust-red and coal-black unlike anything Earthly. It almost seemed to vibrate in your eyes.

"The dust flowed like water, fine and rich. The sky was white on a clear day, pink when sand was in the air, and occasionally, rarely, white-blue with ice particles. The sunsets were outrageously violet, a color almost sarcastic in its intensity.

"The landscape was huge. All the features were a hundred times as large as their counterparts on Earth. Valleys that would split continents. Volcanoes that thrust out of the atmosphere. Calderas that you could lose entire cities in. Cliffs like the side of the world.

"I once took a hopper and flew deep into the southern highlands. I found a crater, and landed at its center. The edge of the crater was above me. The horizon was surrounding me, embracing me. I wept with joy; this magnificent world had accepted me as its own."

– Chiangan Chen, ***When The World Was New***

A month later, the manned Chinese mission left Earth orbit. Named the *Chaosheng* ("pilgrimage"), the craft was a much cleaner design than the *Horus,* and was intended for *colonization,* not research. The six-person crew would not be returning to Earth. They arrived in Mars orbit in 2026, and established a small base on Phobos. They then headed down, and landed safely on the surface. Mission Commander Wen-Xuan Liang was the first to step out of the main lander, on December 15, 2026, 10:00 PM (GMT). Local time was sunrise, the 26th of May, m0000 ("Martian year zero"; see p. 31). The Chinese "immigrants" found much of their base ready and waiting, courtesy of the robots. The initial mission was followed by another six-man mission every three months. Some established a permanent presence on Phobos; the rest colonized Mars.

2026–2039: Research and Debate

The Chinese colony prospered. The base was named, in a burst of sentimentality, "Guxiang" ("hometown"). Most of the colonists' efforts went toward building infrastructure to support future colonists, but they also took time to explore Mars, both in person and via robot. Expeditions went west to Olympus Mons, north to the pole, east to Candor Chasma, and south to the Noctis Labyrinthus. The journeys of the Chinese explorers were prime-time entertainment back on Earth, and their discoveries, however dry, were front-page news. The "Mars as pop culture" fad, which had begun in the late 2010s, got another boost, and lasted well into the 2040s. Every nation that had the desire and capability to send people to Mars suddenly found that it had the mandate as well.

The American mission *Thunder Bird* arrived in 2027. The Russians, somewhat nervous about the possibility of a second *Horus* accident, had declined representation on this mission. The two nations continued to share technology, and the Russians pursued their own Mars program. Like *Horus 1, Thunder Bird* was a compromise mission; half of the 70-person crew was there for scientific research, and intended to return to Earth. Half were there to start a permanent colony. The three landers set down just south of the eastern end of Marineris, overlooking Eos Chasma. The Americans named their base Plymouth. The early years of Plymouth were marked by disputes and friction between the short-term scientists (derogatively called the "temps") and the permanent engineers (the "inmates"). The scientists resented the fact that the engineers didn't spend all their time helping support the scientific research, and the engineers wanted the scientists to pull their own weight in the mammoth task of building a colony on Mars. In 2031, the first Russian mission arrived, and landed next to Plymouth, nearly doubling the size of the settlement.

Meanwhile, the Chinese (who were already bringing in 24 people a year) made an alliance with Japan's Tenzan Heavy Industries. Together, they constructed several Earth-Mars "cyclers" – dedicated-purpose spacecraft designed to travel constantly back and forth between the Earth and Mars. These vessels, though capable of course adjustments, were more like space stations, and were big enough to carry 100 colonists each trip out. The Chinese colony began to grow even faster, and this inevitably caused argument.

Terraforming, Pro and Con

Even prior to the construction of the cyclers, the question of whether to terraform Mars was an international debate. The anti-terraforming group came to be called "preservationists." Some of them believed that research into the history of Mars would be made more difficult by terraforming efforts. Some held that the aesthetic beauty of the extant Martian terrain was reason enough to avoid changing it. Others held that altering Mars to suit man was imperialism in a new form. Many ecologists argued that even an ecology devoid of life needed to be protected. And many people felt that the question of whether there was living Martian life needed to be settled before doing anything that might kill it.

The Green Side

"When I was in college back on Earth, my junior-year geology prof did a section on terraforming. A lot of the young radicals in the class were up in arms about how altering other worlds would be sacrilege. The professor blinked mildly at them. He then placed a rock on the table, and hit it with a hammer. He continued to do this until it was dust, then he swept the dust into the sink and washed it down the drain. The whole class was puzzled. The prof looked up, and said, 'Was anyone morally outraged by that vicious and pointless destruction of a rock?'

"Everyone got the point. Rocks don't have rights."

– Chinhong Sun, Ares Conspirator,
The Second Tree of Knowledge

The pro-terraforming side called themselves "green." Like the preservationists, their arguments ranged from scientific ("By making Mars inhabitable, we can spread humanity over multiple worlds, thus protecting ourselves against global catastrophes.") to spiritual ("It is humanity's destiny to grow and spread to wherever we can reach."). To say the debates were fierce would be an understatement; several bombings of scientific facilities home to pro-terraforming researchers were attributed to preservationists. A few anti-terraformers were stoned to death when visiting areas suffering from population pressure.

As more and more people went to Mars, a middle ground emerged. The "slow and steady" position held that terraforming Mars on a scale of centuries would allow plenty of time for scientific research, and would also make it easy to *stop* terraforming, if public opinion went against it. Some of the pro-terraforming crowd had been promoting a slow process all along, and they formed the core of this grouping; they were joined by anti-terraformers who saw it as an acceptable compromise, with "breathing room" built in.

As always, the emergence of a middle ground drove the ends of the spectrum toward the extremes. The "fast" terraformers wanted to hit Mars with ice asteroids, delivering gigatons of water into the atmosphere, churning up the surface, and producing massive amounts of heat. The preservationists wanted all colonists off the planet, and no one allowed on it but scientists, in sharply limited numbers.

In relation to the nations involved, China and America tended to be split between slow and fast terraformers. Crowded Chinese cities encouraged people to look toward the wide-open spaces of Mars, and the American expansionistic tradition of the Old West was still alive in some hearts. The United States had well-organized preservationist societies, but they were very much a minority.

On Mars itself, the colonists at Guxiang were mostly slow terraformers, with some fast terraformers. They'd all been selected as colonists, and none believed in leaving Mars untouched. At Plymouth, however, the "temps" were often preservationists, and the "inmates" were fast terraformers. The division was not absolute; some engineers favored a more hands-off approach, and a few scientists regarded changing Mars as an irresistible experiment. Nevertheless, this was one more wedge between the two halves of the American colony.

The Conspiracy

In 2032, the *Thunder Bird 2* mission arrived in Mars orbit. Most of the original scientists left for the trip home, and a new batch was sent down. The engineers at Plymouth did their best to keep an open mind, and not blame these new "eggheads" for the opinions of their colleagues who had just left. Unfortunately, the new arrivals took one look at the churned and scarred terrain around Plymouth and began criticizing the engineers for their careless destruction of primeval Martian terrain. The process of building Plymouth, locating needed minerals, etc., had left its mark on the ground – a mark which most of the scientists saw as desecration.

Thus, the previous split between preservationist and fast terraformers continued at Plymouth. The engineers began to talk about ways of going ahead with building up the colony, and transforming Mars, without the help of the American scientists. For a few years, nothing came of it.

The Preservationist Side

"You don't get it. No one today gets it. Mars is gone forever, and you think of it in terms of 'the lost areological record.' It's not just the transformation of the landscape. It's the destruction of a planet for no reason beyond human arrogance. This was a complex and living world – yes, 'living'; the interplay of wind, rock, and light can be life without the need for DNA. Memetics says that anything that replicates itself is life. Look at the rocks of Vastitas Borealis. The wind carves them into strikingly similar shapes, but minor variations in their environment means that no two are identical.

"And don't talk to me about population pressures. Two million-plus people on Mars haven't relieved any pressures on Earth. As to the 'new frontier' argument, there's thousands of cubic A.U. of space out there; why desecrate Mars?"

– Ahmed al-Adnan, ***The Land Is The Message***

In late 2035, a Japanese mission landed on Aurorae Planum, just across Marineris from Plymouth. The Japanese government was very interested in the commercial possibilities of Mars, and the crew of the *Ama-No-Gawa* were scientists tasked with investigating fast terraforming. The split at Plymouth was known to much of Earth, though the intensity of the debate had been softened by censors for political reasons. Regardless, the Japanese knew who at Plymouth would be sympathetic to their program, and who wouldn't. Most of the fast terraformers at both bases just exchanged moral support. A few decided to do something more.

They did not formally name their conspiracy – or even consider it a "conspiracy" as such. They were (and, largely, "are") a group of geneticists, planetologists, and engineers who decided to begin the fast terraformation of Mars through the means available to them, in defiance of their respective government's decisions on the matter. The nominal leader was Fujihiko Kaneda, of the Japanese mission. A biologist with a background in genetics, he was determined without being fanatical. He genuinely saw making Mars more suitable for humans to be a short-term need, necessary for the growth of the human spirit. Skilled in oratory, he was able to convince many who otherwise would have been borderline.

The conspiracy was interplanetary; many scientists back on Earth provided basic research, and sympathizers in various governments saw to it that at least a few people of green persuasion were on every spacecraft sent to Mars. The conspiracy spent the rest of the 2030s planning, experimenting, and growing.

2039–2040: The Plague

By the middle of 2039 the conspiracy numbered over 400, and was calling itself "The Ares Project." The major components of the transformation were in place (see *The Ares Plague,* p. 35). On November 1, 2039, bacteria were released into the atmosphere, ozone-friendly chlorofluorocarbon factories started, and other elements of the plan were initiated. These changes were noticed, in a small way, almost immediately. The CFCs added to the atmosphere were hardest to hide. They first came to widespread public attention in March when the colonial government at Plymouth accused the Martian Chinese of being careless with their industrial processes. No one had yet decided that the CFCs might be deliberate.

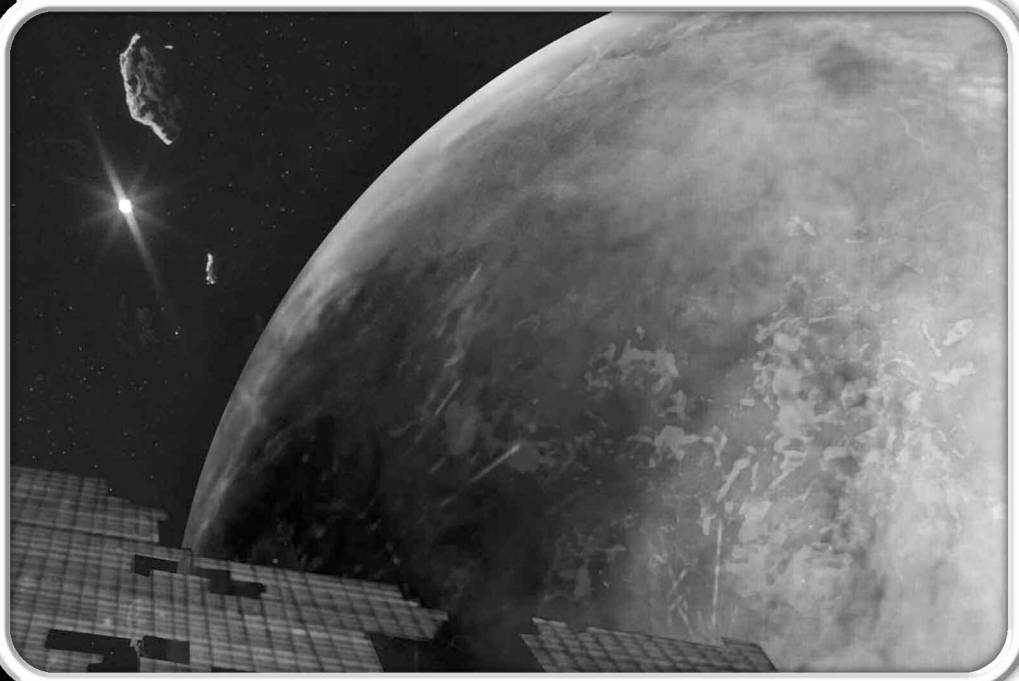
By 2040, the bacteria were doing well enough that several announcements of "Martian Life Discovered!" had come and gone with the revelation that the bacteria were apparently mutated Earth breeds. The public assumed that other colonies were getting sloppy, accidentally releasing Earth life into the atmosphere. Biologists studying the captured bacteria weren't so sure. In July, they announced that the bacteria were clearly engineered as terraforming agents.

This revelation reverberated around Mars and to Earth. The national governments accused each other of going ahead with fast terraforming without even discussing it. Heated denials of complicity were returned. The preservationists formally organized, and became the capital-P Preservationist Movement; they began a campaign to add terraforming prohibitions to the Revised Outer Space Treaty. Old disagreements at Plymouth were brought to life again. The split between engineer and scientist had faded over the 2030s, as Plymouth grew from 70 to hundreds of people, but many original settlers remembered. Most of the accusations were misdirected, but some suspicions were accurate. The administrations of every colony began internal investigations, and expeditions went out to find the source of the CFCs. Now that someone was obviously changing Mars, the CFCs could no longer be regarded as accidental. Many of the CFC factories were found and shut down, but most were too well hidden to be discovered quickly. Between the investigations and clues found at the factories, the conspirators began to get caught.

By the end of 2040, over half the members of the Ares Project had been identified. In the press, they were the "Ares Conspiracy," and the bacteria they'd released were the "Ares Plague." The conspirators hated both these names, but they have stuck to this day. By the end of 2040, the effects of the Plague were becoming visible. Average air temperature was up an entire degree Fahrenheit, and the polar caps were, just barely, starting to melt.

2040–2056: Transformation

With some of the conspirators captured, many of the rest fled. The Conspiracy had boltholes in the wilderness, and they used them. Some simply hid and watched the Ares Plague do its work. Others continued their work, releasing more bacteria and building more CFC factories. The most radical attempted to liberate their companions or defend the existing factories; others planned a revolution. Several people were killed in armed skirmishes, including Kaneda. Homicide was virtually unknown on Mars, and the violence shocked everyone on both planets. China threatened to send troops to Mars. Over 50 of the leading conspirators, knowing capture was imminent, accepted an offer from Captain Latisha Fox of the American DSOV *Michael Collins,* and fled to Ceres in the Main Belt.



In February of 2041, the remaining captured conspirators were collected at Plymouth, the largest habitat that was home to a significant number of the guilty. The trials were informal and quick; the conspirators were exiled from Mars. Some of them chose to go to the Belt; others returned to Earth. They left with mixed feelings. They would spend the rest of their lives as expatriates, and many people regarded them as despised criminals. On the other hand, their work on Mars was clearly succeeding, probably could not be stopped, and made most fast terraformers think of them as heroes and martyrs.

Ecoclysms

The next 15 years were full of turmoil. The Ares Plague worked brilliantly. The minor improvements in the greenhouse effect raised the temperature slightly, and the added heat was just sufficient to push Mars from one equilibrium point toward another. As the polar caps melted, they released CO_2 and water vapor – both of which are greenhouse gases themselves. The air pressure and temperature shot up stunningly quickly. By the middle of the 2050s, air pressure was up tenfold, and average temperature had increased more than 10° Fahrenheit.

The landscape of Mars responded violently to these changes. The desiccated regolith sucked up the water in the air. The enthusiastic chemical reactions this entailed, and the increased weight of the soil, caused cliffs to fall and terrain to collapse. The sharp reduction in the weight of the polar caps caused the land under them to recoil upward, causing marsquakes and fracturing the ground. The added heat increased atmospheric turbulence, and dust storms were common. Most habitats were sturdily constructed on safe ground, but some were poorly built . . . or just unlucky. Between 2040 and 2060, dozens of people died in "natural" disasters related to the Ares Plague, and many more were injured. By 2048, it was clear that the best efforts to end the Plague had failed. Both China and the United States announced they were going to stop trying. What direction they would take next was left unspoken for the moment.

Anniversary

More vessels arrived from China and the United States every year. Other newcomers came from a consortium of South American nations, from the European Union, from Russia, and from many other countries and organizations. By far the most were Chinese. The year 2049 was the centennial of the People's Republic of China, and part of the multiplanet celebrations included the announcement that the Chinese Mars colony had grown to 2,000 people, and that it was now formally an autonomous region of the PRC. Further, China declared its intent to settle Mars with genetically engineered lifeforms and aggressively pursue terraforming. These announcements conflicted somewhat with the spirit of the Revised Outer Space Treaty (p. 49) and caused grumbling in the U.S. colony.

The Preservationists, on the other hand, were outraged. They had taken the credit for driving the Ares Conspiracy (or parts of it) off Mars, and the dramatic aftereffects of terraforming had made it easy for them to recruit new members. Now they began striking against Chinese targets. The remaining free conspirators defended the Chinese efforts, and fought to keep the transformation of Mars going; the new Chinese and American police who had arrived on Mars were often caught in the crossfire. The most infamous clash was a strike by Preservationists on a trio of CFC factories that were discovered in Herschel Crater in 2050. The Preservationists were met by a conspirator ambush, and a bloody firefight developed. The only survivor was a badly wounded conspirator, Marta Cegielski. She was forced to call for help on the emergency band. She was tried as a murderer, convicted, and sentenced to 10 years imprisonment in the newly built jail at Plymouth. Only lack of evidence prevented a far harsher sentence.

That was the last major incident. By 2050, public opinion on Earth and Mars viewed both factions as equally culpable extremists. With a decline in domestic support for radical Martian preservationist groups, the United States, Europe, Japan, and Russia found themselves free to join China on the path of expediency. In 2052, the U.S. Congress surrendered to the space development lobby and voted to fund fast terraforming. The Mars Development Corporation was founded next year. With the United States on board, American-controlled areas on Mars were no longer safe havens for radical Preservationists. With Chinese and U.S. law enforcement cooperating, those militants who weren't arrested went into hiding.

New settlers arrived at Mars every year, then every month, then every week. In 2040, the population of Mars was 1,000. In 2045, 2,500. In 2050, 5,000. In 2055, 15,000. Most of the immigrants were from China, and Chinese have never made up less than 51% of the population.

2056–2087: Growth

By this time, travel to Mars was a commercial affair, and scores of spacecraft departed Earth for Mars every year. Now that the transformation of Mars was no longer an uncontrolled, random process, immigration rose notably. The population of Mars was 150,000 in 2065, 550,000 in 2075, and 1,200,000 in 2085. Many of these immigrants were gene-altered humans designed for Mars. Most were Chinese. Americans were a puny second-place group, and several other nations vied for third.

The Chinese government had already begun an ambitious plan to divert icy Kuiper Belt Objects to Mars. Now they began to spin mirrors out of asteroids, using them to bring more heat to the surface (see p. 29). They also contracted various biotech firms to begin seeding the planet with bacteria and simple plants. By the end of the 2050s, the other major Martian powers were doing the same. Smaller organizations altered local areas to suit them, distributing flora in small canyons or creating lakes. The nations painted with a broader brush.

The Chinese mirrors blazed down and continued melting the caps. Japanese geneticists created a thousand species of plants, and distributed them worldwide. The United States favored more hard-tech solutions, and dug massive thermal boreholes to bring heat up out of the interior. More organizations created mirrors, and the insolation climbed. In 2057, long-term research projects of Xiao Chu and other biotech companies came to fruition, as the first Mars-adapted parahumans were born. Though superseded later by more advanced designs like the Yousheng (p. TS117), the early Zhiminde ("colonial") parahumans were an unequivocal statement of China's intentions.

The Flooding of Marineris

In 2065 China and the United States opened talks on a cooperative megaengineering project. The Chinese wanted an open body of water near their territory, but the obvious choice, Marineris, flowed downhill to the east – into American territory. Fortunately, by this point, most American habitats had been moved to higher ground for greater protection from the continuing ecoclysms, so few would need to be relocated. The Chinese pointed out that the Americans would benefit from the water as well, and could get energy from the necessary dams at their end. The United States agreed.

The American colony built dams across the eastern outlets of Marineris, at the narrows of Eos and Capri Chasmas. The Chinese built locks along Ius Chasma, where the floor of Marineris begins to sink. Then the Chinese and U.S. mirrors narrowed their focus into Marineris, where Ius and Noctis Labyrinthus met. Surveyors had located a massive aquifer at that point – truly an underground sea the size of Lake Superior. The mirrors melted the ground, and boiled the water beneath.

In July of 2066, the aquifer broke through. The steam spouted thousands of yards into the air. The melting land slumped, placing enormous pressure on water already seeking escape. The flooding of Marineris began.

As the water flowed east, it reacted violently with peroxides in the ground, while simultaneously trying to freeze and evaporate into the desiccated air. The noise could be heard for tens of miles. A few of the mirrors kept their focus on the source of the flood; others spread light over its path, to encourage it to stay liquid and flowing. It churned through the open gates of the locks, and continued east through Melos and Coprates into Eos. It finally broke against the American dams. The water continued to push up from underground for months. The Marineris Sea slowly filled.

In 2069 Chinese terraformers began skimming Kuiper Belt objects through the upper Martian atmosphere. The friction dissociated them into water, hydrogen, and oxygen, all of which were needed to thicken the atmosphere. The results were impressive; all by themselves, the KBOs raised atmospheric pressure by more than 10%.

In the following year, Xiao Chu began commercial production of the ZR-3 Mars-adapted bioroid (p. TS117). From the start, they were produced in enormous quantities. Over the next decade, tens of thousands of bioroids, of this and other types, were built to meet the expansionistic needs of Rust China. Production slowed in the early 2080s, when public perception of bioroids shifted, but they remained a large and significant minority in the Martian Chinese population.

In the 2070s, Mars gradually changed from a collection of separated colonies to a world of interconnected city-states surrounded by mini-habitats. True Martian cultures came into being. The green terrorists faded into obscurity, their cause victorious. From the Main Belt, the former Ares Conspirators (now called Duncanites; see pp. TS85-86) watched with pride and homesickness. Some did more than watch: a few Duncanites had accepted Xiao Chu contracts to assist in herding additional Kuiper Belt Objects to Mars. At the same time, militant Martian Preservationists, driven to desperation, began to reappear; 2070 marked the first appearance of the new and deadly Negative Growth organization, who opened their campaign with a daring attempt to breach one of the Marineris dams. Their actions failed to change Sino-American policy, but helped contribute to an increasing militarization of both colonies: to prevent any resurgence of wide-scale violence, both China and America established permanent garrisons on Mars. This action, taken to ensure public order, was the first faltering step in what would become a significant Martian military buildup in the coming decades.

The year 2077 saw a much more positive development: the beginning of the Space Elevator project. Back in the 2020s (while the technology was still theoretical), the Chinese government had selected their initial landing site partly due to its proximity to Pavonis Mons, the perfect foundation for an elevator. In 2077, a construction team (consisting mostly of cybershells) set up a factory on Deimos. Some of them built mass drivers to lower the moon's orbit. Others began turning the carbon-rich substance of Deimos into the cable that would make up the Elevator. Over the years the cable slowly spun its way to the surface as Deimos neared areosynchronous orbit. Meanwhile, the southern rim of Pavonis' caldera turned into a small town surrounding the port facility that was the foundation of the Elevator. In 2083, the lower end of the cable drifted out of the sky and was locked into place. The first car, loaded with dignitaries, came down the next week.

The Elevator was (and is) significant because it made getting from Mars orbit to the surface orders of magnitude cheaper, energy-wise. In space, distance matters far less than the *energy* difference between where something is and where you want it to go. The Elevator physically only stretches from the surface to areosynchronous orbit. In terms of energy, it reaches the entire solar system.

Events on Earth prevented the Elevator from realizing its full potential immediately. Almost as soon as it was completed, escalating hostilities between China and TSA led the United States to impose an embargo on helium-3, while rising tensions in Earth orbit led to the curtailment of civilian space flights. During the Pacific War, commercial space travel between China and its colonies dwindled to a trickle. The Chinese on Mars dealt with the resulting shortages very well, tightening their belts and relying more heavily on Mars-grown and -manufactured products. This period also saw the rise of the Martian Triads, who ensured black-market luxury goods reached those who could meet their price. A certain reserve of helium-3 was absolutely necessary for maintaining vital industries. In 2084, Rust China bought black-market helium-3 from the Gypsy Angels Collective (p. TS86), who had hijacked it from an American tanker.

The hardships during the embargo brought Rust China economically closer to most of the other settlements on Mars, thanks to an increased need for trade. The only non-TSA colony that didn't improve its relations with Rust China was the American settlement. The Chinese had been justly angry about the embargo, and the Americans were outraged that the Chinese were buying from the "Pirates of Hyperion." Perhaps in reaction to the muted hostility, the American Martian Territories (formerly governed entirely by the Bureau of Martian Affairs) were organized into the Martian Commonwealth in 2085. Elections for governor were held later that year. The cooperation of previous decades was over; relations between the Chinese and American colonies never rose above chilly after this point.

The Pacific War ended in 2085 with a Chinese victory over the TSA, and the United States halted the embargo the following year. China resumed interaction with its colonies, at levels even higher than before the embargo. A growing number of Chinese, unnerved by the events on Earth, chose to emigrate to what they perceived as the relative safety of Mars. In the coming decade, the new colonists shipped to Mars were the best China had to offer, while the influx of money, food, and goods seemed like luxury for old Mars hands. Most historians mark this as the beginning of a "Golden Age" for Rust China.

Native Life?

Extremely controversial evidence for ancient, microscopic life on Mars was discovered in the late 20th century. In the 21st, robots returned Martian rocks to Earth, and more compelling evidence was found; not enough to be 100% conclusive, but still hard to dismiss. The first scientists on Mars included several biologists eager to make their careers by finding definitive proof that life once existed on Mars – or, even better, *living* samples! They didn't succeed. For decades, no one managed to produce better evidence. The tiny globules and ropelike features of the original discoveries were duplicated in many Martian rocks, but they continued to be ambiguous.

In 2078 a miner working on an exploratory dig near the Hellas Sea noticed what looked like a fossil in rocks from several hundred yards below the surface. The biological community converged on the site. By the end of 2079, they determined that the "ropelike features" of the earlier samples were indeed life, and that these "Mars worms" had evolved into a diverse and flourishing ecosystem in the Hellas basin, over a billion years ago. The largest known lifeforms of this period are just barely visible to the naked eye, measuring less than 1/64 of an inch long. Unfortunately, life on Mars never had the chance to advance further. The planet cooled, the atmosphere froze, and the water dried up. The "large-scale" life of Hellas never spread beyond that sea, and never achieved its potential.

Many Preservationists refuse to accept that Martian life could be wholly extinct, and they may be right. By 2078, terraforming was too far advanced for the discovery of fossils to stop, so it merely inflamed the controversy, a dispute that continues to this day. There is now a lucrative market for fossils (driven by both scientists and wealthy collectors), and a large number of paleontologists (professional and amateur) who spend their time digging around Hellas.

2087–2099: A Sovereign World?

In 2087, the population of Mars was 1,350,000 sapient beings. With the Elevator in place, Mars became the second economic center of the System, after the Earth-Moon hub. Goods poured up and down the cable, and immigration continued to climb. In 2090, the population of Mars was 1,600,000. In 2095, 2,000,000. By 2100, 2,500,000. An unfortunate parallel to this was a steady growth in the U.S. and Chinese military presence on and around Mars, born of China's postwar resolve to protect its increasingly prosperous colony, and fanned by America's lingering resentment of Chinese hegemony on the Red Planet, which demanded that the United States match any Chinese build-up with its own.

Others rejected terrestrial nationalism. Now that Mars was ceasing to be financially dependent on the homeworld, political independence was becoming economically viable. Of course, dreamers and optimists had been working toward a free Mars since 2026, and many of the Ares Conspiracy's leaders had been libertarians and anarchocapitalists who had hoped to see Mars free of all terrestrial government. But now it actually looked like it might work. In the 2080s and 2090s, Free Mars organizations began to spring up everywhere, often with wildly conflicting ideologies. By the late 2090s, the various factions had coalesced into the two major groupings recognized today: peaceful and violent. (See p. 55 for a discussion of the Free Mars movements.) The various governments on Mars were busy dealing with a newly wealthy planet, and their reactions to Free Mars activities were often delayed, and either ineffectual or vastly overpowered when they finally came. With governments looking either weak or paranoid, popular support for Free Mars grew. Today, a large portion of the population consider themselves Martians first and whatever else they may be second.

New Myths

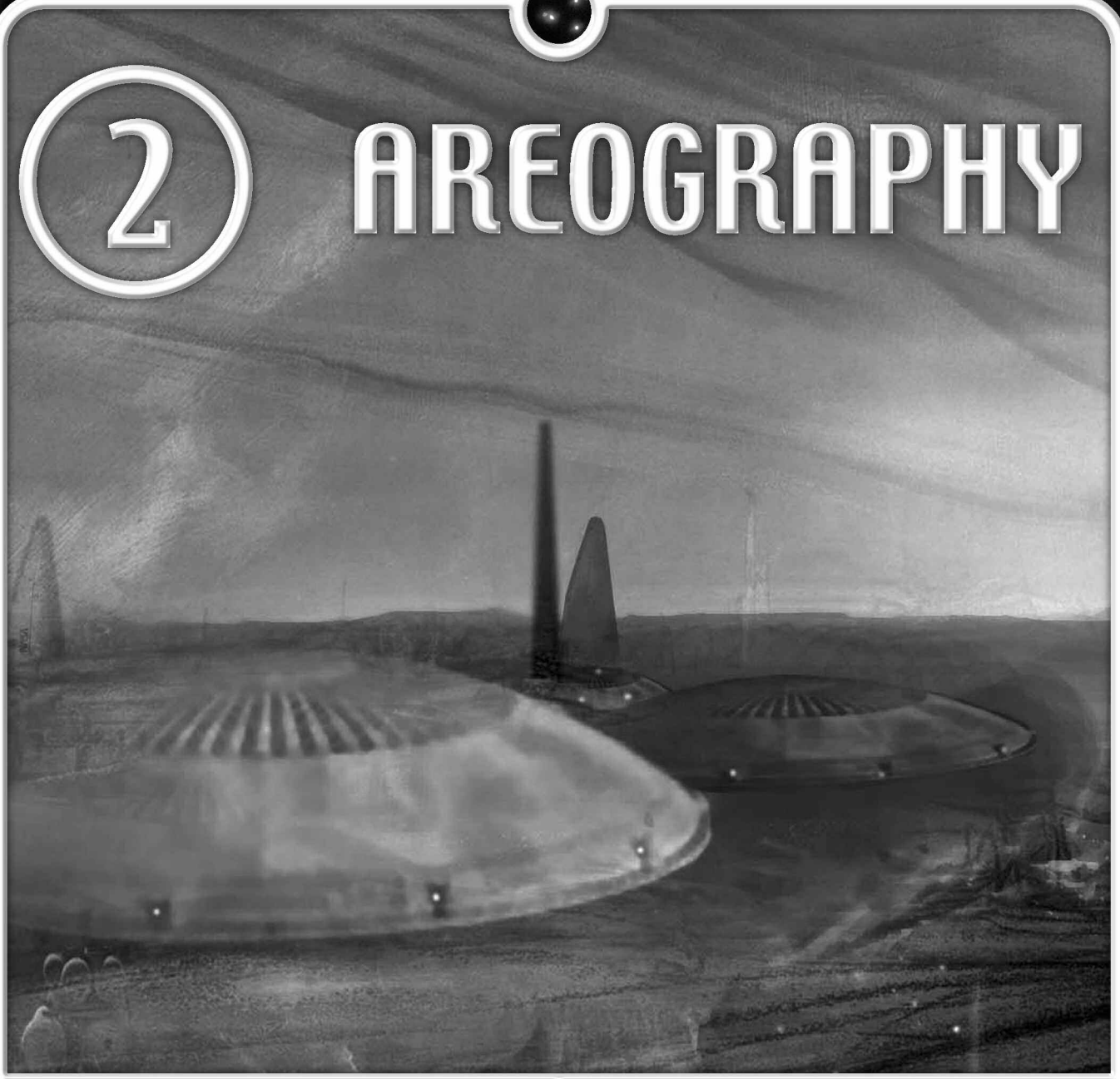
"Spend enough time on Mars, you'll hear it again and again: A surveyor is out in a canyon, and stumbles across ruins, obviously of intelligent construction, built into a cliffside where they don't show up from orbit. Then a huge duststorm blows in, and she has to take shelter in the ruins. Dust gets into her radio and visual recording gear, so she can't call for help and can't take pictures. She explores the ruins, and finds out that it was an outpost for aliens visiting our solar system, keeping an eye on Earth.

"Then the storm blows away, and she heads back to civilization. But she's got a bad case of red lung, and barely makes it before dying. Other surveyors, following her notes, find nothing.

"Sometimes it's a miner digging deep underground, or an areomancer led there by auspicious dragon lines. Sometimes the builders are native to Mars, and sometimes they're our ancestors. I think I've heard that story a dozen times. I hope there's something to it."

– Copernicus Jones, ***Roughing It on Mars***

2 AREOGRAPHY



I released the hook, and my glider dropped off the Coprates Spur into the eastern end of Melas, heading toward the Sun. It was northern summer, and the sunset was precisely aligned with Marineris. This only happens for a few days a year, and the sea below and sky around were speckled with boats and wings.

Have you heard of the "green flash"? It happens when the sun sets behind a perfectly flat horizon – usually a body of water. As the sun passes through the atmosphere at an angle, it's broken into a very narrow rainbow. It's too minor an effect to notice, usually. The sun radiates heaviest in a few wavelengths, and the yellows tend to wash out the purples and greens.

But, when the sun is going down, the red sun sets first, then orange, then yellow. If the horizon is lumpy, you'll be seeing a little of each sun at once. If it's flat, all of the red-orange-yellow suns will be below the skyline while the green one is still up there. It's only for a split second.

To my west, Marineris extended well beyond the curve of the planet. The sun set precisely where water touched sky. I climbed for a moment to watch. The light was horizontal, streaming past me. The canyon wall to my left was glowing with red stones and deep black shadows. Under me, the water went into shadow a moment before the sails, which stood like flames over a sea of night.

Then the sun set. And the light flashed green. Combined with the red landscape, the world turned black, save for the flames below and angels above. And I was one of the angels.

Tharsis

Tharsis is one of the major continent-sized bulges on Mars. It lies mostly north of the equator, in the Western Hemisphere, just to the west of Marineris. Its features include the four largest volcanoes on Mars. Most of the Chinese territory is located in Tharsis.

Areography in a Nutshell

"Quick 'n' dirty: The Northern Hemisphere is mostly flat and mostly low. It's where the Borealis Sea is forming. The Southern Hemisphere is mostly high, and lots rougher. It's got a couple big impact basins. Along the equator, you have the Marineris Sea, which stretches a sixth of the way around the planet. Americans on the east end, Chinese to the west. To the left of the Marineris, you have the three Tharsis Volcanoes, nicely lined up north-to-south. The middle one is where New Shanghai and the Elevator are. Just northwest of that is Olympus, the tallest mountain in the System.

"Fun fact for the kids: Despite the fact that the northern hemisphere is low, and the southern hemisphere is high, the lowest point on the planet is in the south (under the Hellas Sea), and the highest point (Olympus) is in the north. It's a weird planet, no joke."

– Copernicus Jones, ***Roughing It on Mars***

Olympus Mons

Olympus is the best-known areographic feature on Mars. It's the highest mountain in the solar system, and would cover the state of Arizona – the volcanic caldera at the top could comfortably hold Luxembourg. The edge of Olympus is defined by the cliffs that encircle it. Averaging 6 miles high, they are one of the few steep parts of the mountain. Between the cliffs and the lip of the caldera, the slope is gentle, rarely more than a few degrees. The caldera is a collection of overlapping, sunken circles with near-vertical walls up to two miles high. The summit of Olympus, 16 miles above the datum, nearly sticks out of the atmosphere.

Nix Olympica

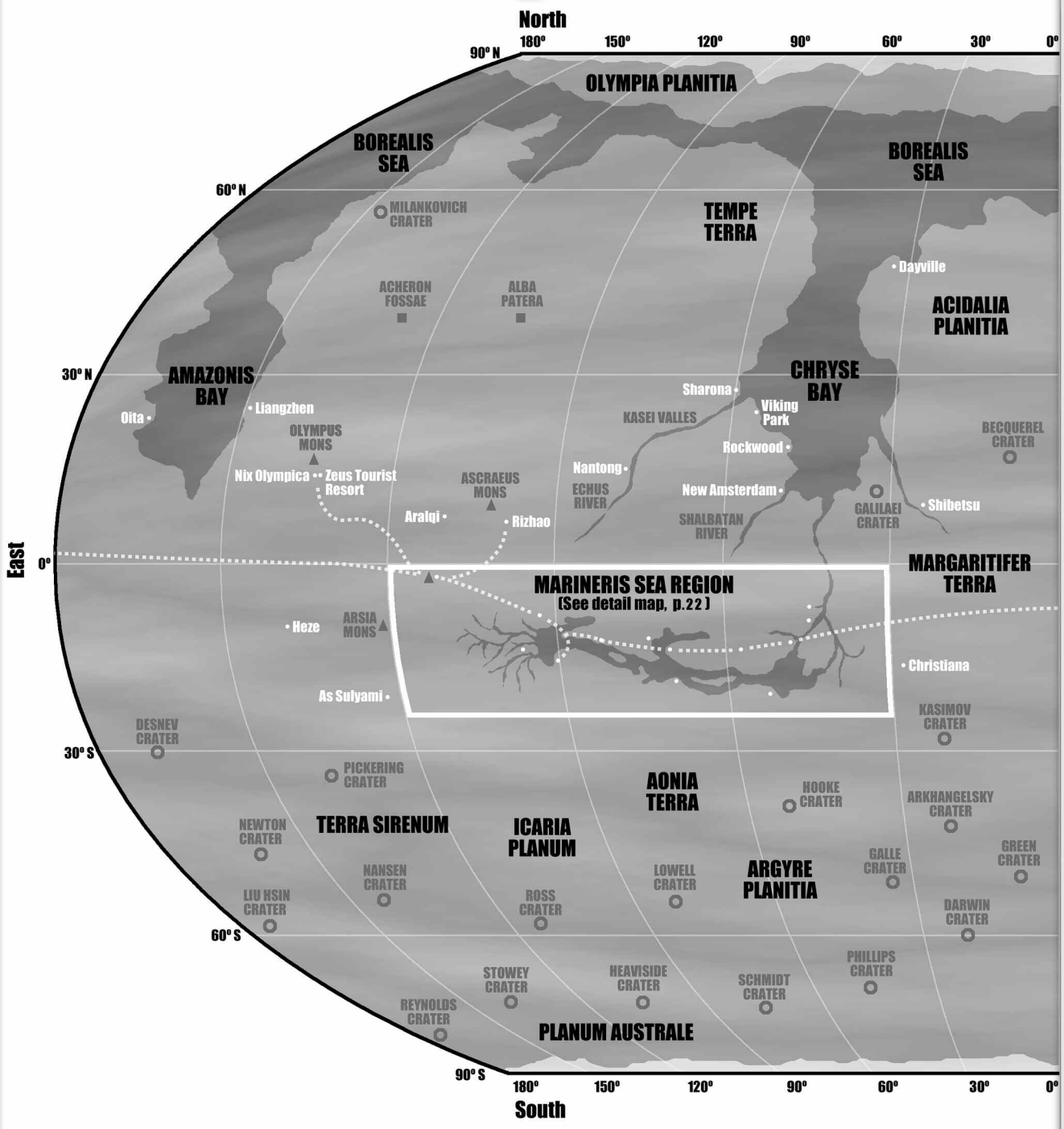
When Olympus was first discovered as a white dot on the face of Mars, it was named "Nix Olympica" – the Snows of Olympus. In 2100, that is the name of the principal human habitat on Olympus Mons. Located on the south slope at the top of the cliffs, it has a stunning view across Tharsis. Nix Olympica was founded as a research station by an American research team in 2045. The original mission of the base was studying the areology of Olympus – why was the surrounding escarpment so consistent, why did Olympus form in the first place, etc. In 2047, the Chinese sent a similarly tasked expedition, who cheerfully set up shop next to the Americans, and both sides proceeded to share data freely.

The synergy seemed to work unusually well; perhaps the view to the south, or the majestic mountain they sat on, gave everyone enough perspective to avoid national rivalries. In the early 2050s, scientists from other disciplines used Nix Olympica as a meeting place with their counterparts from other nations and organizations. By the late 2050s, several international labs in fields completely unrelated to areology had been established. "Nix Oh," as it was called for short, had become a hotspot of cooperative scientific inquiry.

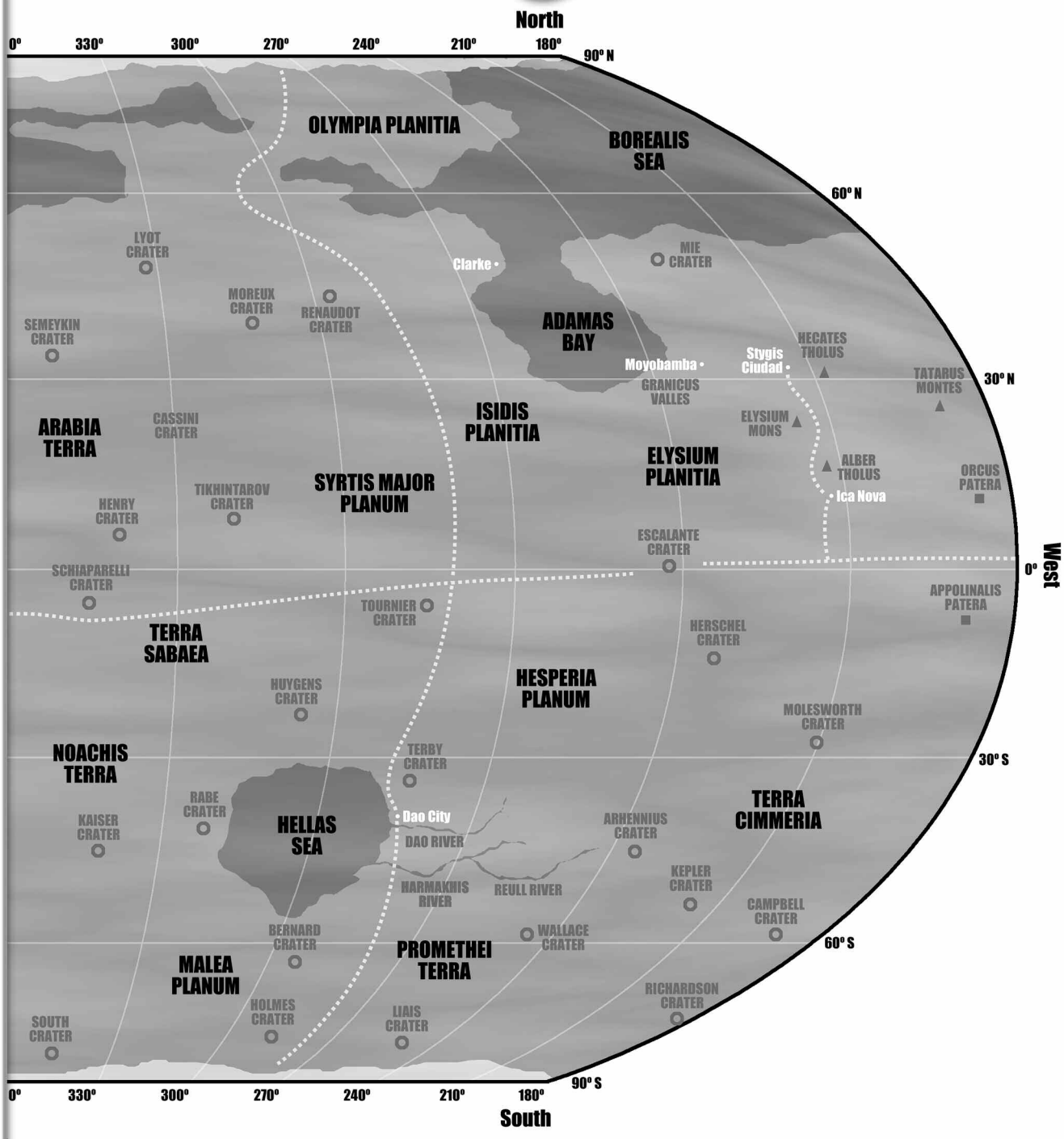
By the 2060s, the scientists running Nix Olympica realized their respective superiors were worrying about questions of jurisdiction. While physically closer to the Chinese colony, Nix Olympica was founded by Americans. Most of the inhabitants were upset by the suggestion that Olympus, or their bastion of international cooperation, could belong to any one nation. So, they politely told their governments to keep their hands off, or they'd go on strike. The Rust Chinese and America/Mars leaders grumbled, but in 2063 signed an agreement that made Nix Olympica an independent entity, but one that could only grant citizenship to newborns. The scientists stayed citizens of their original nations, but the city was free of outside intervention.

North vs. South

As the above quote indicates, the two hemispheres of Mars are quite different. The north has most of the water, and also most of the air, as it is miles lower in average elevation. Further, Mars has a more elliptical orbit than Earth, and the effect is to make northern summers notably longer than the winters – while the opposite is true in the south. As a result, 95% of the population lives north of 20°S latitude. Trips to southern Mars are like journeys back in time; the landscape has fewer plants and animals, and is marked everywhere by craters. Most modern areology is going on in the south, though a few scientists are hurrying to examine the northern plains that are slowly disappearing under the waters.



MARS
Planetary Map



KEY

- Habitats
- Craters
- Mountains
- Other Geologic Formations
- Railways
- Water
- Polar Ice
- Rivers

Today, Nix Olympica is a college town and, to a lesser degree, a tourist resort. Physically, it's a domed city a mile across, surrounded by smaller domes and a few open-air facilities. The architecture tends strongly toward unadorned Greco-Roman styles, but there are also a surprising number of stark concrete blocks – many scientists don't care what a building looks like, so long as their lab is well-lit. Green parks dot the city, and the social atmosphere is one of vibrant intellectual conversations over huge mugs of spiced coffee. It's connected to the Equatorial Railway by a dedicated spur line.

The University of Mars

"The University of Mars" was originally just a nickname for Nix Olympica. It was home to some of the most brilliant minds on Mars, and they each had their interns, protégés, students, and groupies. The city *felt* like a school, and there was certainly no better place on Mars to go if you wanted to learn from the masters.

U. Mars came formally into being in 2066, when a "ground-worker" terraforming scientist, Dr. An-Wen Wu, wanted to take time off from field research, but still needed to earn a living. He looked at his skill-set and decided to teach. His post to the Web declared the "University of Mars" open, and that year he taught a class in applied terraforming groundwork. (See p. 82 for a description of the different kinds of terraforming.) His colleagues thought this was a great idea. The next "term," there were classes in several terraforming disciplines, genetics, physics, and transhuman sociology. Things snowballed from there. Over the years, U. Mars became more like a traditional university, and less of a free-for-all, and in 2100 it is only slightly less structured than a typical college of early-21st-century Earth. (Their mascot, of course, is the War God, and they have both men's and women's athletics – although not a lot of competition, at least not yet.)

U. Mars is best known for its Genetic Engineering and Terraforming Departments. The genetics program is the equal of any on Earth, and in terraforming U. Mars is unmatched. Overall, U. Mars puts its emphasis on the hard sciences. In the softer sciences, arts, literature, and so on, the courses are less challenging and tend to be eclectic in subject matter. (Generally they're taught by a hard scientist who follows, for example, opera as a hobby.)

Most classes at U. Mars are taught with the students in the physical presence of the instructor. It's possible to take a class by telepresence with the professor's permission, but the university's overall philosophy is that face-to-face interaction is the whole point of a university. Otherwise you might as well learn from the Web. Whether a course is taught in an actual classroom, a coffee shop, sitting in the park, or out on the face of Olympus, varies from course to course and possibly week to week.

Anywhere in the System but Earth, a degree from U. Mars is respected. On Earth, reaction to a U. Mars degree depends on both the type of degree (terraforming vs. philosophy), and the snobbishness of the person reacting. Very few of the ancient Earth colleges respect upstart U. Mars very much.

Underground, Domed, Open

Habitats on Mars come in three types. The largest group are *domed:* above-ground cities covered by a clear dome or other enclosure. A somewhat smaller number are *underground:* built into cliffsides, mesas, or simply beneath the surface. A small fraction are *open-air.* These are almost all in the lowlands, and inhabited by people adapted to the atmosphere. A few minor open facilities are located higher up; they can only be reached by people wearing oxygen masks.

Zeus Tourist Resort

Olympus is the focus of a lot of athletic effort. As the highest peak in the System, it's a natural target for mountain climbers, tourists, etc. The Zeus Tourist Resort is the most popular and extensive facility for exploring Olympus for fun.

Physically, the main Zeus facility is located a mile to the east of Nix Olympica, on the cliff-edge. It's connected to the city by tram. Other branches of Zeus are sited at the caldera, at the ski resort several miles above Nix Olympica, and at the base of the cliffs under the city. The entertainments provided by Zeus include:

Climbs up the side of the cliffs. There are varying degrees of difficulty, but most take many days to complete. Shorter climbs up small sections are also offered.

Climbs up the entire mountain. This is a multiweek trip, starting with one of the cliff-face ascents and followed by the long, slow hike up to the caldera.

Skiing. Above Nix Olympica, a portion of the mountain many miles square has been carefully groomed and dusted with water snow to provide a fun experience for skiers of any skill level. The low gravity and thin air make it a very different experience from Earth skiing, and overconfident "Earthlings" are always breaking legs.

Aerial tours of the mountain. These can be short hour-long trips by hopper (p. 105), or zeppelin excursions lasting several weeks.

Zeus also offers all the perks of a good resort: hot tubs, good food, and bragging rights.

The Tharsis Volcanoes

Southeast of Olympus, forming a northeast-southwest line across the equator, are the three Tharsis Volcanoes. Each is nearly as tall as Olympus, but they are much smaller in diameter. Like Olympus, they are quite dormant. From north to south they are Ascraeus, Pavonis, and Arsia. The Chinese have lightly settled Ascraeus and Arsia around their bases and have placed minor scientific and research stations on their flanks and summits. Pavonis, as the Elevator foundation, is heavily settled at the summit, around the base, and along the path of the Equatorial Railway. The railroad has four tracks for several hundred miles on either side of Pavonis (rather than the normal two; see p. 25), and there are north-south spurs leading to the other Volcanoes and beyond.

New Shanghai

Over 90% of the traffic to and from Mars passes through New Shanghai. Located on the southern rim of the Pavonis Mons caldera, it is the largest city on Mars. It would be even bigger, but it lies 11 miles above the datum, and the thin atmosphere requires that the city be domed.

New Shanghai is a cramped, bustling port city, with all that that implies. About 4% of the Martian population lives under its domes or in the immediate suburbs, and more come down the Elevator daily. New Shanghai is predominantly Chinese, but is the most diverse city in Rust China, with an Anglotown, a Japanese Quarter, and other non-Chinese neighborhoods.

Physically, New Shanghai is made up of six domes clustered around the complex that forms the Elevator foundation. Most of the city near the foundation is underground; the surface is open to the air, and is made up of unpressurized warehouses, cargo loading and unloading facilities, and the like. The domes are New Shanghai proper. Each is over a mile across, and connected to the others by massive gateways that can also serve as emergency airlocks in case of puncture. The domes are numbered; various naming schemes have been proposed, but none have captured public approval. Each dome is a city in its own right. The following generalizations are just that, and each dome contains elements considered typical of the others.

Dome One houses the administrative facilities for New Shanghai, including City Hall, the headquarters of the Xiao Chu Corporation (p. 51), and the local headquarters of other corporations. It also holds the Bureau of Tourism and Immigration, which (in theory) processes everyone who comes down the Elevator. (The Triads and other organizations arrange for some people not to pass through Immigration.) If the visitor is going on to non-Chinese Mars, the stop at BT&I is purely perfunctory. Dome One is designed to be a tourist-pleaser, with parks, distinctive architecture in a variety of styles, and relatively broad boulevards. After weeks in a spacecraft and days on the Elevator, it looks quite spacious, but in truth it's quite compact – there was only so much real estate for the urban planners to work with. Dome One has the best view over the caldera of Pavonis, and buildings on its northern edge have a spectacular view down three miles to the caldera floor.

Dome Two is primarily commercial/industrial. It houses a few factories, with an emphasis on gear needed in the Belt and spacecraft parts. There are also a few wholesalers and a small neighborhood of lower-class housing.

Domes Three through Five are residential. Dome Three is predominantly upper-class Chinese, and is where some of the more exotic transhumans live. The best restaurants are in Dome Three. Dome Four is middle-class Chinese and houses the various non-Chinese enclaves (with the notable exception of the Japanese Quarter, below). Dome Five is a mix of lower-class Chinese and some commercial interests.

Dome Six is commercial, with an emphasis on the entertainment industry. It includes everything from theaters and concert halls to tourist traps selling worthless trinkets to brothels and traditional "spaceport bars." The Japanese Quarter is in Dome Six, and many of the shops are Japanese-owned.

Outside New Shanghai are other domed habitats, most considerably smaller. There is no room left for development under the domes, so the city is forced to expand into makeshift construction. The retaining ring for a new dome touching Domes Two and Three has been laid down, and construction is proceeding. All the space in this new Dome Seven has already been claimed, though construction won't be complete until 2102.

The Marineris Sea

What used to be Valles Marineris is now a sea connecting the Chinese and American colonies. Nearly 2,500 miles from end to end, the sea averages over 50 miles wide; from the center, the enclosing walls are out of sight below the horizon. The water itself is brownish-red, thick with salt and silt. The sun never sets on Marineris; at night, it is constantly illuminated by orbital mirrors to keep the area close to temperate. Most winters, the sea does not freeze. Marineris slowly descends from west to east, down the slope of the Tharsis bulge. Giant locks in the western half keep the water from pooling at the eastern end.

The original Marineris valley complex was subdivided into a dozen interlocking canyons. The three that make up the main body of the sea today are (from west to east) Ius, Melas, and Coprates. Melas is by far the widest, and both Ius and Coprates are divided by thin islands running along their length.

Noctis Labyrinthus

"The Labyrinth of Night" is a chaotic sprawl of overlapping canyons. On a map, they bear a resemblance to shattered ice. The average width of these canyons is only a few miles. They are considerably higher than the Sea itself, and many are dry, while others have rivers running through them down to the Sea. The wetter canyons are filled with greenery, and there are many Chinese habitats scattered through them. The dryer ones are less verdant, and have fewer inhabitants. The plateaus between canyons have a few airports and small spaceports on them, but are mostly deserted.

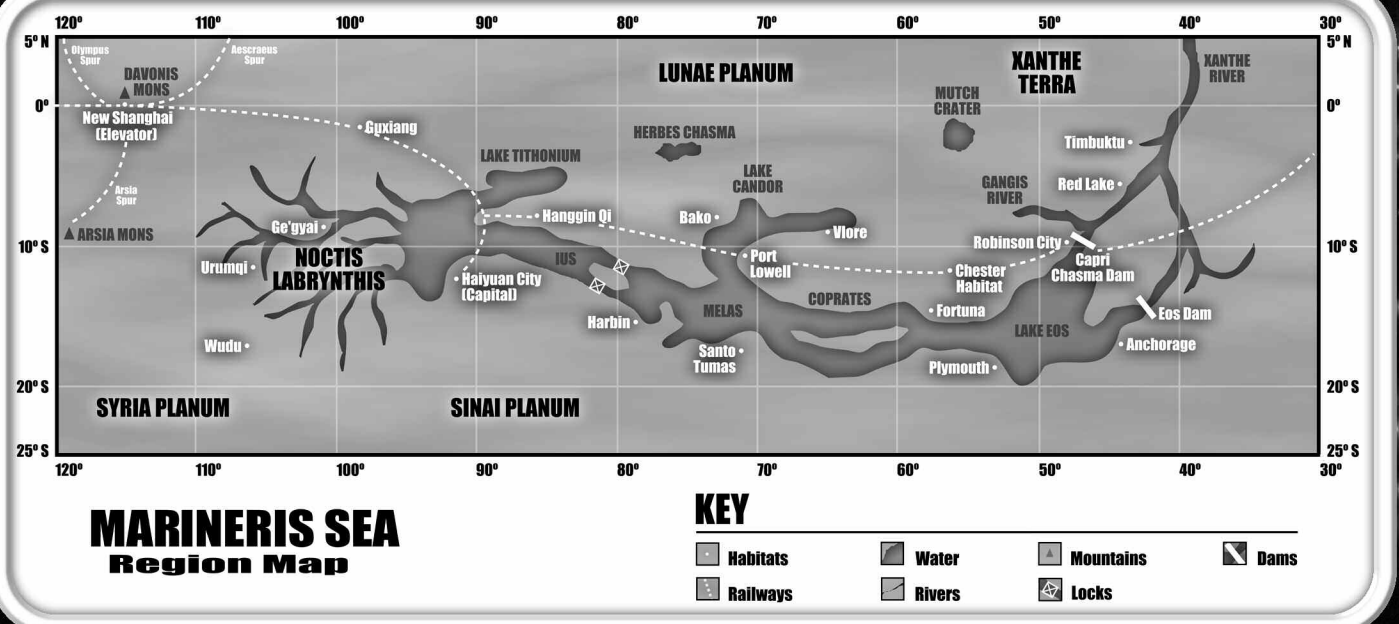
Haiyuan City

The second-largest Chinese city on Mars, Haiyuan is on the northeast shore of the flooded crater Oudemans. Like its counterpart, Robinson City (p. 24), much of the intra-Mars economy passes through Haiyuan, and it's a busy, beautiful port.

The city is domed; it is terraced up the sloping wall of the crater and burrows back into it. The docks are located outside the dome, and are reached through airlocks of all sizes, up to those capable of holding a cargo truck. The city combines a Mediterranean layout with traditionally eclectic Chinese architecture. Close to the docks, the streets are wide enough for major cargo haulers, but further up the slope they are designed for pedestrians and the smallest vehicles only. The only building over five stories is the weather spire at the north end of town. The railroad station is close to the docks, and leaves town by burrowing into the crater wall. It emerges from the ground again three-quarters of the way up the southern wall of Marineris, and climbs to over a mile above the surface of the water before it reaches the north wall and joins the Equatorial Railway.

Lake Tithonium

This is a "dead end" branch of Marineris, lying to the north of Haiyuan City. It sees little commercial traffic – only some pleasure yachting, mostly tourist-oriented.



MARINERIS SEA
Region Map

Other Chinese Habitats

Aralqi is in Poynting Crater, north of Pavonis and west of Ascraeus. Wet winds from the Borealis Sea approach Tharsis from the northwest, and dump their water as they climb the bulge. As a result, Poynting holds a self-contained lake. The town contains a number of bioroid creches. Aralqi sees some tourism due to its remarkable view of Olympus and (on a clear day) all three Tharsis Volcanoes.

Ge'gyai is set in one of the valleys of Noctis Labyrinthus. It is agricultural, specializing in fruit trees. The habitat also produces excellent wines and ciders.

Hanggin Qi is on the north shore of Marineris, in the Ius section. The area is rich in nitrates and platinum; Hanggin is a mining town, with tunnels reaching miles back into the cliff walls. The tailings from the mines are dirty enough to stain even the brown waters of Marineris, and ships pass Hanggin Qi quickly. Cleaning up the area is a frequent topic of debate, both within Rust China and at pan-Mars meetings.

Liangzhen rests on the shores of the Borealis Sea, west of Olympus Mons. It marks the western border of Rust China. A small town, the habitat sees some trade with the inhabitants of Elysium, to the west, and there's some light manufacturing, mostly furniture. The citizens of Liangzhen often feel abandoned by the government of Rust China, and they have made several attempts to have a railway spur built out to their town, and to get funding for another factory.

Wudu is at the heart of a massive wheat-growing complex in Syria Planum, south of Noctis Labyrinthus. Apart from the huge annual output of wheat and breads, Wudu is a center of New China activity (p. 55), and the area is full of Bureau 12 agents trying to track down the headquarters of the terrorist organization.

Lake Candor

This body of water branches off the middle of Marineris, paralleling it to the north. They are connected at their respective middles. It is a separate cultural entity in its own right; all the major non-Chinese, non-American presences on Mars have habitats on its shores.

Port Lowell

Named for the man who started the myth of Martian canals, Port Lowell was founded by the American Mars Development Corporation (p. 52) specifically to attract non-American interests. Located on the southeast shore of Candor, it is not part of the American colony, and can best be described as a corporate city-state that leases its land and facilities to other organizations (including nations). The MDC originally constructed the basic outlines of a city, including seaport, airport, power, plumbing, etc. Simultaneously, it sold sites within the city to nations and other organizations who were interested in a presence on the Marineris Sea, but weren't willing to shoulder the expense of building a major city themselves. Part of the incentive the MDC provided was the promise that other organizations would also be using Port Lowell; the MDC bootstrapped participation by using each new "customer" as a selling point to the next prospective tenant.

Port Lowell gradually came online throughout the early 2080s, and the official city dedication was in 2084. Today, the port is a moderately busy trading center. It hasn't lived up to the MDC hype of becoming "the center of Martian trade and multiculturalism," but it's thriving economically.

On the social front, however, Port Lowell receives frequent criticism. It is explicitly a city where everything is bought and sold. For example, there is no police force per se; tenant organizations rent protection from several security firms. (One, Mars Development Security, is a wholly owned subsidiary of the MDC.) This means that the average Martian probably can't afford police protection himself. Most companies in Port Lowell offer the services of their security agency as part of the employment benefits package, alongside health and dental. Some don't.

Architecture in Port Lowell is functional and ugly, and the city's few parks and playgrounds are privately owned and gated. The nightlife tends toward the raucous. The population is mostly young, blue-collar workers with no dependents; people go elsewhere to raise children.

On the positive side, the commercial district sells virtually anything you could want to buy. The corporations are always hiring, and the pay is usually good. Port Lowell can be an excellent place to get a start in a variety of careers. Nevertheless, turnover in the population is high.

Currently, Port Lowell's tenants include the governments of Japan, Saudi Arabia, Peru, the European Union, Brazil, and others. Nearly every major corporation on Mars owns at least a small plot of land, including Xiao Chu, Triplanetary Lines, and Colonial Genetics (see pp. 51-54 for corporate profiles).

Lake Eos

This lake forms the eastern end of the Marineris sea. More than 60 miles across, two huge dams keep it from flowing northeast into Xanthe Terra. The American colony surrounds it.

Other American Habitats

Chester Habitat lies 100 miles to the north of Marineris, in the Ophir Planum area. The surrounding area supports numerous farms, and Chester is the meeting place for the farmers. The Equatorial Railway runs through the town; foodstuffs are loaded here for transport to the rest of the planet and the Elevator.

Red Lake is on the shore of the lake in Innsbruck Crater, fed by outflow from the Capri Chasma Dam. The city specializes in aquaculture, including kelp farming. The lake is fenced off from the main flow of the river. Fort Meier (home to the U.S. Army garrison; see p. 46) is nearby, and soldiers on leave are a frequent sight.

Santo Tomas is on the south shore of Marineris, in the Nia Fossae region. It is a shipbuilding town, producing both watercraft and components for spacecraft, which are sent up the Elevator and on to the Schiaparelli Yards (p. 28). The city is spread out over several square miles, and is often in the shade of the Marineris cliffs to the south. These effects make the city feel gloomy and deserted.

Sharona is on the side of Sharonov Bay (formerly Sharonov Crater) on the Borealis Sea. It is a destination for the automated North Pole ice miners (p. 26) and also a center of terraforming research, with an emphasis on the hydrology of the Borealis. Like most habitats on the shores of the growing Sea, few of the buildings are permanent, and they are moved further up the slope of the crater wall every few years.

Timbuktu is located in the crater of the same name, in Xanthe Terra. It is largely a scientific community, full of scientists doing genetics research on various food crops.

Robinson City

This city is the largest single habitat in the American colony. A domed city, it lies just west of the Capri Chasma dam, on the north shore of Eos.

Robinson is more businesslike than Haiyuan, its Chinese counterpart. The two cities handle roughly equal amounts of trade, but Robinson City, in the popular idiom, "does it with less style." Much of the architecture was originally designed with a Frank Lloyd Wright aesthetic, but in comparison to Haiyuan, it simply ends up looking boxy. The city is also less personal; with American efficiency, all of the main streets are wide enough for large cargo vehicles. As a result, the city feels less friendly to pedestrians.

That said, Robinson is clean and laid out well. Tourists find it hard to get lost, and the large parks scattered throughout the city are unquestionably gorgeous, mixing grassy lawns with fast-growing baby redwoods. Most buildings are only one to three stories, but there are a few slim structures dozens of stories tall poking through the dome. Newcomers unused to what Martian gravity allows always think they are far too slender and airy to stand.

Xanthe Terra

Billions of years ago, Xanthe Terra was carved into runnels and canyons when gigatons of water ran from Marineris into the northern sea. Today, it is again full of rivers, including the runoff from the dams at the east end of Marineris. The area is almost entirely American, and relatively fertile, with large-scale farming in the valleys. While not as densely populated as Marineris, Xanthe has been inhabited since the 2040s, and is considered a "suburb" of Marineris civilization.

Zhigansk

Located in northern Xanthe Terra, on the Borealis Sea, Zhigansk is the only Russian settlement bigger than a few dozen people, and was the first Martian colony of note to declare independence. Neglected by the Russian government during the extended insurgencies of the late 2050s, the people of Zhigansk pronounced themselves "free Martians" in 2064. The Americans promptly offered to incorporate the city into the Martian Territories – and were proudly rebuffed. The Russian government has made several protests to the new Zhigansk government, but has been unwilling to provoke an armed confrontation on the doorstep of America/Mars. Instead, there are a number of Russian operatives in the city, attempting to undermine the government and memetically encourage a "return to the Motherland."

As an explicitly independent city, Zhigansk is quite popular with many branches of the Free Mars movement. Many of them make the city their home base, though the violent ones aren't too popular. The government of America/Mars regards this fact with some minor dismay, but so long as the Zhigansk government doesn't deliberately shield violent preservationists, it's not a huge issue. Rust China, on the other hand, is borderline-hostile toward Zhigansk, both because of the bad relations between their respective countries on Earth, and because a fair number of New China dissidents (p. 55) have been spotted in Zhigansk.

The policies of the Zhigansk government are to be friendly but distant to the Americans, unfriendly but distant to the Chinese, and to in general allow people in Zhigansk to run their own lives, free of government interference where possible. Economically, Zhigansk is not

thriving under these policies, but the citizens are getting by, and they remain fiercely independent and determined to make their city survive.

Syrtis Major

This dark-sanded desert was the first feature of Mars to be seen from Earth. It is several miles above the datum, and very dry. There are a few mining concerns here. It is also the playground of the millionaires of Mars (p. 47).

The North and South Seas

To the north and south of the equator are two seas. One fills the lowlands; the other is cupped in an ancient impact basin.

The Borealis Sea

The northern plains of Mars were ocean floor billions of years ago . . . now they are again. The entire equator, and the bulges of Tharsis and Elysium, drain into Arcadia, Acidala, and Utopia Planitiae, then into the Borealis Sea. By far the largest body of water on Mars, the Sea is just under twice the size of the Mediterranean. The Borealis does not quite encircle the globe; an isthmus connects Xanthe Terra to the polar cap. The sea is very icy; even during the long northern summer, it is never completely free of ice, and its surface freezes over during the winter. Thermal boreholes under the water keep it from freezing solid. A major goal of terraformers is to raise the temperature sufficiently to make Borealis liquid for most, if not all, of the year. At that point, the hydrological water-cycle will help to maintain Mars at a stable temperature, preventing runaway greenhouse effects and ice ages.

The shores of Borealis are moderately populated. As the sea is still rising, there are no true permanent settlements (though a few were mistakenly designed that way). The area supports some agriculture and seasonal aquaculture, and there are also mining, scientific research, and terraforming activities going on.

In this area, the Americans outnumber the Chinese slightly. The other national powers are also represented in smaller numbers. Culturally, the shores of Borealis are just past the frontier stage; the area is well-administered, but still growing rapidly, and people living on the Marineris Sea think of it as "rural" at best, "the sticks" at worst.

The Equatorial Railway

The two major colonies – those of China and America – are on the equator; so are many of the minor colonies. Like on Earth, the equator is warmer than the rest of the planet, and it's adequately wet, particularly near Marineris and the lowlands of Xanthe, Isidis, and Amazonis. The best land routes between the colonies were charted in the middle of the 21st century, and the notion of a railroad first popped up in the 2040s.

Each colony has constructed, and is responsible for, its own section of the railroad, as well as a portion in the wilderness. It is a mag-lev system, with two tracks running side-by-side for most of its length. As of January 1, 2100, it does not quite fully circle the equator. The final (American-built) section is expected to be laid in late July, with attendant celebrations, at Escalante Station in Elysium Planitia. For most of their length the tracks are slightly south of the true equator, particularly near the Marineris Sea, where they run along the north shore of the Sea. Several spur lines go north and south of the main line, leading to Nix Olympica, Hellas, the Poles, and elsewhere. Anyone wishing to lay new spurs connecting to the mains may do so, so long as they agree not to interfere with the operation of the main lines. Mag-lev track costs $1,000,000 per mile, and can consume a great deal of power. Stats for typical train cars are on pp. 103-104. A day pass is $3 (allowing unlimited travel for one day), a month pass is $70, and a 24-month year pass is $1,500. The purchaser may opt to have his pass be a physical card, but usually it is virtual – the entry gate computer visually recognizes the pass owner.

The Hellas Sea

Hellas is an enormous impact basin lying almost precisely opposite the Tharsis bulge. (Most areologists don't think the two are related. The fact that the second-largest impact basin, Argyre, is opposite the second-largest bulge, Elysium, merely annoys them.) The lowest point on the planet, Hellas has begun to fill up with water draining from the surrounding terrain. As Hellas is "downhill" for over 15% of the planet, it is likely to become a self-contained ocean sometime in the 22nd century, as it certainly was in the distant past. Today it is only a few hundred miles across, choked with icebergs when it's not frozen solid. There are settlements around its rim, mostly American, European, and South American. For the past quarter-century the area's population has climbed steadily, fed by the discovery that Hellas was once the cradle of Martian life (p. 15). Hellas is the only area on the planet that can rival Nix Olympica (p. 17) for scientists per capita.

Viking Park

The portion of Chryse Terra surrounding the landing sites of Viking 1 and the Mars Pathfinder (now the Carl Sagan Memorial Station) is parkland, off-limits to development. American-run tours of the area are available. The tours are by zeppelin, which float over the Viking 1 and Pathfinder sites and land nearby, so tourists can get a feel for "primeval" Mars. The Americans are making a minor effort to keep flora and fauna out of the Park, but it's a losing battle. They are also constructing dikes around the area to protect against the growing Borealis Sea. Predictions suggest that the sea will cover the park to a depth of nearly a mile within a few decades, and there is debate over whether the landers should be moved, domed, or abandoned.

Argyre Basin

The second-largest impact crater on Mars, Argyre is located deep in the southern hemisphere, south of Mariner-is. Unlike Hellas, it is surrounded by mountain ranges, so most rainfall tends to drain away from it. The few streams leading down its side freeze or dry up before reaching the center, which is mostly dry. Argyre is of interest only to scientists at this time.

Elysium Planitia

The second-largest continent-sized bulge, Elysium is located a few thousand miles to the west of Olympus Mons. It has its own volcanoes: Hecates and Albor Tholi, and Elysium Mons itself. None can quite rival the Tharsis Volcanoes, but they are still taller than any mountain on Earth.

Elysium is located at a higher latitude than Tharsis, and the air there is both cold and thin. Nevertheless, the Peruvian colony has made it home (see p. 48). Their colony is centered in the Elysium Fossae on the western flank, where several rivers flow.

The Poles

The ice caps of Mars have been radically altered by terraforming, and are on the verge of disappearing. One is a valuable source of water; one isn't much more than a curiosity.

North Pole

The polar cap pokes up out of the Borealis Sea, with a thin fringe of black sand beach. This cap is mostly water ice, and is under constant assault from orbiting mirrors. The huge "lens" of ice located under the surface acts as a heat sink, and has kept the cap from vanishing entirely. Nevertheless, it should be wholly melted before the first decade of the 2100s is over.

Water Mining

Despite the new clouds and seas, Mars is still a desperately dry planet, and ice from the polar cap is a desirable commodity. Several companies have set up automated drillers that tear chunks out of the cap, float them across the Borealis Sea to railroad stations on the coast, and break them down again into smaller chunks to be loaded on the trains and shipped around the planet. Other more agriculture-oriented corporations land zeppelins on the cap, melt water to fill their holds, and then use the zeps as "crop dusters."

South Pole

The south polar cap was mostly frozen carbon dioxide, and today is almost entirely gone. Sheets of dry ice only a few hundred yards thick (as opposed to miles) are all that's left. The south pole is three miles higher than the north pole, and thus less hospitable. There are few inhabitants beyond a few scientific and terraforming stations.

Other Habitats

As Sulaymi was founded by wealthy Saudi nomads as a nexus of several of the more popular traveling routes. It is located in the Daedalia Planum, south of Arsia Mons. The area is very dry, and the city supports itself through mining and trade, as a minor spaceport, and through gifts from the rich travelers who use it as a rest stop on their wanderings.

Bako is the center of African presence on Mars, founded by Ethiopian settlers in the 2080s. It is one of the few predominantly African habitats on Mars. It is also the center of the Martian software industry, with 80% of the home-grown software and Web presences created there. It is located on the west shore of Lake Candor.

Moyobamba is a Peruvian city, located in the Granicus Valles, where rivers flow down off Elysium's western slope into the Borealis Sea. It is home to several major bio-terraforming facilities, which produce gengineered plants and animals for dissemination to the rest of Mars. The local zoo and botanical gardens are the finest on Mars (which is not saying much, compared to Earth).

New Amsterdam is a tiny Dutch habitat of only a few hundred people. It is located at the mouth of the Shalbatan River (formerly Shalbatana Vallis), west of Xanthe Terra. It is home to several pharmaceutical and biotech labs.

Shibetsu is one of the new Japanese settlements, barely a decade old, located on Ares Vallis, east of Xanthe Terra. It is home to a Seihin rover factory and several faux-beef growth facilities. The local steakhouses have a favorable reputation, and the residents are thinking of opening a bioshell bunraku (puppet) theater.

The Elevator

The elevator is an open framework whose supporting cables are woven threads of graphite and diamond over 10,000 miles long. It masses millions of tons, constructed from material mined from Deimos. It is held in place by a trick of orbital dynamics; its center of mass is in areosynchronous orbit over Pavonis Mons, and it is kept vertical by tidal forces. The bottom "anchor" is a combination of magnetic and physical clamps designed to prevent minor oscillations (if there were a *major* oscillation, nothing humans are capable of building would hold it in place). The anchor is deep underground, so that the huge elevator cars can stop above it and still be near ground level. Tours of the anchor are available, though security is reasonably tight. Even though the cables are very difficult to damage, an interruption in the flow of commerce up and down the elevator would be staggeringly costly.

The Elevator itself is encrusted with power lines, emergency gear, station-keeping thrusters, defensive weaponry, and the "up" and "down" tracks that the cars actually run on. The elevator cars are buildings in their own right, running on magnetic tracks on the inside of the framework. They range from five-man maintenance cars, to bulky cargo containers, to 10-story luxury hotels. The trip up or down takes two days, and is mostly in microgravity. When a car arrives at the anchor, it is separated from the vertical track, and moved away on conventional horizontal tracks to be unloaded. It is then reloaded and moved to the "up" track for departure. Typical prices are $1,000 per person or $2,000 per ton of cargo, though these values can as much as triple depending on quality of accommodations or special handling requirements for cargo (e.g., "Do Not Expose to Vacuum").

Deimos

Deimos is the upper elevator anchor, constituting the "high port" for New Shanghai. It is almost entirely dedicated to the transfer of people and cargo from spacecraft to elevator cars, and amenities are few. Deimos is much more massive than the elevator cable, so it is nearly in areosynchronous orbit.

Cutting the Cables

Many violent organizations want to sever the Elevator. This would dramatically increase the cost of importing to or exporting from Mars, and that's a step towards a lot of different ends (see *Free Mars,* p. 55). The actual cut would probably require a nuke or an esoteric ultra-tech solution (e.g., a bacterium that can survive in vacuum and eat diamond). *Where* one severs the cables makes a big difference.

At ground level, the Elevator is held in place mostly by orbital dynamics. Vaporizing the anchor would not cause the Elevator to fly up into the sky, though it would probably drift away from the anchor-point. It would be a simple engineering matter to temporarily snag the Elevator and rebuild the anchor. To achieve anything lasting, the Elevator would have to be moved away while the anchor was gone. This would involve sabotaging the station-keeping thrusters, or somehow moving Deimos itself.

At the other end, severing the cables at Deimos would cause the Elevator to fall. Due to its open structure, most of it would burn up in the atmosphere. The few miles closest to the ground would not, and parts of New Shanghai and its suburbs to the east would be badly damaged. Deimos would assume an elliptical orbit, intersecting its pre-separation orbit once per day. Cutting it at points in between Deimos and the surface would produce a compromise – the lower section would fall; the upper section would hang there and go slightly out of orbit.

All the Way Down

"The A-class hotel cars on the Martian Elevator are sumptuous. Since you're trapped in a small building for a couple days, they'd better be. Upholstered walls, marvelous food featuring both "Sino-Chinese" and "Anglo-Chinese" dishes, free entertainment. You spend most of your time getting to know the other guests, and the descent is just long enough for something interesting and romantic to develop. Plus, the view of Mars can't be beat.

"Or so I hear. I made my first trip down in a cargo container with an unkempt Felicia series."

– Copernicus Jones, ***Roughing It on Mars***

From space, the only parts of the port visible are the numerous landing pads around the Elevator terminus. Gravity on Deimos is miniscule, and only the most ungainly spacecraft are unable to land. Many pads are custom-designed for specific classes of spacecraft, particularly passenger vessels. Most passengers can walk out their spacecraft's airlock into a passageway extended from the port, grab a handle on the slideway, and be carried directly to their elevator car, where they can check into their rooms for the trip down. Some lines are experimenting with modular passenger suites than can be detached from the spacecraft and plugged into an elevator car, so passengers do not even need to change rooms. This has not yet proved economical.

Cargo is handled similarly, where possible. When the spacecraft can mate directly with the unloading dock, cargo is transferred in a shirtsleeve environment and routed to its elevator car through conveyor ducts. Some spacecraft have incompatible cargo bays, and in those cases the cargo is moved from spacecraft to port airlock or elevator car by rocket-propelled "forklifts."

As a habitat, Deimos is adequately spacious, but makes few concessions for visitors. There is a local, utilitarian hotel for people who have business in the port itself. There's a tiny tourist industry which caters mostly to moonhounds and megaengineering fans. The rest of the "city" of Deimos is home to just over 1,000 cargo movers, traffic controllers, and elevator crew who live on Deimos more or less permanently.

Phobos

Phobos is the larger of the Martian moons, orbiting 4,000 miles above ground. This is lower than Deimos, so the elevator oscillates to avoid a collision. It is possible to book a seat on an elevator car specifically to see Phobos go by, but it's less spectacular than one might think. Phobos passes the elevator at 4,400 miles per hour, and little more than a split-second gray blur is visible.

Port Phobos

Before completion of the Elevator, Phobos was the port of entry for Mars, and home to almost 10,000 people. Today, the population is in the low thousands, including scientists studying either the moon itself or Mars. Most of the inhabitants work at Port Phobos. Today, 50% of the port is unused. Most of the freight passing through is very low-priority cargo, though a percentage is material that, for political reasons, can't go down the elevator into Chinese territory. The port is losing money, and is subsidized by the American government. Despite the ongoing shrinkage, Phobos is still a reasonably busy place.

There are several small private spaceports on Phobos, as well as the main base of the PLAN-SF Deep Space Fleet (p. 41), which, for security reasons, does not use the excess capacity of Port Phobos except in emergencies. Phobos is also home to the Mars Academy of Space Technology (p. 52).

Schiaparelli Spacecraft Construction Yards

The only major spacecraft-assembly facility in Mars space is considered part of Port Phobos. It is actually a collection of facilities, some on the surface, some orbiting the moon. Most are owned by Xiao Chu (p. 51), others by Tenzan Heavy Industries (p. 54), and others by smaller manufacturers. While most spacecraft are still constructed in Earth orbit, Schiaparelli is a strong contender in the Deep Beyond market.

Mars Orbit

The space around Mars is home to a variety of facilities: some are industrial, but some are purely recreational.

High Arcadia Adventure Theme Park

High Arcadia is a luxury theme park based on Greek mythology. It is by far the largest entertainment facility outside near-Earth space, and thus is a vacation destination for not only Martians, but also whatever portion of the System is closer to Mars than to Earth at a given time.

The parent corporation, the Arcadia Entertainment Group, is an autonomous extranational entity, and is not subject to most international treaties – including, notably, the Genetic Regulatory Protocols. As a result, many of Arcadia's policies and activities are ethically questionable. One of Arcadia's best-funded divisions, however, is their public relations team, which is constantly working to build Arcadia's reputation as a crystal-clean provider of entertainment for all ages and forms of people.

The park is inhabited by many species of uplifted animals and parahumans, as well as a large number of cybershells. Many of the inhabitants can talk intelligently. Some are presapient, with limited vocabularies, while others are assisted by computers. A fairly large percentage are fully sapient, however. Jobs are always available for transhumans who match traditional Greek myths.

High Arcadia orbits Mars at 20,000 miles. It is cylindrical in design, with four main "cities" alternating with windows. Each city has a slightly different target audience. Despite the name, most of the territory in each city is highly artificial "wilderness," with scattered small villages and one larger town near the docking ring.

The first, Athens, is targeted at children (and nonchild bioroids or infomorphs who are "childlike" in mental development). It is inhabited by talking animals, fauns, a small breed of centaur (who love to give rides), and other friendly, playful species.

The second city is Thebes, which is the mainstream attraction. It is tailored to be neither too cute, nor too violent, nor too sexy. It's full of interesting adventures with a wide range of mythic species, most of which can be defeated through the use of brains and a bit of brawn, with a minimum of actual fighting.

The first of the two "adult" cities is Corinth, home to Bacchanalian excess. Physical pleasures ranging from feasts to orgies are available here, with a wide variety of companions. Many of the willing sexual partners are bioroids provided by the Martian Triads (p. 88).

The last city is Sparta, which is specifically violent. Physical combat is available with minotaurs, dragons, and many other beasts (mythical or otherwise). At the heart of the city is a somewhat anachronistic gladiatorial arena where guests can fight with employees of the park or each other. Sparta is packed to the brim with waiting medical personnel, and rarely loses a customer (or a member of the staff), but waivers must still be signed at the gate.

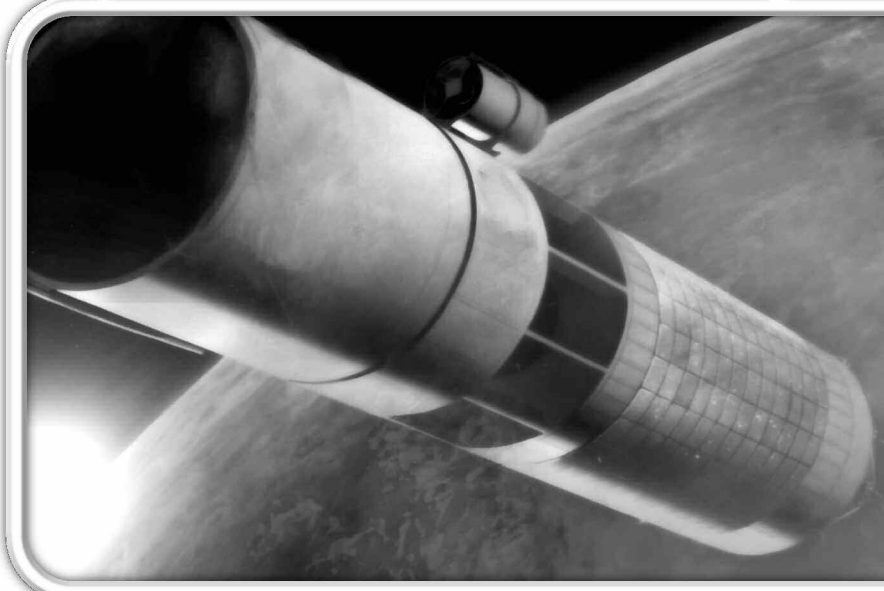
Orbital Mirrors

One of the chief hard-tech terraforming techniques is the fleet of orbital mirrors, ranging in size from tens to hundreds of miles across. They "hover" on the far side of Mars from the Sun, balanced between the push they get from sunlight and the pull of Mars' gravity.

The mirrors are used for a variety of tasks. Most simply reflect sunlight onto Mars, adding to the insolation and helping raise the average temperature. These are diffusely focused, spreading the light over the entire hemisphere facing them. A smaller group are specifically focused on the poles. They alternate from one pole to the other as Mars swings around its orbit, pointing at the north pole for the northern winter, and the south pole for the southern winter. These mirrors are significantly responsible for the constant shrinkage of the polar caps. Finally, a handful of mirrors are used to provide spot heat to points on the surface. This can be done for many purposes, including weather control (by creating a high-pressure zone), mining, melting permafrost, and bursting aquifers.

From the surface, the mirrors dominate the night sky, each as bright as a full moon. From any given point, at least half a dozen are visible.

The mirrors were constructed, and are controlled, by a variety of organizations, including the major national governments, Xiao Chu (p. 51), and the Mars Development Corporation (p. 52). Since they have obvious uses as weapons, these organizations monitor each other closely, and each mirror is rigged with self-destruct packages in case of takeover by terrorist forces. During the course of the past decades, a few *have* been destroyed, and a few more have suffered catastrophic structural collapse. Of the "broken" mirrors, some deorbited and burned up, some were pushed away by light pressure and are now accelerating towards interstellar space, and a few remain in high Mars orbit. Their disposal remains a topic of debate.



Orbital Strike Platforms

The major Martian governments all have heavily cloaked weapons in orbit, including orbit-to-surface k-kill missiles and X-ray lasers. The governments all know that the other nations have them, but their existence is no more than a rumor to the public. It's unclear under what circumstances the governments would use the lasers; while they're precise weapons, using one would be impossible to hide. The k-kill missiles, however, can be used quietly and with finesse. Indeed, they probably *have* seen use.

Land Use and Common Courtesy

Under the terms of the ROST (p. 49), real estate on Mars is "owned" by those who are occupying it or making use of it. The ROST is very vague about what "occupation" and "use" are. It also doesn't use the word "owned," but rather suggests that the occupants are holding the land in stewardship for humanity. The distinction amounts to nothing.

The first nations to land on Mars did so in widely separated areas, so land disputes were few. The first scientists/colonists always kept their counterparts informed about new habitats, and asked politely for permission when they needed to enter "foreign" territory. The few genuine arguments were resolved civilly and without the involvement of international organizations.

The first real test of this "common courtesy" arrangement was in 2046, when a phenomenally rich strata of nitrates (rare on Mars, and necessary for agriculture) was found by U.S. explorers under Solis Planum, south of Marineris. The explorers announced their find, stated their willingness to sell the nitrates at going rates, and sent areologic samples to scientists worldwide. A week later, the camp at Solis suffered massive life support failure, and all the U.S. explorers still resident died. Within a week, a group of Chinese settlers had occupied the camp, fixed the life support, and claimed the nitrates.

The U.S. was outraged. No official accusation of sabotage and murder was made, but the press and public shouted it loudly enough. The interplanetary community waited to see if common courtesy was about to dissolve into vicious land wars.

Instead, the Chinese government on Mars labeled the "settlers" as dissidents, tried them for murder, and returned control of the nitrates to the U.S. The dissidents were exiled to the Belt. Popular opinion in the decades following was divided on whether China had backed down from a shameless land grab, or honorably punished real renegades. (The truth, known to few, is that they were *not* acting under orders from the Chinese government, but thought their superiors would support their actions.) In 2100, the issue has largely been forgotten.

The common courtesy system, however, is still in place. With more and more organizations on Mars, and increasing tension, it's becoming an increasingly fragile framework, but it's still holding.

Claiming a piece of land is technically no more complicated than building a habitat on it. Most people post their claims to the Web. Precise borders may be set or not, and may be physical (e.g., a fence), or virtual. The largest land claim is, obviously, the Chinese territory that stretches from the foothills of Olympus well into Marineris. The smallest are individual homesteads.

There's no formal system in place for handling land disputes. If the individuals involved can't work it out, they get their superiors involved. The case can escalate until it reaches the national level, at which point there's usually a treaty that spells things out. Most of the spacefaring nations have treaties that provide details on how to adjudicate land claims in accordance with the ROST.

The issues that *could* promote land disputes are those of resources like precious metals, strategic location, and simple "living room." The last is never a point of tension; Mars is sparsely populated, and there are still millions of acres that haven't been touched. Similarly, there are occasional disagreements over metals and other areological resources, but Mars has miles and miles of untapped veins of ore. Wealth goes to those who explore best, not to the pushy. As for strategic location, in an interplanetary society, the most strategic location is at the top of the gravity well, not the bottom. Any advantage in mere areographic positioning could be obliterated by orbital superiority. Accordingly, the powers on Mars currently get by with the "common courtesy" system. How much longer it will work is unknown.

Clocks and Calendars

The Martian day is 24 hours, 39 minutes, and 35.25 seconds long. It is technically known as a "sol," but the word "day" is far more commonly used. Clocks used for military and scientific purposes usually measure time from 00:00:00 to 24:39:35, and then click over to 00:00:00 again. Some civilian clocks use the same system, while others freeze at 24:00:00, and start again with 00:00:00 forty minutes later. The period of frozen time is known as the "gap" or "*tingdun*" (pause). Social custom says that things that happen during the gap don't count, and shouldn't be spoken of afterwards (e.g., a stolen kiss, a whispered secret). This custom is more common in the non-Chinese Martian cultures. Among *every* culture, the extra half-hour-plus is regarded as a minor gift of time from Mars to its inhabitants.

Since the sol steadily drifts out of synchronization with the Earth day, very few Martians bother to keep track of the current time and date on Earth, instead counting on their infomorphs to do so. Those who *have* to keep track handle it in a variety of ways. For example, the news show *Today on Earth* is packaged and sent out to human habitats throughout the System once per Earth day. On Mars, the local affiliate broadcasts it every sol at 08:00, Robinson City time. Once every 36 days, they show two episodes back to back, to make up for the slippage.

Mars is divided into six time zones, each four hours apart. From 0° to 60° longitude is the Xanthe Time Zone, which includes most of the American settlements. The Pavonis Time Zone is from 60° to 120°, and includes much of the Chinese settlements. From 120° to 180° is the Olympus Time Zone. 180° to 240° is the Elysium Time Zone. 240° to 300° is the Syrtis Time Zone, and 300° to 0° is the Arabia Time Zone. (The Olympus Time Zone is actually 4.66 hours ahead of Elysium Time, to allow for the odd-length day.) Like time zones on Earth, the borders occasionally detour from the longitude lines to avoid splitting territories. So, all of Arsia Mons is on Pavonis time, and the Hellas Sea is entirely in the Syrtis Time Zone. The time zones are abbreviated to XT, PT, etc. when necessary (e.g., *Today On Earth* is broadcast daily at 08:00 XT). The Martian Date Line (corresponding to the International Date Line) is between the Olympus and Elysium Time Zones. Mars has nothing similar to "daylight time."

The Martian year is 668.60 days (sols) long. The calendar consists of 24 months, most of which have 28 days. The sixth, 12th, and 18th months are 27 days. The last month is 27 days in years ending in 1, 3, 6, and 8; it's 28 days in other years. A seven-day week using traditional English names is commonly recognized. The months officially have no names, but a system mixing English month names with constellations is in wide use:

Name	Length
January	28 days
Virgo	28 days
February	28 days
Libra	28 days
March	28 days
Scorpius	27 days
April	28 days
Sagittarius	28 days
May	28 days
Capricornus	28 days
June	28 days
Aquarius	27 days
July	28 days
Pisces	28 days
August	28 days
Aries	28 days
September	28 days
Taurus	27 days
October	28 days
Gemini	28 days
November	28 days
Cancer	28 days
December	28 days
Leo	27 or 28 days

January 1 is the winter solstice, and the constellation months are roughly synchronized with the sun; for most of the month of Virgo, the sun is in the constellation Virgo.

The year the Chinese landed is considered year m0000. Year m0039 began on September 13th, 2099, Earth time. The Chinese system of assigning animals to years (in the cycle Rat, Ox, Tiger, Hare, Dragon, Snake, Horse, Sheep, Monkey, Rooster, Dog, Boar) sees some use in unofficial contexts; Year m0039 is the fourth year of the Hare since landing. In this book, Earth years and dates are used to allow easier cross-referencing between this book and others in the ***Transhuman Space*** line. To convert, use the following formulas:

E = (M×1.8808) + 2,026.35
M = (E×0.5317) - 1,077.36

E is Earth year, M is Mars year. Because of issues like leap year, this is only accurate to within a few days.

Holidays

New Year's Eve is, of course, celebrated on the last day of Leo. Landing Day (May 26) is another worldwide holiday, though it's a little more fervent among the Chinese. Religious holidays are usually celebrated in synch with the Earth calendar, so Christmas (for example) usually comes twice annually, and moves around from year to year. For Muslims, the month of Ramadan similarly moves around the calendar.

Nonreligious holidays are often celebrated on the same *date* as on Earth, only in the Martian calendar. E.g., Thanksgiving is held on the fourth Thursday in the *Martian* November, and May Day is still May 1. Among the Chinese, the Dragon Boat Festival (marked by gaudy boat races along Marineris) is celebrated on March 5, and the Harvest Moon Festival is held every September 15.

Most Mars-born people reckon their age – and birthdays – by the Martian year. If they need to know their age in Earth years, they multiply by 2 for an approximation, or ask their infomorph.

In a Martian Minute

"Some of the early proposals for the Martian clock got shot down fast. One suggestion was to divide the day into 24 hours, the hour into 60 minutes, the minute into 60 seconds . . . but each hour, minute, or second would be 2.75% longer than the Earth unit. When the scientists and engineers heard that they'd have to come up with new constants for everything from liters-per-hour to the speed of light, they revolted.

"The suggestion did catch on in one way. Even though the Martian minute is, in reality, the same as the Earth minute, the idiom 'Martian minute' means 'a little bit more than a minute.' 'Martian hour' is used in the same way. So, if your friend visiting from New Shanghai says he'll be done instructing his infomorph 'in a Martian minute,' what he means is '. . . but it might take a little longer than that.'"

– Danforth Pleasanton, Professor of Off-Earth Sociology, Harvard University

3 THE MARTIAN ENVIRONMENT

Zhaoyi Wu stepped out of the airlock and onto the Martian sand. The breeze brought gooseflesh up on his arms; icier than even Mongolia, almost colder than Siberia. He blinked up at the sun. Smaller, dimmer. He felt little warmth from it, but he imagined he could feel the sting of the ultraviolet light the atmosphere did little to stop. He blinked again; his eyes were very dry, and each gust caressed his face with dust. He sniffed shallowly, and smelled iron, and dryness, and sand. Then his lungs rebelled against the carbon dioxide, and he began to cough hopelessly.

The one he loved was going to become a ghost, a mind emulation. He could not believe what he loved about her would survive the change. If she was going to change, he would change as well.

He collapsed. A few minutes later, he died.

Natural, unprotected humans cannot walk the surface of any planet but Earth . . . but that may soon change. The atmosphere of Mars still has poisonous levels of CO_2, but continued terraforming is expected to produce a safe atmosphere some time in the 22nd century. Plans are in motion to change Venus, and other worlds will follow.

This chapter describes the environment of Mars, and its (mostly negative) effects on humans. Chapters 8 and 9 will describe some of the ways people are getting around those effects, but in this chapter we are discussing unmodified humans. Many of the rules in this chapter are specific implementations of the rules in Chapter 2, *The Solar System,* of ***Transhuman Space.*** Consult that book for more general guidelines.

Gravity

The gravity of Mars is about 3/8 that of Earth – 0.38 G. This allows remarkable athletic feats for people of Earth-average strength (i.e., ST 10).

Encumbrance

The encumbrance chart on a ***GURPS*** character sheet assumes Earth-normal gravity. For a prolonged Martian campaign, the GM may want to calculate the correct numbers for Mars gravity, to speed play. This system shows how. A revised Martian encumbrance chart is printed below for your use; photocopy it and fill in the blanks with the appropriate values for your favorite Martian. ("Wt." is the weight on Mars that corresponds to that encumbrance level, "Adj." is the adjustment to the base Move, and "Move" is the new Move value.

Begin with the character's Earth weight in pounds. Multiply by 0.62. If any portion of the character's body weight counts as encumbrance – e.g., because of Overweight (p. B29) or Fat (p. B28) – subtract it from the product. Round to the nearest 5 lbs. The result is the character's *base negative encumbrance* (BNE). Since the character himself only weighs 38% of "normal," he can shoulder quite a load and still be carrying less than he would on Earth. The BNE tells how much.

*Example 1: Stanley is a **GURPS** character with ST 10. His Earth weight is 150 lbs. Stanley's BNE is 0.62×150 = 93, rounded to 95 lbs.*

Example 2: Chan has ST 10 and the Overweight disadvantage. This adds 45 lbs., for a total of 195 lbs. on Earth. Her BNE is (0.62×195) - 45 = 75.9, rounded to 75 lbs.

Now you need to figure the character's encumbrance levels. On Earth, "no encumbrance" is up to 2×ST in lbs., "light encumbrance" is up to 4×ST, etc. (p. B76). On Mars, the multipliers are larger, *and* the character gets a bonus equal to his BNE!

No encumbrance: up to BNE + (5×ST).
Light encumbrance: up to BNE + (10×ST).
Medium encumbrance: up to BNE + (15×ST).
Heavy encumbrance: up to BNE + (30×ST).
Extra-heavy encumbrance: up to BNE + (50×ST).

The absolute maximum someone can carry (normally 30×ST, see p. B76) is BNE + (80×ST).

Example 1: Stanley can carry up to 95 + (5×10) = 145 lbs. and still be carrying "no encumbrance." His other encumbrance levels are: Light, 195; Medium, 245; Heavy, 395; Extra-heavy, 595. The absolute maximum he can carry is 895 lbs.

When a character is carrying less than his BNE, he may get a bonus to Move. On the chart, these "negative" levels are labeled "None-1," "None-2," and "None-3," and give +1, +2, and +3 to Move, respectively. These encumbrance levels are calculated like so:

None-3: up to BNE - (9×ST).
None-2: up to BNE - (6×ST).
None-1: up to BNE - (3×ST).

Example 1: Stanley's "None-3" encumbrance level is 95-(9×10) = 5 lbs. If he's carrying practically nothing (not even heavy clothing), he gets a +3 bonus to his Move!

Example 2: Chan's None-3 encumbrance level would be 75-(9×10) = -15 lbs. Her player crosses out that line on her chart; Chan's best possible encumbrance level on Mars is None-2, granting a +2 bonus to Move.

The encumbrance levels given by these rules are in Earth weight. Figure how much the character's equipment would weigh on Earth, look that weight up on the PC's Expanded Encumbrance Chart, and you get the character's Move on Mars. (Obviously, do *not* include body weight that counts as encumbrance; it's already figured in.) Since the weight given for equipment in this and other ***GURPS*** books is Earth weight, this is the simplest system. For other rules pertaining to encumbrance (e.g., fatigue loss), treat the negative levels the same as "no encumbrance."

Mars Encumbrance Chart

Level	Formula	Wt.	Adj.	Move
None-3	BNE-(9×ST)	_____	+3	_____
None-2	BNE-(6×ST)	_____	+2	_____
None-1	BNE-(3×ST)	_____	+1	_____
None	BNE+(5×ST)	_____	+0	_____
Light	BNE+(10×ST)	_____	-1	_____
Med	BNE+(15×ST)	_____	-2	_____
Hvy	BNE+(30×ST)	_____	-3	_____
X-hvy	BNE+(50×ST)	_____	-4	_____

Alternate Encumbrance Levels

Some transhumans, and most animals, have different Earth-normal encumbrance levels. (See pp. B139, B145, and CI55.) This system will still work, but the Martian ×5, ×10, ×15, ×30, ×50, ×80 multipliers are wrong for them. Take their actual multipliers for each level of encumbrance, divide by 0.38, and round off to the nearest convenient number. The multipliers for the "None-*n*" levels do not change.

Dexterity

People native to Mars may use their DX and DX-based skills normally in Mars gravity; their reflexes expect it. Visitors from different gravities will have slightly more trouble.

Normal humans have a G-increment of 0.2 G (see p. TS53). Mars is therefore 3 G-increments away from Earth-normal conditions. This imposes a -3 penalty on DX and DX-based skills for people used to Earth gravity (only -1 if they have the G-Experience advantage (p. CI25)). Guidelines for applying this penalty are on pp. TS53-54.

A character trying to take advantage of the Move bonus granted by negative encumbrance levels (above) must roll vs. DX-3, or he will lose his balance and go sprawling in an amusing manner. Characters with G-Experience, or who are native to Mars, ignore this roll.

Jumping distances, thrown object distances, and Max ranges for bullets are multiplied by 2.6 on Mars.

Atmosphere

Poisonous carbon dioxide makes up 75% of the Martian atmosphere. 15% of the remainder is oxygen, and the rest is a mix of nitrogen, water vapor, noble gases, greenhouse gases (such as methane and halocarbons), ozone, and other gases. Air pressure is up dramatically from pre-terraforming days, to about 40% of Earth-normal (still "very thin" in ***GURPS Space*** terms). The Martian atmosphere is lethal to normal humans. Life support, a respirator, or the Andraste biomod (p. 97) is normally required.

CO_2 Poisoning

A baseline human breathing Martian air will lose 1 point of ST (as fatigue) each second. If he passes out, he will take 1 point of damage every HT seconds, and eventually die. The unlucky adventurer can, of course, hold his breath for as much as several minutes before losing fatigue; see p. B91. (Note: These rules are different from the carbon oxides rules on p. S101, as those are intended for relatively low concentrations.)

Atmospheric Contents – A Terraformer's Guide

Oxygen

Oxygen is necessary for two reasons. First, it drives tremendous chemical energy releases within the living cell, providing the power of life. Second, it forms an ultraviolet light shield, ozone, which protects life below from some of the Sun's harmful radiation.

High partial pressures of oxygen are corrosive and dangerous. At concentrations higher than 0.21 bar, even damp twigs and branches can spontaneously catch fire.

Nitrogen

Nitrogen serves three primary functions. First, it provides a neutral, nonflammable buffer in the air to provide pressure and dilute the powerful chemical effects of oxygen. Second, it is a prerequisite for life, since it is incorporated into the proteins from which life is made. Last, when combined with oxygen in the upper atmosphere, it forms nitrous oxide, which blocks the Sun's shorter-wavelength ultraviolet light.

Water Vapor

Water in its liquid form is clearly important to life. However, in its gaseous state it plays an equally important role – it keeps a planet warm. Water vapor is one of the most powerful greenhouse gases readily available. On the downside, water vapor is difficult to keep in equilibrium. The more water vapor in the atmosphere, the hotter it gets, and the more water vapor is evaporated from the oceans. The Martian terraformers keep a close eye on their atmosphere's water vapor.

Carbon Dioxide

Carbon dioxide is critical for plant respiration, and is also a greenhouse gas. In concentrations greater than 1%, it is poisonous to normal humans. On Mars, CO_2 is the obvious choice for holding heat, and humanity has met Mars halfway by adapting its representatives to high CO_2 levels.

Other Greenhouse Gases

Methane, ammonia, halocarbons (carbon tetrafluoride, hexafluoroethane, sulphur hexafluoride, etc.), and other gases are more effective than CO_2, and don't have the positive-feedback properties of water vapor. They also "block" atmospheric heat loss in wavelengths not covered by water vapor or CO_2. They generally need to be mechanically produced (though biotech to handle it exists as of 2100), but they are also only needed in tiny quantities.

Noble and Light Gases

Noble gases like argon and neon are frequently present in a planet's atmosphere, but play no role beyond "nonflammable buffer." They are inert. Light gases like hydrogen and helium may be introduced to an atmosphere, but don't stay there over geologic time. They're too light to be held by a gravity lower then a gas giant's.

The Ares Plague

The Plague was a combination of a number of different organisms. The Ares Conspiracy gave them color names for reference, and those names (with the word "Plague" now attached) are in common use today. Three specific species formed the backbone of the Plague:

The Blue Plague was a bacterium designed to live on or near nitrate beds, and to combine nitrogen and atmospheric water to produce ammonia. Ammonia is a powerful greenhouse gas, thousands of times better than carbon dioxide on a molecule-by-molecule basis. The Blue Plague was specifically designed to die out after a few decades, to prevent the buildup of too much poisonous ammonia in the atmosphere.

The Green Plague, also a bacterium, was seeded near surface ice deposits, and combined water and carbon dioxide to produce methane. Methane is also a greenhouse gas, comparable to ammonia in effectiveness.

The Black Plague was a lichen, designed to live on or near carbon dioxide ice, and to be as black in color as possible. It was the first of the Plagues, and was distributed over the south polar cap. Thanks to its color, it absorbed immense quantities of heat, and melted most of the cap in a few decades.

The three major plagues, and a number of minor ones, still survive on Mars today. Their intended habitat has radically changed, so they are slowly dying off, but biologists can still find samples.

Nonbiological Techniques

The Ares Conspiracy placed its emphasis on biological techniques. Bacteria are easy to transport and hide, self-replicating, and difficult to eradicate. The Conspiracy tried several nonbiological methods as well, with varying degrees of success. The most infamous is the "Black Dust" expedition. In early 2040 the science zeppelin *Asmodeus* was dispatched on a mapping and surveying mission to the south polar region. The Conspiracy placed its own people on board . . . along with many tons of fine black dust (mostly volcanic silicates such as obsidian). While the zep crisscrossed the pole, it was also dropping dust. When the first load ran out, the crew landed at a prearranged pickup and loaded more dust. They were able to continue this for months before their efforts were noticed, at which point the zep landed again – and the crew vanished, hidden by the Conspiracy. The dust was not as effective as the Black Plague, but its contribution helped.

The most effective nonbiological technique was the construction of the CFC factories. These room-sized devices were concealed far from population centers, near natural sources of sulfur and fluorine. They released powerful greenhouse gases, such as carbon tetrafluoride and hexafluoroethane, that could not easily be produced by biological means. The CFC factories were expensive to build in quantity, difficult to conceal (the CFCs produced were easy to detect), and prone to breakdowns without frequent maintenance – and regular visits by repairmen made them even easier to find. Nevertheless, the CFCs provided a huge boost to the temperature, and made the biological plagues that much more successful. One of the CFC factories is on display at the Burroughs Museum (p. 58), and some presumably still exist in the wild, though they are certainly nonfunctional.

Temperature

The average temperature at the equator is just above freezing; the highest temperature recorded during the past decade was 80°F, the lowest was -150°F. The normal rules on freezing from p. B130 apply.

Altitude

Because of the low gravity, pressure on Mars falls off about one-third as fast as on Earth. On the other hand, Martian mountains are *much* taller, and the atmosphere starts out thinner. At the lowest altitudes, the average pressure can reach 45% of an Earth atmosphere. Above 5 miles, the pressure is much lower, and the air cannot be breathed even by gengineered animals and humans.

Weather

Before terraforming began, weather on Mars varied mostly in terms of how windy it was and how much dust the wind was carrying. In 2100 rain and snow have been added to the mix.

Dust Storms

Martian dust storms can cover the planet for months, and boast 100-mph winds. Historically, they are most likely to begin during the southern spring, when rising temperatures melt CO_2 out of the southern polar cap, dramatically raising atmospheric pressure. This does not cause dust storms every year, and the effect is much reduced by the changed atmosphere of the late 21st century, but planet-girding dust storms still remain a possibility.

These storms are characterized by high winds and abrasive sand. Pitting can turn a clear glass plate opaque in hours. The corrosive soil of the Southern Hemisphere makes these storms even more dangerous (see *Red Lung,* below). Unprotected persons or equipment will take 1d-4 points of damage for every *second* they are exposed to a light or moderate storm, 1d-2 for a heavy sandstorm. Faceplates of airmasks, windshields of vehicles, etc., will become opaque in 2d hours if made of unarmored glass. Even without this effect, the thick clouds can impose Vision penalties as bad as -7 at high noon. DX rolls to stay standing, and ST rolls to walk into the wind, can be as bad as the GM likes – up to "impossible." Truly severe and widespread dust storms will have a major impact on the planetary economy. See p. 122 in the Campaigns chapter.

Precipitation

Rain and snow are far more common on Mars in 2100 than in previous decades, but are still considered cause for happiness and, sometimes, celebration. The game effects are no different than on Earth. Because of prevailing wind patterns, the poles receive very little precipitation; due to elevation, the Southern Hemisphere is dryer than the north. The areas which receive the most rain are the east sides of mountains and continental bulges near the equator, particularly including the Chinese colony on east Tharsis.

Other Details

Mars has been radically changed in the past century; its average temperature has been raised tens of degrees, and its atmosphere is very different. All this puts immense tectonic stress on the land, and it tends to react in dangerous ways.

Sand, Dust, and Fines

The surface of Mars is largely desert, covered with sand, dust, and the micron-scale dust technically called *fines.* Modern equipment designed for Mars is effectively immune to dust, but older devices, or those built for Earth, are more vulnerable. If such equipment is being exposed to the Martian surface, make a dust check once a week. Roll 3d vs. 19 for new equipment, 18 or lower for older equipment. There is a -6 penalty if the device is not "Mars-ready." On a failure, the equipment fails and must be repaired (takes 1d days and 1/5 the equipment's original cost). On a critical failure, the device is permanently damaged and must be replaced.

Red Lung

Virgin Martian sand is highly reducing and corrosive in the presence of water. Near bodies of water or in areas that receive substantial amounts of rainfall, the ground has been neutralized, and no longer poses any threat. However, large tracts of relatively unaffected regolith remain, particularly in the Southern Hemisphere.

Anyone who spends a lot of time on the Martian surface runs the risk of contracting *red lung* – the effect of the corrosive Martian dust on the human respiratory system. (People with the Andraste biomod are immune to red lung, as is anyone modified or designed with Mars in mind.) Roll against the character's HT once a year. Failure means the victim loses 1 point of HT. This loss is permanent without treatment. Treatment costs $1,000, is available at any habitat with more than 100 people, and involves a week of bed rest while "trained" bacteria repair scar tissue in the victim's lungs.

If the exposure comes in a single large dose (e.g., the victim loses his respirator in a dust storm), roll against HT-4. Failure means he takes 1d damage to his lungs. This damage will heal normally unless a second roll against unmodified HT is failed. Critical failure on the first roll means a coughing, choking death.

Aquifer Bursts

An *aquifer* is an area of porous rock saturated with liquid water. They are quite common on Mars, and can hold entire lakes' worth of water. When a weak point is opened between the aquifer and the surface, the water comes rushing out. This causes the porous rock to sag and compress. The rock on top of that will be shaken and fragmented, and settle, putting more pressure on the water, causing it to rush out even faster . . . Marineris was flooded by a planned aquifer burst, filling an area as big as a small European country.

Most aquifers have been charted by areologists, and unplanned bursts are rare – but exceedingly deadly when they do occur. Entirely apart from the danger of being drowned or crushed by crashing water, the burst can trigger landslides and reactive terrain (see below). Many aquifers have been tamed and "capped" to provide water for various habitats. These represent vulnerabilities, since blowing the cap would probably destroy the community.

Landslides

Even before terraforming, the walls of Marineris, and similar cliffs, were largely landslides. With dramatically increased humidity, cliff walls around the planet soaked up water and began collapsing. The process has mostly stopped; everything left is reasonably stable, and likely candidates for further collapse are marked on all good maps. Regardless, wise travelers stay away from cliffs when it's raining.

Mudslumps

The other common form of water on Mars (besides the poles and aquifers) is *permafrost:* subsoil containing some water and frozen solid. With increased temperatures the permafrost is melting, producing everything from slightly soggy land to mud seas to quicksand. For people, quicksand is the only real threat. Spotting quicksand requires a Vision roll at -3 or an unmodified Survival skill roll. (The visibility of quicksand actually varies widely; GMs may apply up to a +2 bonus or -2 penalty to this roll and still be realistic.) If the victim falls in, a Fright Check at +2 is required. If the Fright Check is failed, all normal penalties of a Fright Check are applied.

Getting out of quicksand requires the Swimming skill, rolling at a -2 penalty and moving at 1/3 speed. The GM should apply all rules from p. B91, particularly those covering encumbrance and fatigue. By all reports, being trapped in quicksand is very harrowing, and the GM may ask for more Fright Checks, at increasing penalties, if the adventurer has trouble getting out. (Note that these rules are for Mars gravity; on Earth, the Fright Check is at only +1, and Swimming is at -3.)

Sinkholes

A sinkhole is the result of the collapse of surface soil into a cavity that has formed below ground. Sinkholes can form and stabilize in seconds. What was flat ground an instant before collapses into a deep, funnel-shaped hole. The hole grows quickly in depth and width, then stops just as fast. The hole will suck down and bury anything above it. On Mars, sinkholes can be the result of aquifer collapses or permafrost melting.

Sinkholes range in size from one or two to several hundred yards across. A very few reach larger sizes. The walls of a sinkhole are of loose soil. Scaling the walls (up or down) does two things: it makes the sinkhole wider, and it buries anything at the bottom that isn't already buried. Use Climbing skill at -3 to climb out of a sinkhole.

Bodies of Water

Terraformed Mars has several, separate bodies of water, including Marineris, the Borealis Sea, and the Hellas Sea. The water is thick with minerals and salt, and must be filtered before drinking. Treat unfiltered Martian water as a poison; each ounce drunk does 1d damage (roll vs. HT-5 to take only half damage) within one minute.

Visually, the Martian seas are brown-red and foamy; they're often compared to coffee. The low gravity allows high waves that are startling to newcomers from Earth. People inexperienced with Martian seafaring take penalties to their Boating and Powerboat skills as for any DX-based skill (see p. 34). The Martian tides are very low; the moons have no pull to speak of, and the Sun is more distant than from Earth.

What Is This Stuff?

*"Despite the best efforts of the Peruvians, most coffee on Mars sucks. It **looks** like Martian seawater, and it very nearly **tastes** like Martian seawater. This is why they spice it so heavily. Most Martians, of course, either genuinely like it, pretend to like it, or don't know any better. Nevertheless, thanks to returning tourists, on Earth 'Martian coffee' now means 'really, really bad coffee.'"*

– Danforth Pleasanton, Professor of Off-Earth Sociology, Harvard University

Radiation

Mars has a thin but effective ozone layer; it is also further from the Sun. For baseline humans in 2100, the risk of ultraviolet sunburn is about the same as on Earth (which is to say, slightly higher than on Earth in the year 2002).

4 ORGANIZATIONS

"They're all bastards," said Raeb's friend.

"Huh? Who?" I turned to her with a puzzled expression. I could just barely hear her over the music. She gestured at the screen, where the motley members of the band Nataku were dancing along to their latest hit, "No Space in Space."

"Them. See, they don't write their material, it's handled by the songwriting AIs belonging to their publisher, right? So it's catchy, danceable, just offensive enough, and laden with so many memetic layers it's a wonder they don't crystallize out of the atmosphere."

I gulped back some of my drink, and watched her platinum hair change color in time to the club's lights. "Um, such as?"

"Well, apart from the standard 'buy stuff' and 'don't question authority,' this song contributes to the 'Mars is full' meme. The verse about sleeping in an alley in New Shanghai? An attempt to foster the image of Mars as packed to the brim with scary foreigners. Of course, the other side is just as bad."

"The 'other side?'"

"Oh yeah, Colonial Genetics with their 'manifest destiny' bit, Triplanetary extolling this place as a tourist spot, et cetera, ad nauseam. Bastards, all of them."

"Hmm, if you say so. Raeb didn't give me your name."

"Deirdre Dachshund."

"'Dachshund?'"

"My parents were big-eared and short. C'mon, let's dance."

"I thought you hated this song!"

"I hate the message, not the medium. Like I said, the song's catchy."

Population

As of 2100, official estimates from both China and the United States place the population of Mars at 2,400,000. That figure is low by about 5%; there are many people, criminal and not, who try to stay "off the books." The population is 50% male, 45% female, and 5% other.

Broken down by allegiance, 55% of the population is Chinese, 18% is American, 7% is Japanese, 7% is European, 5% Peruvian, and the rest is mixed, with an emphasis on Arabs and non-Peruvian South Americans.

Martian population growth began strongly in the 2040s, when the number of people on Mars was doubling about every Earth year. It slowed down during the most chaotic years of the Plague, averaging 20,000 people a year. In 2067 (after terraforming became more planned), the curve jumped a bit, and continued to grow. Currently, the Martian population is increasing by 200,000 people a year, with about 45% of that being immigration. Half the population of Mars has lived there for 15 years or more, and 38% were born (one way or another) on Mars.

Rust China

Historically, the mainland Chinese government on Earth was sometimes known as "Red China," to distinguish it from the non-Communist government of Taiwan, which was (and is) also "China." Over the years, "Rust China" has become a popular shorthand for the Chinese government on and of Mars, named for the distinctive hue of Martian regolith.

Rust China is an autonomous region of the People's Republic of China. The chief executive holds the title Chief Administrator, and is appointed by the National People's Congress back on Earth. As of 2100, the Chief Administrator is Lanqing Wang (see box). Rust China has three seats on the National People's Congress, representing New Shanghai, Haiyuan City, and the Martian colony as a whole. The representatives serve 5-year terms, which they spend entirely on Earth. Currently, the representatives are Qichen Zhu (New Shanghai, politically "old school"), Rongji Li (Haiyuan City, liberal and secretly in favor of Martian independence), and Ping Wu (representing the whole colony, slightly left-of-center).

Chief Administrator Lanqing Wang — 175 points

Age 62; 5'10", 165 lbs. A solidly built gray-haired Chinese man. He is a naturally born human, with an Andraste biomod and a little brainwork to help him focus (represented as Workaholic).

ST 11 [10]; **DX** 10 [0]; **IQ** 14 [45]; **HT** 12 [20].

Speed 5.5; Move 5.

Dodge 5; Parry 4 (Judo).

Advantages: Administrative Rank 6 [30]; Ally (Programmed; wearable virtual interface hosting LAI-6; 60 points; 15 or less) [12]; Andraste biomod (p. 97) [14]; Charisma +1 [5]; Comfortable [10]; Reputation +2 (Fair and honest administrator; among Rust Chinese) [10]; Status 6* [20].

* Includes two free levels from Administrative Rank.

Disadvantages: Enemy (Violent factions of Free Mars; 6 or less) [-15]; Sense of Duty (all Chinese) [-10]; Workaholic [-5].

Quirks: Bit of a coward; Is beginning to wish he could relax more; Mostly honest. [-3]

Skills: Acting-13 [1]; Administration-16 [6]; Area Knowledge (Rust China)-15 [2]; Climbing-9 [1]; Computer Operation-14 [1]; Detect Lies-12 [1]; Diplomacy-14* [2]; Economics-13 [2]; Judo-7 [1/2]; Law-14 [4]; Memetics-11 [1/2]; Politics-15* [2]; Psychology-14* [2]; Savoir-Faire-18 [4].

* Includes +1 for Memetics.

Languages: Arabic-12 [1/2]; English-13 [1]; Japanese-13 [1]; Mandarin (native)-14 [0].

Lanqing Wang has been a civil servant since he graduated from Chungshan University on Earth in the 2060s. An able bureaucrat and politician, he was one of the first 100 employees of the Colonial Directive (p. 40) and worked his way up the ranks with alacrity. He spent the years from 2080 to 2083 on Mars as assistant chief of the local branch of the Directive. He subsequently returned to Earth, where his experience and insight was instrumental in stopping the "banishment" of criminals to Mars as colonists. In 2095, the Mars Chief Administrator stepped down after being forced to violently put down a Free Mars uprising in New Shanghai. Wang was the obvious choice to replace him. His resignation from the Directive was gleefully accepted, as they were delighted to have a friend occupying Mars' highest post.

Politically, Wang is a moderate, believing in a "hands-off" attitude toward local affairs. He favors the carrot over the stick; behavior that strengthens China as a whole (e.g., signing over patents to the State) is rewarded through incentives like tax breaks or offers to have government agencies handle the reams of paperwork. He is very loyal to China, and opposes the Free Mars forces, though he tries to avoid using violence against them.

Rust China has no individual legislative branch; theoretically laws are passed by the Earth-bound Congress. Since this is largely impractical, the Chief Administrator issues edicts which have the force of law, and then passes them on to the Congress to be legitimized.

The Chief Administrator is advised by a Council indirectly elected by the people. The Council generally are the voices of those who elected them, though some are corrupt or indifferent.

Individual habitats, in theory, administer themselves as they see fit, but they tend to fall into certain categories. The cities are run by democratically elected councils. In addition to running the cities, the councils elect representatives to the Administrator's Council and appoint judges. There are no nonlocal judges or courts. If someone appeals to an authority above his local court system, he will have to visit Earth and the Supreme People's Court. This is onerous enough that people tend to settle things among themselves; getting the government involved is socially stigmatized. In habitats smaller than cities, a variety of governments are used. One-family habitats are often patriarchal; scientific stations appoint a leader by tests or lottery.

The government on Earth, overall, does not interfere too much in the Chief Administrator's decisions (beyond sending thousands of new settlers every year, and expecting a steady return on investment). In turn, the Chief Administrator sees his role largely as supervising the economy, and avoids meddling in local politics.

Rust China is a "socialist market economy." This system combines a reliance on small-scale industry and agriculture with tight rein over food prices, the money supply, and other central controls. The effect is one of rapid growth, though the weaknesses of socialism (bureaucracy, corruption) and capitalism (unemployment) are still issues.

All Chinese military forces in and around Mars come under the control of the Martian Military District, commanded by brooding Pacific War hero General Xu Jiaping. He reports to Beijing, but is also expected to provide aid to the civil government where appropriate.

The Colonial Directive

The Directive is the Chinese agency responsible for colonizing other worlds. It has two significant branches, the "home office" and the Mars branch. (Smaller divisions exist on every world with a Chinese presence.) The home office has nominal authority over the other branches, but they are largely independent. It also determines which planets get more colonists, how many go, and who they are. Directive policies on who should make the trip from China proper to Mars have varied over the decades. The original settlers were scientists and support technicians; after Mars was opened up in the late 2060s the immigrants became more diverse, chosen from a large pool of volunteers and specially bred bioroids. On the other hand, for several years in the early 2080s, Mars was used as a

The Art of Guanxi

Guanxi is Chinese for "a relationship." It is the connection between two people whereby they exchange favors. The art or science of cultivating and using these relationships is *guanxixue* (pronounced guan-shee-shwe). This literally means "relationship-ology." In China (both on Earth and Mars), a great deal that would be handled by bureaucracy in other nations (e.g., America) is instead taken care of through the exchange of favors. On Earth, this was a reaction to the rigid bureaucratic maze China has had since the days of the mandarins. On Mars, it continues to exist due to the *absence* of clear bureaucratic structures!

Individual habitats in Rust China are self-governed and often have very minimal human governments. Many of the day-to-day tasks considered part of "government" in prior centuries are handled by infomorphs; the people who technically have the authority only really get involved when something unusual occurs. As a result, there is no formal procedure for anything the infomorphs don't expect, beyond "ask the guy in the corner office." Since civil servants often hold several offices, and probably have a nongovernment occupation as well, it can be difficult to get in touch with them. Further, the highest levels of the Rust Chinese government, while more organized, are currently employing a "hands-off" policy, letting people govern themselves.

The effect is that, when you need permission to put a new airlock in the city's dome, there is no planning bureau, no forms to fill out, and no line to stand in. Instead there's Administrator Shuyue Guo, who has the responsibility for approving this sort of thing . . . but she doesn't have time to see you; she's busy planting this year's meta-triticale crop. This is where guanxi comes in. If you have the web of contacts a typical Chinese has, you can put out feelers and, eventually, discover that your old college buddy's aunt is from the same crèche as the hydrologist Guo consults with. The aunt would be happy to put you in touch with the hydrologist, who in turn gives you a letter of introduction to Guo . . . and you're all set, except for the favors you now owe.

In rules terms, guanxi is handled through Contacts and the Savoir-Faire skill, though other skills such as Streetwise and Diplomacy can also play a part.

dumping ground for criminals exiled from China, mostly technically competent but politically unsound professionals, but also including not a few thieves and murderers. This practice stopped with the embargo in 2083 (p. 43), and was not resumed when interaction was reestablished. However, the thugs and revolutionaries already on Mars formed the core of the Martian Triads (p. 56). In the years since, the immigrants have included everyone from farmers to genetically optimized scientists. Almost all are volunteers (though the question of whether someone *designed* to be happiest on Mars is actually "volunteering" is a tricky one).

Ministry of State Security (Guoanbu), Bureau 12

The Twelfth Bureau of China's Ministry of State Security has the mission of protecting China's off-Earth colonies, specifically including Mars and Mercury. Created in the late 2040s as a new division of the Ministry, it and its agents are competent and respected. It works closely with the space-going representatives of Bureau 10 (p. TS97). The usual division of labor is for B-12 to do the actual spying, while calling on B-10's technical experts to analyze the results.

The current focus of Bureau 12's activities is counterespionage (stopping spies in Chinese territory) and industrial espionage. While the Bureau sometimes does engage in activities against other spacefaring nations (particularly the United States), the risk is usually too great for the reward. Most nations have excellent counterespionage agencies of their own, and industrial scientific secrets are much more valuable in this age than foreign troop deployments. With so much science being done by corporations, China favors spying on them first. Their diligent pursuit of Transpacific Socialist Alliance operatives or fugitives is an exception to this rule; the bureau regards the TSA as an actively hostile power, and is zealous in following up leads on TSA activities.

Bureau 12's training center is on Earth, and all operatives receive the bulk of their training there. The Bureau's headquarters in space is at Haiyuan City, with branch offices in New Shanghai, Port Lowell, Deimos, and Phobos. Bureau 12's public reputation wavers between "slightly sinister" and "competent professionals." While the Bureau *has* arranged an assassination or two, the public *rumors* of such activities are probably false, spread by the TSA and other anti-China organizations.

PLAN-SF Deep Space Fleet

The People's Liberation Army Navy Space Force (PLAN-SF) Deep Space Fleet is a growing part of China's military presence in space. The fleet has been significantly enlarged after the Pacific War, as China was determined not to be caught again without a proper means of protecting its supply lines between Earth, Mars, and Mercury. Most of the fleet's activities involve observation, tracking, and shadowing of rival space forces. They also act as a "coast guard," moving against smuggler, Trojan Mafia, and Martian Triad activities. In time of war, they are expected to both attain space superiority around Mars and escort commercial vessels. If necessary, they are also tasked with reinforcing Mercury and patrolling China's asteroid belt stations. Deep Space Fleet vessels from Mars deployed to carry out the strikes against the Trojan Mafia in 2097.

The Deep Space Fleet calls Phobos home. As much as half of the Fleet's 30 SDVs can be near Mars at any given time, although it's more common for most to be in deep space. Vessels often visit Hesheng Station in the Belt (see p. TS41), and others deploy throughout the solar system. At Mars, the SDVs are backed up by three *Gang Lung*-class SCVs (p. 106), and a large number of AKVs, transatmospheric UCAVs, TACVs, and other vessels. Some of the smaller vessels are berthed inside Phobos.

Unlike most other space forces, the Deep Space Fleet is heir to a "wet navy" tradition, and uses naval ranks, symbols, and nomenclature ("spaceships," not "spacecraft"). The USAF, in particular, regards this as charmingly quaint.

Wen-Xuan Liang, The First Man on Mars 167 points

Age 103; 5'4", 140 lbs. A short and slightly plump Chinese man, gray-haired and somewhat wrinkled, but overall very well-preserved. He is a naturally born human with an Andraste biomod (p. 97). He's had the best possible treatment to reduce the effects of aging.

ST 9 [-10]; **DX** 10 [0]; **IQ** 14 [45]; **HT** 10 [0].
Speed 5; Move 5.
Dodge 5.

Advantages: Ally (Programmed; wearable virtual interface hosting LAI-6; 60 points; 15 or less) [12]; Andraste biomod (p. 97) [14]; Composed [5]; Intuition [15]; Luck [15]; Patron (Chinese government; 9 or less) [30]; Reputation +4 (As cultural hero; among all Chinese) [10]; Reputation +2 (As First Man on Mars; to rest of humanity) [5]; Wealthy [20].

Disadvantages: Acceleration Weakness [-5]; Sense of Duty (To Chinese) [-10]; Truthfulness [-5].

Quirks: Pretends not to hear questions he'd rather not answer truthfully; Proud. [-2]

Skills: Acting-13 [1]; Area Knowledge (Mars)-15 [2]; Astrogation-12* [1/2]; Astronomy-14 [4]; Bard-14 [2]; Computer Operation-13 [1/2]; Diplomacy-13 [2]; Free Fall-8* [1/2]; Geology (Areology)-11/17 [1]; Leadership-14 [2]; Performance-13 [1]; Physics-13 [2]; Planetology (Earth-like)-13/19 [2]; Research-13 [1]; Savoir-Faire-14 [1]; Survival (Desert)-12 [1/2]; Teaching-14 [2]; Writing-14 [2].

* Liang's Astrogation and Free-Fall skills are slightly out-of-date; apply the penalties from p. B185 as for one TL of difference.

Languages: English-13 [1]; Mandarin (native)-14 [0].

Wen-Xuan Liang, the first human to set foot on Mars, is still alive and reasonably well in 2100. He has started having problems with acceleration, and no longer visits Earth. His current career is as a celebrity and science popularizer in the tradition of Carl Sagan.

Born on Earth in the closing years of the 20th century, Liang belonged to a happy, upper-middle-class Chinese family outside Shanghai. His academic career was nearly flawless, and he initially went into particle physics, but found it dull and stultifying. He made the transition to astronaut training successfully, and quickly became one of China's best and brightest. He was not the most brilliant or skilled astronaut, but as a leader he excelled. His appointment as leader of the *Chaosheng* mission involved very little politicking on his part; he was simply the best man for the job.

After the landing he acted as assistant leader of the colony for nearly two decades, before taking a trip back to Earth to visit family and do a worldwide public appearances tour. He found Earth crowded and heavy, and returned to his new home the next year. The Chinese government asked him to use his celebrity to help China's reputation and promote interest in the sciences. For the past several decades he's been doing so, writing popular science texts on Mars, terraforming, and other issues, giving speeches, teaching occasional classes at U. Mars, officiating at ribbon-cutting ceremonies, etc.

In person, Liang is a quiet presence – until (and if) he decides to orate, when he is spellbinding. His stories of the early years on Mars are a perennial crowd-pleaser, but he can be just as fascinating discussing planetary formation. He enjoys his reputation, and takes advantage of it in small ways (such as getting good tables in restaurants). The Chinese government takes good care of him medically, and his assorted careers pay very well. He is no longer embarrassed by his "first words" gaffe.

Phobos HQ

The headquarters of PLAN-SF Deep Space Fleet is on Phobos, in Hall Crater at the moon's South Pole. The center of the crater is the landing field for spaceships; the field is surrounded by maintenance facilities, which in turn are surrounded by centrifuge tracks that follow the crater's rim. To prevent physical deterioration in the absence of gravity, the living quarters, commissaries, gymnasiums, etc. are in large track habitat "train cars" that circle the crater every 2 minutes, producing 1 Martian gravity inside. (Thanks to the so-called calcium hack possessed by many bioroids and nanomod-equipped humans (see the *No Degeneration in Zero-G* advantage, p. TS132), the centrifuge is there to prevent muscle deterioration, not bone calcium loss.) Going from the stationary parts of the facility to the centrifuge is handled via small "elevators" that pick people up from airlocks in the fixed buildings and accelerate around smaller tracks until they meet the moving structures. In the event of an actual conflict near Phobos, the centrifuge would be spun down and locked.

A Fractured Colony

On Earth, discontent has murmured in China for centuries. One of the oldest nations extant, it has never had a truly democratic government at the national level. In an age of free information, everyone in China knows that there are alternatives to the Chinese way of life. The merchants want unfettered capitalism. The weak want democracy. The powerful want things just the way they are.

As the 21st century draws to a close, these schisms have been transported to Mars. The average Chinese immigrant was promised new opportunities on Mars. Some feel they haven't received them. Certainly, this far from Beijing, local government is the rule, and it often proceeds in a remarkably democratic form. The need for incentives drives the mix of communism and capitalism that thrives on Mars. Nevertheless, some want more.

The New China movement (p. 55) is just part of this. Though actual political parties (apart from the Communist Party itself) are rare, philosophical movements in Rust China can have the strength and organization of any American party, with meetings, conventions, and influence at every level. Their true intentions are usually cloaked, and these thin veils are enough to keep the government from cracking down on them. The Rust China colony is orders of magnitude more likely to see a shift in its government than any similar region in China proper.

This is complicated by the diverse – some would say schizophrenic – methods the Colonial Directive has used for choosing colonists over the decades. The initial colonists were multitalented scientists and engineers; not transhumans, but the best of the best. After Guxiang was well-established, the next wave were still competent individuals, but they were closer to being ordinary people – no longer paragons, merely hard workers. The Directive relaxed its screening, allowing other government agencies to recommend candidates, which were sometimes taken without question. Thus, some of these colonists were people unwanted on Earth; free-thinkers, radicals, Christians, Muslims, non-ethnic Chinese, "internationalists," and simple troublemakers. They were not the majority, but they were as troublesome to the authorities on Mars as they were on Earth.

Then, for a while, sending troublemakers to Mars was *de jure* policy. This spurred the creation of the Martian Triads, and was quickly stopped. It was followed by a return to tight screening, backed up by *building* ideal Martian colonists in the form of parahumans and bioroids. These designed Martians form a large portion of the population today.

The end result is something greatly unlike China on Earth, home to both China's best and worst, in forms unknown on the homeworld. Rust China is both a showcase of what China can accomplish, and a synthesis of the Dragon Empire's greatest troubles. Its future is unknown.

Mars Garrison, 67th Space Infantry Division

The People's Liberation Army has one brigade of the elite 67th Space Infantry Division (p. TS105) assigned to Mars. It is headquartered at Phobos, but at any given time, one of its three battalions may be deployed aboard SCVs, on maneuvers in the Martian desert, or practicing microgravity combat operations in orbit. The Mars Garrison undergoes special counter-terrorist training, and special Immediate Action Units are tasked with responding to attacks against the space elevator, spaceyards, solar mirrors, and other strategic sites.

The Mars Garrison also has a few more regular regiments, mostly mechanized infantry and armored cavalry (equipped with wheeled armored fighting vehicles), combat engineers, and air-assault units. PLA soldiers on Mars are a mix of humans and bioroids, but most officers are humans. Aside from the 67th, most units are under strength; full mobilization relies on a call up of Martian reservists.

Martian People's Armed Police

A paramilitary force about 2,000 strong and headquartered at New Shanghai, the Armed Police also have smaller garrisons throughout Rust China. They are under control of the Chief Administrator rather than the Martian Military District, but differ from regular police in having military-style uniforms and living in barracks. Most are Mars-grown combat bioroids, with Earthborn and Martian superior officers. It's fairly common for ex-PLAN-SF troops, human and bioroid, to find civilian Armed Police jobs after retiring; many Xieh (p. 84) gravitate to the force. Their missions are border security, counterterrorism, and assisting regular police in any especially dangerous tasks (such as a raid on a Martian Triad headquarters). In time of war they may be transferred to military control.

The force traces its origin to the first Chinese police officers sent to Mars during the initial Preservationist-Ares Conspiracy conflict, but was expanded significantly in the 2070s. Troopers are equipped with Mars rovers, light aircraft, and supporting patrol cybershells. They wear nanoweave body armor and carry assault pods, but lack heavy vehicular weapons. The force has a few elite squads that practice hostage-rescue and other demanding missions.

America/Mars

The United States of America came in second in the race to Mars, and is still second today. The Chinese committed themselves wholeheartedly while the United States hesitated, and the Chinese had a coherent plan when America fell back on political compromises. Today, China holds the Elevator, and gives favor to its people and cargo over anyone else's. It doesn't look like the United States can catch up, but it will continue to try.

The American colony on Mars is known formally as "The Martian Commonwealth," colloquially as America/Mars. It is a self-governing commonwealth, similar to the status Puerto Rico had at the beginning of the 21st century. Martian-Americans are U.S. citizens, but cannot vote in national elections and do not pay Federal income tax. On Earth, America/Mars has one nonvoting seat in the U.S. House of Representatives, also an elected position. This office is currently held by Republican Isaac Fremeen, who spends most of his time campaigning for statehood – as opposed to independence.

The current Governor of the Martian Commonwealth is Myrna Burton, a 40-year-old native Martian and Alpha upgrade. While a competent administrator, she is politically neutral on most major issues. Political theorists credit her election to her suitability as a "compromise" candidate between the independence-minded Mars Party (p. 56) and the loyalists.

Governor Myrna Burton — 197 points

Age 40; 5'8", 145 lbs. A dark-skinned woman with red-black hair worn long.

ST 10 [0]; **DX** 11 [0]; **IQ** 14 [45]; **HT** 12 [10].

Speed 5.75; Move 6.

Dodge 5.

Advantages: Administrative Rank 6 [30]; Ally (Programmed; implanted virtual interface hosting LAI-6; 45 points; 15 or less) [9]; Alpha Upgrade (p. TS115) [35]; Andraste biomod (p. 97) [14]; Reputation +1 (Competent administrator; all Martian-Americans) [5]; Status 6* [15]; Voice [10]; Wealthy [20].

* Includes two free levels from Administrative Rank and one from Wealthy.

Disadvantages: G-Intolerance (0.05 G increment) [-20]; Honesty [-10].

Quirks: Keeps herself tightly reined; Power-hungry; Proud. [-3]

Skills: Acting-14 [2]; Administration-15 [4]; Area Knowledge (America/Mars)-15 [2]; Computer Operation-15 [2]; Detect Lies-12 [1]; Diplomacy-17*† [4]; Economics-12 [1]; Falconry-13 [1]; Law-13 [2]; Literature-13 [2]; Memetics-12 [2]; Politics-18*† [4]; Psychology-14* [2]; Running-10 [2]; Savoir-Faire-19† [2].

* Includes +1 from Memetics skill.

† Includes +2 from Voice.

Languages: English (native)-14 [0]; Japanese-13 [1]; Mandarin-14 [2]; Spanish-13 [1].

Myrna Burton was born in Timbuktu in 2059. She was the fifth child in her family. Families that large are rare on Mars; her childhood was marked by intense sibling rivalry. These power struggles became habitual for her. As she grew up, she was a fixture in student government, first in the Timbuktu intermediate schools and then at U. Mars, where she was president of the student council her first two years. After that, she pursued local office, becoming a city selector at Nix Olympica while still in college. She got her degree in psychology in 2081 and left Nix Olympica shortly thereafter. As an independent city, it was too small for her ambition; she returned to America/Mars. She was a senator by 2088, Vice-Governor by 2094, and won the gubernatorial election in 2096. As of January 1, 2100, she is beginning to prepare for the 2100 election; there is some strong opposition, and she is being pressured to take a stance on the independence issue.

While power-hungry, she also works within the system. All her political maneuvering has been above-board; she has won her office through her good personal presence and voice, and by being as politically inoffensive and "vanilla" as possible. Personally, she is conflicted on the independence issue. Ruling a separate nation has its appeal; so does emigrating to Earth and getting elected there. Unfortunately, her one trip to Earth was a disaster. Her G-Intolerance is apparently psychological; doctors have been unable to find a physical cause. She simply hates non-Mars gravities and functions very poorly in them. She is thus considering coming out in favor of Martian independence – but not if it will cost her the 2100 election. In her deepest thoughts, she wants to control all of Mars, and occasionally considers engineering a reason to conquer Rust China and the other Martian powers. This is currently impossible, but she still dreams. Her other hobbies include 19th-century English literature and her pet Mars hawk, Baskerville.

The government of America/Mars is based on a traditional three-branch structure. The legislative branch is the Martian Senate, which is locally elected, with one senator for each 10,000 citizens. The executive branch is the Governor and her appointees; she is elected by the whole Commonwealth. She also appoints the judges of the judicial branch. The senate currently numbers 42, split roughly evenly between the Mars Party, Republicans, Democrats, and Libertarians. The latter three parties are all suffering from internal conflict; each is officially against independence, but afraid of losing members to the growing Mars Party. Any given session of the Senate is guaranteed to have at least one bill supporting independence, requesting statehood, demanding a vote in national elections, or otherwise impacting America/Mars' relation with the home country.

Bureau of Martian Affairs

BoMA is the United States' federal agency responsible for the well-being of the Martian colony and the flow of people and goods between America proper and Mars. It has offices in Washington, D.C., Robinson City, New Shanghai, and at the major spaceports on Earth. Applications for emigration in either direction go through BoMA, and are usually granted if the applicant has no criminal record.

Before the American Mars colony became a commonwealth in 2085, the Bureau was technically its governing body. Having an organization on Earth ruling people on Mars never worked terribly well, and most Martian BoMA personnel worked closely with the local administrators, who might have been scientists, military officers, or technicians in charge of the local life support plant. Sometimes the Bureau's representative exercised real authority, and sometimes they served as secretaries to the actual power.

After 2085, most BoMA personnel on Mars became redundant and were laid off. Some became part of the government, with essentially unchanged duties. Others went on to work in different fields. A few were resentful of the change in government; they are frequently involved in whatever political movement currently espouses strong control over the colony by Earth.

Those BoMA officials still on Mars are largely liaisons between the Commonwealth government and BoMA on Earth. Policy decisions by the local government trickle back to the Federal government through BoMA, and vetoes come back the same way. The nonliaison Bureau agents largely handle emigration and immigration.

Space Intelligence Agency

On Mars, the vast bulk of the Agency's activities are information-gathering. This includes intercepting and decoding transmissions and actual espionage in the classic mode. It also includes the young science of inferential memetics: determining what's going on in other organizations by observing the memescape surrounding them. (E.g., if Chinese aerospace manufacturers watch a lot of revival Westerns in their free time, it probably means that PLAN-SF is organizing a series of small-fleet missions.)

The SIA prefers to report to the Federal government, not the Commonwealth. Since the local government does in fact have authority over their activities within its borders, this causes frequent friction. Few SIA agents (less than 20%) are native Martians, but the slight stigma of being a "colonial" generally goes away after a few years in the agency.

Other Space Forces at Mars

The European Union often has an SDV or two near Mars, and it maintains a small ESCA base on Deimos, which is home to a few transatmospheric UCAVs and some TACVs. Other space forces have some smaller craft, which either use Deimos as a base or use the facilities of whichever major power they are allied with. The TSA has thus far not dared put an obvious warcraft near Mars, though some cargo craft are TSA-aligned, with concealed armaments.

United States Aerospace Force 91st Space Wing

The USAF has a powerful presence on Mars. It would be overkill for any other colony the size of America/Mars, but the USAF feels that they must match the local Chinese military. They haven't succeeded in this – the American colony is simply not big enough to support a military three times too large – but a fight between PLAN and the USAF would nevertheless be very close.

The 91st Space Wing is slightly smaller than the other three Wings (p. TS104). It has six SDVs, three SCVs, and numerous smaller craft. The 91st is based out of Mars Orbit Aerospace Force Base, colloquially known as "Blue Star." (Both Phobos and Deimos were deemed unsuitable for the base; Deimos sees too much civilian traffic, and Phobos obviously has the PLAN-SF facility.) Mars Orbit AFB orbits 60° ahead of Phobos in its orbit. It is currently crowded and only barely up to the task of supporting a Space Wing, but it has a great deal of funds earmarked for it, and rapid growth is expected in the years ahead.

The pilots of the 91st Space Wing are in the finest tradition of military aviators, which is to say brash, patriotic, arrogant, and skilled. Morale is generally high; with no serious hostilities, leave time is generous, and Mars is one of the nicest places outside Earth's orbit to take leave. The possibility of a Chinese threat is taken seriously, but with humor, and the American pilots respect them as good aviators . . . even if they *are* navy. The local commanding officer is Brigadier General Gendo Tobikuma, known for his strict sense of duty and keenly felt responsibility toward the men and women under him. His one weakness is an unfortunate fondness for pleasure bioroids. His leave time is occasionally marked by visits, in disguise, to a brothel in New Shanghai. Tobikuma is also Commander in Chief, U.S. Forces Mars (CINCUSFORMAR), managing U.S. Martian Command (MARSCOM), the Joint Forces Command that exerts operational control over the Aerospace, Army, and Navy forces on or near Mars.

The U.S. Army on Mars

The U.S. Army has a garrison of Rangers on Mars, stationed at Fort Meier just outside Red Lake. Currently, their lives are filled with training and adapting to the special conditions of Mars, though they have been called on twice to help deal with civil unrest. Normally, a local government has no authority over Army troops, but the Pentagon has allowed an exception for America/Mars, given the unusual circumstances. The Governor can call on the troops when necessary.

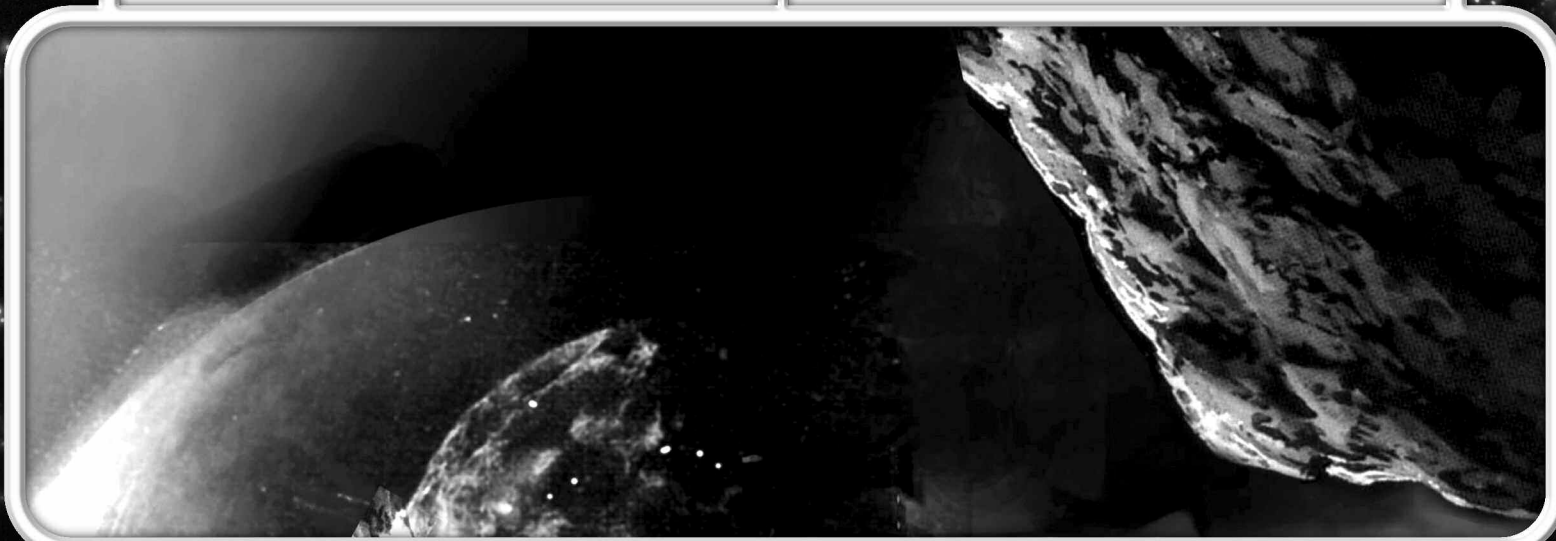
The Mars Rangers battalion (4th Battalion, 76th Ranger Regiment) was established in the early 2070s, and was initially made up entirely of troops imported from Earth. Doing a special ops tour of duty on Mars was, and is, very unpopular, not least because getting an Andraste biomod is pretty much required. Over the past few decades, more and more soldiers have been recruited locally, and today the battalion is about evenly split between Earthers and Martians. This is a frequent source of tension; the imported troops regard the locals as "colonials," and the natives think the "Earthlings" are arrogant and full of themselves. The nonnative soldiers do tend to be better trained, so they have some reason for pride.

In addition to the Rangers, various regular Army units rotate through duty on Mars; aside from a few Special Forces teams, these are mostly cybershell units, so Mars adaptation is not required. Depending on contingencies, there are usually a couple of U.S. Army battalions present, including a ready-reaction force from the 82nd Spaceborne (p. TS104) that is stationed in orbit at Blue Star.

The (Wet) Navy on Mars

From the moment flooding Marineris was proposed, the U.S. Navy wanted to have a presence on it, defending the American end from possible Chinese aggression. Interservice rivalry led to loud protests from the Aerospace Force, but Congress seemed pleased by the idea of having all the major branches of the U.S. military on Mars. The Aerospace Force sullenly delivered a few hundred Naval officers and sailors to Mars in 2078, along with a fair amount of equipment. The Navy's first small Martian ships floated out of the assembly docks in 2080, and the pride of the Martian Navy, the *USS Triton,* was launched in 2081. She is technically a border cutter, but she is by far the largest armed sea vessel on Mars.

Cooperation between the Aerospace Force and the Navy leaves something to be desired. In the event of actual hostilities, the Aerospace Force would likely leave the Navy out of its plans as much as possible. This may actually be wise; it's unclear if the *Triton* and her daughter ships would actually be of any help in a true shooting war. However, they perform their current mission of keeping the peace against terrorists and pirates on the high sea quite well.



The Millionaires of Mars

Much of Mars is unpoliced and open. There are millions of square miles of terrain where no one lives. If you have the desire and funds to *really* get away from it all, Mars can be very inviting.

About a dozen very wealthy individuals have left Earth and set up private estates in the Martian wilderness. The poorest of them is a billionaire many times over – the phrase "Millionaires of Mars" has only caught on thanks to its alliteration. They are mostly misanthropes and extreme eccentrics, though a few of them merely value their privacy very highly. Other wealthy hermits choose deep space; the ones who come to Mars prefer to live in some kind of natural biosphere. Mars also gives some of them a disproportionate sense of power; there is still a society surrounding them on which they can exert pressure through money, and on Mars a billion dollars buys a lot more influence than on Earth. Culturally, about a third of the millionaires are Arabic, and another third are American.

Their individual estates vary from a simple one-woman home on the peak of Albor Tholus to thousands of acres of carefully landscaped terrain north of Syrtis Major, maintained by hundreds of servants. At all scales, the level of eccentricity can be extreme: one lives in a semi-sentient, fully organic structure based on his dead wife, another only hires servants who agree to have their ability to hear surgically removed for the duration of their employment.

The most public of the millionaires' eccentricities, however, are the supertank duels. Driving exotic manned vehicles, some the size of factories, a half-dozen of the richest people on Mars meet twice annually to fight. There are a few limitations: no nuclear weapons, no robot vehicles, the tanks must not fly – and no sensors. Detection must be by the unaided senses of the driver. Given that all of the millionaires are transhumans to one extent or another, they may have very impressive senses indeed, but this is regarded as only fair.

Victory usually goes to the first tank to immobilize its opponent, but among the participants, style is considered more important than brute force. A new and unique mode of attack wins admiration from one's peers; if it works, so much the better.

The millionaires do not permit people anywhere near their duels, for obvious reasons. Two of the current participants don't allow their duels to be recorded at all, but the rest don't care. Recording uses remote-control cameras, and is not broadcast live (to prevent the temptation to cheat by tuning in to the channel showing your opponent's location).

Japan on Mars

Japan's scientific teams were among the earliest missions to Mars, with their first landing in 2035. Unfortunately, Japanese scientists were part of the core of the Ares Conspiracy, and the arguable leader (Fujihiko Kaneda) was a Japanese scientist. When the Conspiracy was unmasked in the early 2040s, Japan took a lot of the blame. This was hardly just – most of the conspirators were American – but the result was that Japanese colonies were not welcome near the habitats of other nations.

Japan neatly sidestepped this unwarranted suspicion by establishing *national* colonies rather than *corporate* ones. Through the 2040s and 2050s, a new Martian economy was coming into being, and the need for corporate cornerstones was obvious. Japan filled that gap by dropping branches of its biggest and most efficient *zaibatsu* almost literally directly from orbit, intact and ready to build. See p. 54.

By the 2090s, animosity toward the Japanese had dwindled, and new colonists built Japanese habitats all along Marineris and elsewhere. Even so, they are still the minority; the average Japanese citizen on Mars is likely to self-identify as a citizen of his corporation before Japan.

The European Union on Mars

The E.U. has tens of thousands of people on Mars, but their presence is very diffuse. Very few habitats over 1,000 people are all-European – and very few over 10,000 have *no* Europeans. Since their numbers are so small, the American and Chinese colonies welcome them with minimal coaxing, and the E.U. is *willing* to coax, rather than spend the money to create an independent colony. Incentives are usually in the form of needed talents and skills; if a Chinese habitat has no doctor, the E.U. offers to send over a dozen Danes, including a general practitioner, a surgeon, and their families. If a new American colony has a shortage of technical staff, some talented German engineers are available – if they'll take a score of average German citizens too. The Union, of course, provides incentives to the professionals in question, usually in the form of paying their travel expenses and providing low-interest loans to help them get settled.

As a result of this program, Europeans dot the Martian population like spice in a stew. They are most common in Port Lowell (p. 23), where the official Union embassy is located, but they are nigh-ubiquitous.

Duel

"I, personally, have always rooted for Gemma Editas, but this duel she hadn't shown her face yet. Haroun had been criss-crossing the desert in his latest creation – the one with the spinally mounted plasma punch – and found nada.

"Then he crosses one of the softer areas, where the bedrock is hundreds of meters down. There's a huge churning in the sand to his right; he couldn't hear it over his own motors, and I guess he didn't look in the right direction in time. A huge metallic snake lunges up out of the sand. It's got tank treads on every side and a giant bore up front.

"Haroun finally sees it, just before it hits him, but he turns too late. The snake burrows under his tank, flips him on his back, and rips off its treads. End of file.

"Haroun was delighted. He thought it was brilliant. He and Gemma ended up trading vehicles, but I hear she just stripped his down for parts."

– Sabino Aznar, Senior AI Tech for Mars Development Corporation

Saudi Arabia on Mars

Saudis make up only a small fraction of the Martian population by headcount, but a very large percentage by wealth. With the Middle East on Earth still troubled, and with the ever-increasing power of the weaponry available to the combatants there, a number of billionaires have chosen to relocate. Several hundred, along with their families and employees, have ended up on Mars.

Many of the Saudi immigrants are very similar to other Martians of similar wealth; they live in or near the cities, administer their holdings, and lead otherwise-unremarkable lives. Others are part of the eccentric group referred to as the Millionaires of Mars (see p. 47). A number, however, have chosen to return to a classical lifestyle and become nomads. The Martian deserts are well-suited to this traditional form of life, with vast stretches of sand separating cities. The caravans typically are made up of mobile habitats (such as the one on p. 102), of varying levels of opulence. Those nomads who consider themselves traveling merchants will have a few cargo vehicles in the caravan, and may well have Truckers (p. 83) more-or-less permanently attached to the cavalcade. Since the habitats they visit almost always have "normal" channels for receiving goods, Saudi nomadic merchants tend to concentrate on hard-to-find luxuries like real silk and chocolate.

However, most of the Saudi nomads simply travel for the joy of traveling, and may avoid civilization altogether. These fantastically rich men and women are exploring their world and the culture of their ancestors, in comfort and in constant motion.

Peru on Mars

In the years between 2040 and 2075, a coalition of South American governments made an intensive effort to colonize the land around Elysium. Many of the settlers were from Peru; descendants of Andes-dwelling tribes are genetically adapted to low air pressures, and theory said it would be relatively cheap to engineer their children to tolerate the air of a partly terraformed Mars.

In 2074, Peru joined the TSA, and the South American coalition dissolved. The Peruvian colonists on Mars claimed not to be interested in the politics dividing the TSA from its neighbors, but the other Martian powers – particularly China – do not wholly trust this detachment. During the Pacific War, the colony explicitly declared itself uninvolved, and no TSA actions against the Chinese colony were provably committed by Martian Peruvians.

In the following years Peru continued to send immigrants to Mars, and their colony has prospered. The other South American nations have not followed through with such vigor, and people often lump non-Peruvian South American colonists in with those from Peru, much to their dismay and the Peruvians' amusement.

The Peruvians on Mars are quite vocal. Despite being only a single-digit percentage of the Martian population, Peruvians and their Martian children dominate, through sheer strength of character, not only the area around Elysium, but also much of the popular culture of Mars, and they are always a noticeable presence at pan-Mars political and scientific gatherings.

Their obvious effects on culture are in the form of popular entertainment. Several Web dramas revolve around the Incas or colonial-era Peruvian heroes, and the virtual recreation of Machu Picchu (hosted in Stygis Ciudad, in Elysium) is the single most popular virtual world on Mars. At political conferences, the Peruvians always try to act as peacemakers, and some credit them with keeping the Martian situation as stable as it is. Their presence in the scientific community is centered around one woman, Margarita Rio (p. 49).

Despite all this, the Rust Chinese government does not trust them, and the SIA office in America/ Mars is dubious. Many suspect that the Peruvians are an entire colony of "deep cover" TSA operatives, waiting for the chance to seize control of Mars. In the meantime, the paranoid blame any otherwise-inexplicable sabotage attempt on the Peruvians' hidden dark side.

The TSA on Mars

Allegations about Peru aside, the TSA has no official presence on Mars. Instead, the TSA military/espionage community has several hundred infiltrators on Mars, attempting to harm Rust China and, by extension, China proper. Their current plan is to sever the connection between China and Rust China by encouraging the various independence movements. In particular, New China (p. 55) gets a great deal of funding and equipment from TSA operatives. Other Free Mars groups vary in the amount of TSA support they will (knowingly) accept. The TSA also tries to harm international relations on Mars and destroy Chinese infrastructure, and would like to bring down the Elevator. Along with the Trojan Mafia, they are partly responsible for Negative Growth's nearly-successful attempt to cut the cable in 2094.

Bureau 12 (p. 41) finds and neutralizes (one way or another) one or two TSA agents every month; new operatives rarely dare to come down the Elevator, and instead go through Phobos Port and fly down to spaceports in non-Chinese territory. The other Martian governments are not kindly disposed toward the TSA, but are not as fanatical as China. Known TSA spies will be deported from America/Mars, but not shot.

The Revised Outer Space Treaty and Mars

The ROST shapes humanity's presence on Mars. Many say it warps it, but most agree that it is a necessary brake on the exploitation of the red planet.

The ROST limits countries from claiming absolute ownership of real estate on Mars, but functional sovereignty is achieved through the system of "Common Courtesy" zones (p. 30). The ROST also prohibits weapons of mass destruction in space. In a strictly technical sense, this is adhered to. The assorted orbital strike platforms orbiting Mars (p. 29) are precision weapons, arguably defensive in nature. The fact that the huge solar mirrors (p. 29) heating Mars could melt a city if their beams were concentrated is politely ignored.

Most of the other provisions of ROST relevant to Mars merely state that things like terraforming and asteroid redirection require regulation and international consensus. In 2100, consensus to use KBOs to terraform the planet is not hard to come by, though many extremists continue to object to the greening of Mars.

Professor Margarita Rio
168 points

Age 27; 5'11", 160 lbs. A tall black-haired woman with significant Incan genetic heritage.

ST 10 [0]; **DX** 11 [0]; **IQ** 15 [45]; **HT** 11 [0].

Speed 5.5, Move 5.

Dodge 5, Parry 6 (Karate).

Advantages: Ally (Programmed; implanted virtual interface hosting LAI-6; 60 points; 15 or less) [12]; Andraste biomod (p. 97) [14]; Mathematical Ability [10]; Reputation +2 (As colorful scientist; all Martians; 10 or less) [5]; Ziusudra Parahuman (p. TS118) [75].

Disadvantages: Combat Paralysis [-15]; Extremely Curious [-10].

Quirks: Believes in "Truth"; Dreads getting old, no matter how far away that time is. [-2]

Skills: Area Knowledge (Mars)-15 [1]; Astronomy-13 [1]; Bard-14 [1]; Carousing-10 [1]; Chemistry-13 [1]; Computer Operation-14 [1/2]; Dancing-11 [2]; Detect Lies-12 [1/2]; Diplomacy-14* [1]; Ecology-13 [1]; First Aid-14 [1/2]; Free-Fall-12 [4]; Genetics (Genetic Engineering)-12 [1]; Geology-13 [1]; Karate-9 [1]; Literature-13 [1]; Mathematics-16** [1]; Memetics-13 [2]; Nuclear Physics-13 [2]; Physics-15 [4]; Planetology (Earth-like)-13/19 [1]; Psychology-14* [1]; Research-14 [1]; Sculpting-10 [1]; Vacc Suit-13 [1/2]; Writing-14 [1].

* Includes +1 from Memetics skill.

** Includes +3 from Mathematical Ability.

Languages: English-13 [1/2]; Mandarin-13 [1/2]; Spanish (native)-15 [0].

Margarita Rio was one of the first Ziusudra parahumans, created specifically to be a member of an early Peruvian Mars colony. She studied at U. Mars, and was one of the shining stars of the class of 2089. Since then her career has been meteoric. Professor Rio is a groundbreaking physicist, with side interests in every field of science. She is also an extremely colorful character, often compared to 20th-century scientist Richard Feynman. Rio's nonscientific interests include dancing, karate, sculpture, and (clandestinely) writing torrid fantasies set on an alternate Mars. On the most important scientific issue of the day – terraforming – Rio is cautious but technically green. She is in favor of altering worlds, but always recommends the slower processes. She is greatly disturbed by the situation on Europa, and is thinking of publicly endorsing the Europa Defense Force (p. TS106). She is completely unaware of her Combat Paralysis disadvantage.

The International Mars Treaty

The IMT was signed in early 2032 by the governments of every nation with a Mars presence, including China, the United States, and Russia. It was mostly a restatement of ROST as it applied to Mars, with additional restrictions dealing with exploitation of the planet and terraforming. Specifically, it stated that the resources of Mars would only be used "to support peaceful and scientific exploration of Mars," and that any terraforming efforts would be "slow and steady." Hitting Mars with icy asteroids was specifically prohibited, as was any terraforming technique likely to radically change the atmosphere in less than a century.

By the late 2050s the Ares Plague had rendered most of the IMT moot. In 2100, it is a dead document, and none of the signatory nations abide by it.

Corporations

For hundreds of years corporate entities have been growing in power. As of 2100, the nation-states of the System are still the primary powers in the realm of physical territory . . . but they are gradually, invisibly, losing the war for economic control. The corporations below are all enormously powerful organizations, whose day-to-day business shapes the future of Mars.

Society Control Ratings

Rust China is CR 4; the government maintains a great deal of control over its citizens. Most weapons are not permitted, and the few that *are* must be licensed. Broadcasts and websites inside Rust China are regulated, though it is impossible to stop access to information from outside. Because of the recent Negative Growth attack, Deimos has heavy security, and is CR 6. Phobos is CR 4.

America/Mars is CR 3; laws are strict where the safety of the community is an issue, lax elsewhere. There is freedom of speech, and ownership of many weapons is permitted – though licensing is required, and they usually can't be carried inside cities.

The remainder of Mars varies from CR 1 to 4, with 3 being the norm. Port Lowell has whatever CR the neighborhood security agency is choosing to enforce (typically 4). Nix Olympica is deliberately CR 2. Isolated parts of the wilderness could be regarded as CR 0 . . . but even crimes out there will have legal consequences eventually.

Note that, regardless of CR, taxes on Mars tend to be high. See *Terraforming Taxes,* p. 52.

The Martian Economy

Ever since the first Martian probes were launched, Mars has been a money sink. Terraforming a world, and building a civilization virtually from scratch, is terribly expensive. As of 2100, Mars' economy is still running at a loss, but only slightly. The chief physical exports are food, deuterium, and some metals. Because Mars still imports more from Earth than it exports, the cost of shipping things back to Earth is quite low, since the spacecraft owners don't want to go back with their holds empty. (Reduce the prices listed under *Space Freight* on p. TS172 by 10% to 50% for the Mars-to-Earth run.) Some end up carrying "genuine Martian handicrafts" and even Martian *rocks,* for collectors. Anything worth marginally more than the cost of the fuel necessary to move it is profitable.

Easily matching the physical exports are the intellectual ones. The greatest experts on terraforming in the entire System are on Mars, and they're actively engaged in the application of their craft. New breakthroughs in all of the dozen sciences associated with terraforming (see p. 91) are routine, and this new know-how is *valuable* elsewhere in the System. At the human level, this consists of things like Martian terraformers taking huge-paying jobs elsewhere, and returning to spend their money on Mars. Martians hold thousands of patents on terraforming machines and processes. Similarly, but to a lesser extent, Mars is a hotbed of biotech advances (see *Biotech on Mars,* p. 60).

Last, Mars offers something *spiritual* to humanity – a frontier. As a place physically distant from the center of power, full of wilderness to explore and tame, it allows for the expansionist drive inherent in the human spirit (and human genetics!) to be expressed. It's true that in 2100 the entire solar system is a frontier, but Mars is close to Earth, and reasonably "friendly." When people think of leaving Earth to make their own way on another world, it's usually Mars they think of. It's difficult to assess spiritual value in economic terms, but it's part of every sale of a Martian guidebook back on Earth, of the popular entertainment recorded on Mars, and of those people who decide to pack up and come to Mars in exchange for nothing but an opportunity.

The Triangle Trade

Wealth flows around the System in a variety of forms and directions, but certain currents are larger than others. The Triangle Trade is one of the most important. Similar to the molasses-rum-slaves triangle of the 17th- and 18th-century Atlantic Ocean, the modern triangle is a route covered by trading spacecraft in which they pick up different cargo at each point.

The first leg is high-tech goods, carried from Earth to Mars. The goods are sold on Mars and replaced with food. The next leg of the journey can have many destinations, but one of the most popular is Mercury. After delivering the food to Mercury, the spacecraft load up with valuable metals, isotopes, or antimatter containers and carry them back to Earth.

The second leg of this triangle can be replaced by journeys to Venus or the Belt, but those locations don't have much that is needed on Earth, making the third leg less profitable. Luna is also a possible destination, but Luna gets most of its goods from Earth. This, however, is changing. Thanks to the Elevator, the cost of shipping goods from Mars to anywhere in the System is lower than it is for Earth – even for destinations close to Earth, such as Luna. While any given product is probably cheaper in itself if Earth-made, the difference in shipping cost has led to Mars' capturing an ever-increasing share of interplanetary trade. Compared to Earth's exports, Mars is still a single-digit percentage, but the flow of goods and food up the Elevator is rising rapidly. A side-effect of this is that the chief Martian exporters are very concerned about the plans to build an elevator for Earth. They'd like to see Mars hold on to its advantage as long as possible.

Xiao Chu Corporation

This Chinese company specializes in microbots (its name means "taming power of the small" in the I Ching), bioroids, and space systems, including megaengineering. It was the primary company involved in building the Elevator, and today manages and maintains the Elevator, Deimos, and much of New Shanghai. Elsewhere in the system, it developed Hesheng Station in the Belt to explore the potential of nanotech, and controls several spaceports on and near Earth. It recently established a base on Titan.

As a Chinese corporation, Xiao Chu technically does not own most of the physical property it is associated with. It is instead managing it "for the people." This is mostly fiction; the company's influence within the Colonial Directive (and the Chinese government on Earth) is immense. There is virtually no possibility that (for example) the government would reassign care of the Elevator to another company – and if it tried, the following economic chaos would cripple the colony. The government may reassign control of *small* portions of the Xiao Chu empire (e.g., a single factory), but this is usually with the company's prior consent.

Xiao Chu is run by a largely anonymous board of directors; the company does not believe in cults of personality, and few people outside the upper levels of management can even name a member of the board. The directors all have a Chinese background, though they are a mixed lot of humans, upgrades, parahumans, and a sapient AI. They are a secretive group, both by corporate policy and personal inclination. In personality, they range from megalomaniacs to selfless supporters of humanity's destiny, but none of them are stupid or naive.

Xiao Chu employs large numbers of bioroids, both indentured and free. The company treats most forms of sapience equally (as shown by the AI on the board of directors), and the artificial humans in its employ are very loyal in return. Like most Chinese employers, Xiao Chu attempts to be the center of its employees' universe, providing health care, company housing and stores, and social events. However, the company is too large to have a strong corporate culture, and its infrastructure on Mars is too thin to succeed in all these goals. Most employees have significant social ties outside the company.

The Xiao Chu corporate HQ is in Dome One of New Shanghai; it also owns property in the other domes, and is backing construction of Dome Seven. Its corporate logo is an atom symbol with the xiao chu hexagram as the nucleus.

Naming Things

Even with the guidelines on names (p. 136), naming Chinese habitats and organizations can be difficult for the typical ***GURPS*** GM. An English-Chinese dictionary is an obvious place to start; pick a word that describes a key trait of the city or corporation you're creating, then find the translation. Another technique is to look at a map of China and take the name of a minor city; *most* habitats on Mars are named either for a city on Earth or for a local terrain feature.

When naming corporations, it's also legitimate to use the English translation instead of the original Chinese. Since the Revolution, the names of Chinese industries tend to be either bland ("New Shanghai Defense Industries") or patriotic ("Great Wall Industrial Group"). Frequently, a series of factories will be distinguished by number ("Haiyuan Electrical Facility #3"). It's very rare for a corporation to be named for a person.

Mars Academy of Space Technology

MAST, based on Phobos, is a major research-and-development firm for Chinese spacecraft and fusion drives. It is run as a corporation, and shares a very close relationship with Xiao Chu, but in truth is more a government agency than a corporation or an academy. Many recent breakthroughs in interplanetary travel were made here, and the best piloting software in the System comes out of its virtual labs.

Mars Interplanetary

This large shipping carrier is partially owned by Xiao Chu. It does most of its business on the Triangle Trade route (p. 51). From its founding in 2070 through 2079, MIp was one of the largest employers of human space crew. However, recent shakeouts in the industry led to massive layoffs. Many remaining cargo flights switched to minimum-fuel, long-travel time courses, crewed by bioroids who could better deal with these journeys.

In addition to being the biggest player in importing and exporting goods from Mars, MIp's mammoth colonial transports brought many Martians to their new home. It enjoys a reputation as the connection between Mars and the rest of the System, particularly Earth. Its angry human ex-employees have tarnished this image somewhat (painting it as a corporation interested in nothing but the bottom line), but it still enjoys a fair amount of goodwill.

The company has major offices on Deimos, Phobos, and in the Belt. Its symbol is a triangle with red and blue circles at two corners, and a set of gray dots at the third.

Triplanetary Lines

This System-wide carrier employs members of the Farhauler's Guild almost exclusively. It is thus Mars Interplanetary's chief rival, economically and emotionally. Triplanetary is largely a cargo concern, but also handles passengers on the lucrative Earth-Mars run and elsewhere. It offers scheduled freight service to those worlds, Luna, Jupiter, and Saturn, and charter service anywhere in the System. Its HQ is on Deimos; its logo is a silver comet approaching Earth.

Triplanetary is having trouble competing with entrenched powers like MIp. It advertises heavily in an attempt to gain business and mindshare, and its public relations and marketing departments try to stay at the cutting edge of meme theory. The company is currently running slightly in the red, and there are rumors that it has received loans from the Martian Triads in exchange for unquestioned use of excess cargo space.

Mars Development Corporation

This U.S. company is the chief mover behind the American colonies on Mars. Since the 2050s it has been building infrastructure, transporting colonists, and instigating terraforming, with the hopes of reaping the profits once Mars becomes economically viable. In the mid-2090s, the MDC began operating in the black, and today its stockholders are on the verge of coming into enormous wealth.

MDC was founded by former employees of NASA and various aerospace concerns in 2053. Its goal was to work in tandem with the U.S. government to exploit the potential of the Martian colonies. Initially, the company was a money sink, spending billions of dollars a year with no sign of profit for decades to come. Vast government subsidies, and funds from stockholders with faith in the future of Mars, kept MDC going as it built cities, recruited colonists, and otherwise manufactured a colony on Mars. In the past two decades, it has diversified enormously, and now has a hand in most aspects of every Martian's life, including transportation, communication, agribusiness, and construction. An entire city on the north shore of Marineris, Port Lowell (p. 23), is a creation of the MDC. While still a predominantly American corporation, the MDC has been becoming more international for many years.

Mars Development Corporation does not try to be all things to its employees. While its salary and benefits are good, it is notorious for laying workers off the instant they are no longer needed, and internal promotion is slow. MDC headhunters routinely lure management away from its competitors, and common wisdom says that it's easier to advance in MDC if you quit and get a management position in another company, as you will probably be scouted and hired back.

The company's headquarters is in Washington, D.C. It has several other offices on Earth, and at New Shanghai, Port Lowell, and every major American habitat. The corporate symbol is three concentric circles: the innermost is red, the middle is green, and the outer is white.

Terraforming Taxes

Changing a planet is very expensive. Every organization that is working toward a greener Mars – including nations, larger corporations, and independent entities like Nix Olympica – assesses a terraforming tax, in one form or another. Depending on the situation, this tax can be quite high. The United States and China take about 10% of someone's income (with deductions if the taxpayer is personally involved in the terraforming process). At Nix Olympica, it's closer to 25%, as the domed city is on the edge of the Martian biosphere, and improving the conditions around it is correspondingly expensive. Note that these taxes are in addition to the "normal" taxes levied.

Deimos Dog

108 points

Age 32; 6'3", 180 lbs. A tall, slightly androgynous fair-skinned woman with platinum blond hair cut very short.

ST 9 [0]; **DX** 12 [10]; **IQ** 13 [30]; **HT** 11 [0].

Speed 5.75; Move 6.

Dodge 5; Parry 8 (Brawling).

Advantages: Andraste biomod (p. 97) [14]; Common Sense [10]; Ishtar Upgrade (p. TS116) [25]; Reputation +1 (As someone willing to speak unpopular truths; among readers of the quasi-radical press; 10 or less) [1]; Strong Will +1 [4].

Disadvantages: Jealousy [0]; Reputation -2 (As someone willing to speak unpopular truths; among officials at various corporations and governments; 10 or less) [-1]; Sense of Duty (To those being exploited by large organizations) [-10].

Quirks: Can't sing, but thinks she can; Laughter sounds like barking (hence her handle); Never pays money for passage anywhere – only exchanges favors or barters; Only wears black and white. [-4]

Skills: Acting-12 [1]; Area Knowledge (Mars)-13 [1]; Bard-14* [1]; Bartender-12 [1]; Brawling-12 [1]; Breath Control-9 [1/2]; Carousing-11 [2]; Computer Operation-13 [1]; Conspiracy Theory-10 [1]; Dancing-11 [1]; Detect Lies-13 [4]; Fast-Talk-13 [2]; First Aid-12 [1/2]; Free Fall-13 [4]; Holdout-11 [1/2]; Philosophy-11 [1]; Research-12 [1]; Running-10 [2]; Scrounging-13 [1]; Streetwise-13 [2]; Survival (Desert)-12 [1]; Survival (Habitat)-13 [2]; Vacc Suit-11 [1/2]; Writing-14 [4].

* Includes +2 from Voice.

Languages: Arabic-11 [1/2]; Mandarin-12 [1]; English-12 [1]; German (native)-13 [0]; Spanish-11 [1/2].

Note: Her computer of choice is a wearable virtual interface hosting a NAI-4, but she loses them too often to take them as Ally (Programmed).

Deimos Dog was born (under a different name) in a colony orbiting Luna, to corporate wage-slave parents who she rarely saw. She came to resent the company where her parents worked for taking them away from her. A rebellious teen, she moved far from home for college, attending U. Mars (p. 20) and pursuing a genetics major. Initially, her grades were impressive, but they steadily declined as she became more and more political. She began to write for the U. Mars newsweb, and her pieces were known for their passion and sniper-like accuracy. She made it to graduation (in the bottom quarter of her class), and promptly decided to throw away her degree and write full-time. She adopted the handle "Deimos Dog," and began a career as a left-wing, anti-corporate, anti-government troublemaker.

In the past years she's made a small name for herself as a quasi-journalist and occasional author of satirical fiction. (She also supplements her income by working as a bartender, a job she truly enjoys.) She spends almost all her time on Deimos or Mars, and goes up or down the Elevator at least once a month. Deimos likes to live life to the fullest, and when not writing she likes to drink, dance, and sing, preferably in large crowds that are doing the same. She goes by a number of aliases, all with "D.D." initials, though her Deimos Dog identity isn't much of a secret. She is known for her scathing postings to the MarsWeb cultural forums. She hasn't really made any enemies yet, but it's only a matter of time before she annoys some high-ranking corporate stooge who tries to have her taken out.

Colonial Genetics

CG is one of the largest gengineering corporations in the System, specializing in pantropic enhancements. Their investment in Mars is as much economic as spiritual. If Mars continues to be a successful cradle of transevolution, the company's future as catalyst for humanity's conquest of the solar system is assured.

Colonial Genetics attempts to foster an image as both family doctor and spiritual counselor; its employees are encouraged to build long-term relationships with anyone who comes to CG, whether to have their children genefixed or for a biomod. Someone who has had work done by CG can expect occasional check-up calls, to make sure that everything is working properly and to be invited to CG-sponsored social gatherings. They also have the option of receiving CG's monthly magazine, *GeneTalk,* which discusses the latest in biotechnology (in nontechnical language), reports on newsworthy CG customers, and gives simple medical advice.

Management at Colonial Genetics knows that it is difficult to be nice to customers if you hate your boss, so internal relations are also friendly and low-stress by policy. CG has a very low turnover rate in its employee pool, and nearly 55% of its employees have been working there continuously since college (or even before). The company offers scholarships to potential geneticists, housing and continuing education to its employees, and (of course) its medical benefits are second to none.

Colonial Genetics has close relations with the Mars Development Corporation. The company is headquartered outside Boston. It has branch offices across Earth and Mars. Its symbol is the silhouette of a transhuman with an obvious tail and a shovel across his shoulders.

ShonTec/Mars

ShonTec is the division of CG specializing in biomods. The Mars office of ShonTec is in Port Lowell, and is *slightly* less above-board and friendly than CG as a whole. The chief of staff at ShonTec/Mars, Bhaskar Yamuna, is greedy and short on ethics. As a result, ShonTec/Mars personnel are a tad less personable, and quite a bit more likely to perform procedures that are medically questionable.

MarsWeb

Like the Web of Earth, the Martian information network is an enormous repository of information, a global communications network that embodies numerous virtual realities. Speed-of-light limitations, and the bandwidth restrictions imposed by tens of millions of miles of interplanetary space, mean that the Web of Mars is a separate entity from the Web of Earth. This can come as a shock to newcomers, who suddenly find themselves cut off from instant access to data, communities, and artificial worlds they have been interacting with their whole lives. Important EarthWeb information is often also available on MarsWeb, updated hourly, daily, or less frequently. However, MarsWeb is inevitably smaller than the homeworld's Web; it holds approximately 1% of the raw data, and the communities (reflecting the population differences) are less than 1/1,000 as rich and diverse. Few people who can emotionally deal with being removed from EarthWeb come to Mars in the first place, but every day sees someone going up the Elevator who is desperately homesick for the electronic culture of Earth. Among Martians, MarsWeb is known simply as "the Web," and use of the full term marks one instantly as a newcomer.

System Technologies AG

This vast transnational has many interests (p. TS96), and is firmly entrenched in Martian society. Its chief interest in Mars, however, is the Elevator. System Technologies has the contract to build the first space elevator on Earth, and its engineers are closely studying the Martian Elevator to see what they can do better. They are in negotiations with Xiao Chu to buy outright the carbon/diamond cable factory located on Deimos. Since the Elevator was completed, the factory has been running at reduced capacity, producing cable for other markets (e.g., suspension bridges). If the deal goes through, the factory will be physically uprooted from Deimos and gently guided into an Earth-bound trajectory. Xiao Chu has not, as yet, warmed to the idea. (See *The Triangle Trade,* p. 51, for why.)

System Technologies AG maintains offices in Deimos and New Shanghai. In addition to above-board information gathering techniques, its employees are engaged in low-key industrial espionage against Xiao Chu.

The Seihin Corporation

Seihin is the largest manufacturer of vehicles on Mars. A Japanese firm, headquartered in Nagasaki on Earth, Seihin was one of the companies encouraged to come to Mars by the Japanese government in the late 2040s. Its first workers landed in 2048, along with enough heavy equipment to set up a primitive factory, and by the middle of 2049 Seihin's Mars Factory #1 was building explorer's trikes (p. 100). Today, every land vehicle from Chapter 9, except for the train cars, is available from Seihin. (Note that Seihin does not manufacture weapons, so the military vehicles are delivered to the customer unarmed.)

In an effort to recapture the spirit of the Japanese economic boom of the mid-20th century, Seihin intentionally has a strong culture, and tries to be a lifetime employer for its workers. On Mars in the year 2100, this seems to be failing. The culture and wide-open plains of Mars are too different from crowded Japan to make the prospect of working at one job for decades palatable. The way lifespans are rocketing upward does not help; if decades of the same work is questionable, what of *centuries?* As a result, Seihin on Mars has a turnover rate much higher than the parent company on Earth, and executives are constantly shuttling out from Earth to see if they can stop it. This also means that Seihin has a larger percentage of non-Japanese workers on Mars than on Earth, though friction is minimal. Seihin's corporate logo is a heavy-duty vehicle wheel.

Tenzan Heavy Industries

This Japanese-founded transnational is involved in the mining of asteroids and the manufacture of space stations and spacecraft. It has sales offices at New Shanghai and construction facilities at Schiaparelli (p. 28). Most of Tenzan's activities are going on in the Belt, but it's an important presence in Mars orbit.

Other Corporations

There are hundreds of other corporations on Mars; here are a few brand names GMs can drop into their campaigns.

Mars Cars is Seihin's chief competitor, though it only manufactures smaller vehicles like the Mars rovers (p. 101).

Ajiwau Ramen is a food manufacturer, specializing in pasta. It also runs a chain of fast-food noodle restaurants, which are just starting to be common enough to be annoying.

Mutatis Mutandis is a designer biomod medcenter/boutique, based in Robinson City with a branch in New Shanghai. It lurks on the cutting edge of body art fashion.

People's Garb is a Chinese clothing manufacturer, specializing in uniforms and work clothes. Their products are known for their durability. They recently branched out into vacc suits.

Ultra-Tech! manufactures handheld electronics equipment, including portable computers, binoculars, power gloves, personal PESA gear, autograpnels, and the like.

Other Organizations

Beyond nations and corporations are a variety of organizations with intriguing agendas and methods.

Free Mars

"Free Mars" is not so much an organization as it is a verbal shorthand for the scores of independence movements on the red planet. They vary in dozens of ways: preservationist vs. terraforming, free market vs. socialist, human vs. transhuman, violent vs. nonviolent. Some are strictly local in their aims, such as the groups trying to free Rust China from China. Others are linked to independence movements on other worlds.

After years of inter- and intra-group squabbles, Free Mars has loosely settled into two main factions. Within these groupings, organizations with widely divergent end goals work together toward the short-term goal of an independent Mars. After that, they can settle ideological differences without worrying about Earth.

The two groups are divided on the basis of violence vs. nonviolence as a method of achieving independence. Since this was a "means," rather than an "end," it proved to be something that couldn't be swept under the rug for later, and extremists on either side were unwilling to compromise. As of 2100, nonviolent factions outnumber violent by at least ten to one; the violent, unfortunately, get more press.

The violent Free Mars adherents believe in armed rebellion and acts of quasi-terrorism. Their precise tactics range from arming the locals, for the day the revolution comes, to attempts to sever the Elevator, thus dramatically increasing the effective distance between Mars and Earth. The nonviolent sides pursue their aims through existing political channels: negotiations with foreign powers, pursuing political office, peaceful demonstrations, and occasional boycotts and strikes.

The two sides, naturally, don't get along. The violent faction believes the peaceful ones are wasting their time. The advocates of nonviolence think the other side are a bunch of terrorists who are producing nothing but ill-will for the cause. The public tends to blur the two sides together, which angers the peaceful protestors even more.

Specific Free Mars groups include:

New China

This is a violent group devoted to the independence of Rust China. The current Rust Chinese government is biased against any freedom movement, and designed so that true power lies back on Earth – and the New Chinese don't believe anyone on Earth *can* truly work toward their goals. Like most of the violent groups, the New Chinese would like to see the Elevator gone, but their short-term goals include assassination attempts on officials of the Colonial Directive and occasional infrastructure attacks designed to show Chinese habitats that they are already, effectively, independent of the government in New Shanghai. They enjoy a limited amount of popular support. China's long history of revolutions has led to a belief that the mere existence of rebels indicates that the current government has problems – but only victory truly legitimizes a revolution's cause. New China hasn't won yet.

The Mars Party

The Mars Party is a peaceful, above-board political party. It is most active in the American colony, but has small branches in major cities elsewhere. (In Chinese territory, the Mars Party tends to be small and quiet, since the government disapproves of them, but they're there.) The Party's short-term goal is liberating the American colony as an independent nation; long-term, this new nation would meld with the other colonies into a unified Mars. Mars Party candidates run in many elections, and they're a growing power.

Frank Roth

Roth is the current leader of the Mars Party and their candidate for the next gubernatorial election. Born in Plymouth in 2042, he grew up during the ecoclysms caused by the Ares Plague, and believes the United States did little to help Mars during that time. He is a fierce and honest supporter of independence for the American colony. He personally holds no strong feelings on the issue of a *unified,* independent Mars, but follows the party line.

Roth is tall, black-haired, fair-skinned, and of mixed racial descent. In person he is personable if a bit stiff; over video the stiffness wins out, and the Party is thinking of replacing him with someone more telegenic. He would be crushed if this were to happen; he genuinely believes he's the best chance the Mars Party has for winning the election.

Negative Growth

This is a violent preservationist group, dedicated to ending terraforming, reversing it where possible, stopping immigration, and allowing the human population on Mars to slowly decline. They favor orbital habitats, and allowing scientists and rare visitors on the surface, but in the long run want to see Mars essentially depopulated. Their violence is in inverse proportion to their chances of success; they are responsible for the most successful attempt yet to sever the Elevator (p. 27). The aftermath has caused many members to flee Mars, hiding out with the Europa Defense Force, Blue Shadow, or other preservationist criminals, but other cells are still operating on the Red Planet.

Negative Growth's members (numbering over 400) will attack nearly anything, especially large-scale terraforming projects. They are most active in the wild, but have presences everywhere. Their leader is Enrico Balthazar, currently the most-wanted sapient being, according to several law-enforcement agencies. Though he is a fanatic beyond the bounds of sanity, he is also startlingly charming – as long as he doesn't see you as an enemy.

The Areohumanists

This group believes in people adapting themselves to Mars, not adapting Mars to people. They are borderline nonviolent; some members have no problem with attacks on infrastructure like terraforming equipment, but all go out of their way to avoid harming people. The group's basic goal is the separation of Mars from Earth influence, so the "new Martians" can radically change themselves into forms best suited to Mars without outside contamination. They tend to be Mars-adapted parahumans, though some haven't modified themselves beyond an Andraste biomod.

Reactions to Free Mars

Unfortunately, none of the Terran powers with a hold on Mars are eager to release it. China, in particular, has almost never willingly released territory. The Martian colony symbolizes how China will continue to grow and endure into the future, and losing it would be a staggering blow to national pride. Currently, the Rust Chinese government only feels slightly threatened by the various Free Mars factions active in its territory. It has responded to their illegal actions with force and to their propaganda with its own. This gentle approach will not last if more of the population comes out in favor of independence. Chief Administrator Lanqing Wang (p. 39) loves Mars, but he loves China too, and he will come down as hard as necessary if a rebellion looks possible.

The government of the U.S. colony, on the other hand, is not trying to stop Free Mars movements. The concept of "independence from the mother country" is a popular one among Americans, for obvious historical reasons. While the police will go after people posing threats to life or property, the government has no public opinion on whether independence is a good thing, and does not act to suppress speech. *Individuals* within the government usually have opinions on the matter, of course. Generally, the more powerful they are, the less interested they are in radical change.

The Martian Triads

This crime syndicate was founded on Mars in the mid-2080s; its core consists of Chinese criminals exiled from Earth (see p. 14), many of whom were members of Earth triads. Initially controlled by their terrestrial parent organizations, they were cut off from their support structure during the helium-3 embargo of the mid-2080s. They resisted the resumption of that control, and in 2089 achieved independence. While the popular name for their syndicate is plural, since 2089 they are really one Triad, bound together by solemn oaths and venal greed.

Historically, the Chinese Triads began as rebels, unjustly accused by their Emperor and forced into hiding. They formed the center of many rebellions against that Emperor and those who followed. Some were justified, some less so. Eventually the original Triad became an explicitly criminal organization, and its Martian heirs are nothing but. There are noble men and women in their ranks, but by and large Triad members are amoral, willing to use violence and the threat of violence to get their way.

On a personal level, the Triads require unwavering loyalty, and joining involves a lengthy ritual including a symbolic journey through the "Willowed City" of the branch he is joining. The applicant must answer questions with the correct password ("Where do you come from?" "The East."), pass "The Circle of Heaven and Earth" (a living bamboo hoop), cross "The Fiery Furnace" (heated Martian stones), to arrive at an altar bearing tablets inscribed to the founders of the original Triad. The novice must mix his blood with hawk's blood, Mars dust, and other, unknown, ingredients, then drink the mixture with his hands tied behind his back. A candle is extinguished, and the new member is reminded that his life may likewise be snuffed out if he breaks his oath of loyalty.

The symbolism of the Triads include a hierarchical system of body art, an obsession with the number 3, avoidance of the number 7 (a reference to an ancient traitor), and a myriad of call signs and hidden signals, such as a particular way of holding a teacup or arranging one's hair.

The Triads still do most of their business on Mars, but only by a narrow margin. In the latter half of the 2090s, they vigorously expanded into the Belt, moving many of their bioroid factories into camouflaged asteroid bases. The Triads have also come into conflict with the Trojan Mafia (p. TS85). The two organizations don't intentionally work in each other's territory (space is vast), and sometimes work together, but when encroachment does occur, the reprisals can be swift and violent.

The average Martian citizen in a habitat of over a thousand people probably unwittingly knows someone who is a Triad – a Chinese citizen may even be aware of the Triad member's allegiance. While the Chinese, like everyone else, regard the Triads as criminals and thieves, Chinese culture allows for them as part of thousands of years of underground rebels who have no choice but to live as they do. Natives of other cultures on Mars are more likely to be outraged by Triad activities, so they keep a lower profile in those areas. Within the Chinese colony, a Triad can even become a "Godfather" figure, who one can go to in need. (Though he's more likely to be though of as "Crazy Uncle Xiong with the claws who took care of that rapist for us.")

Two of the most notorious criminals of the 2090s are Triad-affiliated. Gao "the Swarm" Yanghou is the Triad leader in charge of New Shanghai. His habit of having all his bodyguards sculpted to look like him is the reason for his nickname. Law officers have believed him to be caught or killed on many occasions, and some seriously entertain the possibility that he no longer occupies a single body. Also associated with the Triads is Dr. Mara Omokage, a legally dead bioroid trafficker and brilliant geneticist. She continues to live as a series of xoxes and clones, most of them based in the asteroid belt.

Bioroids

Most of the Martian Triads' income comes from trafficking in illegal or restricted types of bioroids. On male-dominated (and relatively peaceful) Mars, the bulk of the sales are female models, ranging from timid housewives through enthusiastic courtesans to whipcord-mean combatrix models. The Triads have a few birth-labs on Mars (mostly in the Elysian highlands), but most bioroids are decanted at factories in the Belt and shipped to Mars. On Deimos, Triad agents fix their paperwork so they appear to be Earth immigrants, and escort tem to the Elevator car. After the trip down, they are met by their new "employers."

The Triads do most of their bioroid business in Rust China, where bioroids may not be owned, only indentured, and creating bioroids for sex work is illegal. In America/Mars, these laws do not apply. The laws of the Martian Commonwealth regarding bioroids restrict how smart they are, how much human DNA they may have, and what kinds of exotic advantages they may possess. Thus, in America/Mars, the Triads focus specifically on those restricted areas: intelligence, humanity, and strange abilities.

The amount of training a Triad bioroid receives before being sold depends on its series and the desires of the purchaser. Pleasure models may have extensive skills, or may have received only a few lessons in obedience. Similarly, some buyers prefer to train combat designs in their own styles. Servant models are the most likely class to get extensive education in their "careers." Regardless of type, all are genetically and pedagogically programmed for obedience. This may take the form of Sense of Duty or lesser disadvantages like Weak Will; see p. 89.

Loansharking

Another element of the Triad empire is loansharking: lending money to the desperate at extremely high interest rates (10% *per week* is not unknown). The borrowers can be anyone from shopkeepers who want to expand their business, but can't get a load from the bank, to blackjackers who need money for quiet repairs. The most profitable loans go out to prospectors and freehaulers, looking to make one more trip in the hopes this will be the Big One. If they're right, the Triads get paid. If they're wrong, the Triads get a slightly used spacecraft . . . and possibly some slightly used body parts the owner won't need anymore.

A variant of this is *biosharking:* paying for someone's biomods, then getting their new and improved services for a specified – and *long* – period of time. Typically the service period is long enough for the "beneficiary" to earn *twice* what the biomods cost. If the biomodified person doesn't have abilities the Triads themselves find useful, the Triads will rent them out to someone who *can* use them.

Protection Services

"Protection," in the criminal sense, always has two parts. On the one hand, it's simple extortion: "Pay the money or we'll smash up your place." On the other hand, there often is *real* protection involved. Someone who is paying you money on a regular basis is a source of income, and you want them to stay in business so you can continue to bleed them. There's also pride – areas under your protection are your "turf," and other people aren't allowed to trespass.

The Triads run protection rackets at every scale from threats against domed cites down to schoolyard lunch money. The degree to which their activities constitute real protection depends on the effectiveness of local law enforcement. If the area is essentially anarchic, the Triads may be a genuine force for social order. In cities where officially sanctioned police are doing their jobs, there's less need for the Triads to react against poachers on their turf – but then, they're less likely to be operating in those areas *themselves.* Triad protection activities extend from Mars into the Belt, where many gas stations are the subject of this extortion.

Smuggling

Moving illegal bioroids from the Main Belt to Mars is smuggling in itself, of course. The mechanism for it includes Triad agents at both ends of the Elevator, secret landing ports on the surface, bribed officials on Phobos, and stealthy spacecraft and surface-to-orbit vehicles. The Triads use this web of secrecy for more merchandise than just bioroids, naturally. If something is illegal on the surface of Mars, it's certain that the Triads are either already making it available or trying to do so. The possibilities include weapons, from handguns to bombs; drugs; proscribed genetic material; and spy equipment. Their cargo manifest may also include stolen goods (from pirates, say) or items subject to high tariffs.

Burroughs Museum of Martian History

Located at Plymouth, the Burroughs Museum is the largest public facility of its kind on Mars, and the only one that isn't heavily specialized (such as, for example, the Aznar Early Martian Lichens Collection at U. Mars, open to the public by appointment only). The Museum is large, covering both natural history and human history, with smaller wings devoted to science and art.

The natural history building includes a huge display of original Martian rock, sealed in clear containers filled with the original atmosphere. A few exotic rocks are out in the open for the public to touch. Excellent interactive displays explaining Martian geologic history cover the walls. The natural history section also includes biological history, with bottled samples of the Ares Plague (not much to look at), assorted plant life on display, and stuffed and mounted animals.

The human history section is more popular. It includes both Mars-related artifacts from Earth and items used by the early Martian colonists (most of the latter on "permanent loan" in case the original owners want them back). The artifacts on display include several of the original Russian landers, *Viking 2, Zhenchayuan* (p. 7), and gear from the early manned expeditions. A constant program of vids from the 20th and early 21st century about Mars are shown in the small theater.

The science wing is targeted at children, and teaches basic lessons in terraforming and other aspects of planetary science. Preservationists consider it "Green propaganda" and object at every opportunity. The art wing houses paintings, sculpture, videos, and other forms of art created on Mars by Martians. The quality varies, but pieces like Mynogan's "Blue Line on the Red Sky" have achieved interplanetary recognition as works of genius.

Some of the Museum's content is available on the Web, particularly the science lessons and the contents of the natural history wing. Most of the art and artifacts cannot be viewed by telepresence, however. The Museum is open every day but Monday, from 9:00 to 22:00. Admission is $5.

The Journal of Areoscience

This weekly scientific web magazine is the most prestigious publication dealing solely with Mars. It covers everything from sociology to genetics, and is read by any halfway-respectable scientist on Mars – and a healthy number of nonscientists, too. The editors of *Areoscience* attempt to keep the journal apolitical, but the best they can do is maintain a balance between papers with a preservationist slant, and those with a green slant. The home offices of *Areoscience* are in Nix Olympica (p. 17), but the editors are spread across Mars, Mars orbit, and beyond.

Farhaulers' Guild

The Guild is an association of commercial spacecraft crew and captains, mostly natural-born. It was founded in early 2095. Members of the Farhauler's Guild typically have very poor relations with non-Guild crew, and mixed-crew spacecraft are rare.

On Mars, the Guild's main activity is recruiting. Their favorite candidates are human space crew, but they have been known to accept free bioroids and other, more exotic transhumans. As the underdog in the shipping industry, they can't afford to be too particular. Any individual with space crew experience (and no contract with Mars Interplanetary) should expect to be approached by the Guild at least once.

Chet Magill

Magill is the spokesperson and nominal leader of the Truckers' Guild. His cybershell body is a slightly modified cargo truck (p. 102), in pristine condition. The modifications consist of better armor (PD 4, DR 20) and an improved communications array.

Magill comes across as a jovial, easy-going, working-class individual. His intelligence is obvious, as is his dedication to the Guild, but he seems harmless and unambitious. In truth, he is working toward making the Truckers' Guild a more formal organization with real power. This is partly ambition and partly a genuine concern for the role of truckers in the future of Mars. While not without ethics, he is willing to compromise to ensure the health of individual truckers and the Guild.

Truckers' Guild

This organization loosely models itself after the Farhaulers, but is less of a formal institution, more of a "club." The Truckers are people who have been uploaded into cybershells in the form of cargo vehicles, including trucks, small VTOLs, and zeppelins. They provide medium-priority cargo service to all points on Mars. There are many truckers who are not members of the Guild; total Guild headcount is just under 100. Guild members have an informal code of honor which specifies that they will deliver their loads on time for a fair price, support each other when necessary, and provide aid and assistance to other travelers.

While not an inherently violent group, someone who cheats or otherwise injures a trucker will quickly find himself unable to hire other truckers. *Killing* a trucker will probably lead to vengeance. Whether this is in the form of hiring a private investigator, running the murderer off the road, or 300 tons of machine parts "accidentally" falling on him out of a cargo zep depends on the circumstances.

Greens

Historically, this term referred to environmentalists; its meaning in the year 2100 is different, and arguably opposed. Greens are people who support the rapid terraforming of Mars and other worlds. The Ares conspirators were Greens, and their illegal actions have led to the word's current negative connotations. Thus, the major green organization on Mars does not refer to itself as such, and is instead called the Terra Nova Society. It supports safe terraforming methods, including dropping water-rich comets into the atmosphere, deployment of nanotech and biological solutions in vast quantities, and a great deal of megaengineering. The bulk of the Martian population regards them as overenthusiastic at best, dangerous zealots at worst. The society has ties to the Green Duncanites in the Belt, and any members of the Ares Conspiracy still on Mars are presumably members. Refugees from the Europan conflict (p. TS16) can find safe haven with the Terra Nova Society.

Religions

The religions of the old planet continue to be practiced on the new.

Islam

The Arabian population on Mars is largely Muslim, and the religion has found converts among the rest of the Martians as well. The particular flavor of Islam practiced on Mars tends to emphasize doing good deeds for the community, and respect for all forms of sapience – including ghosts. This has caused some disagreements with the more intolerant branches of Islam back on Earth.

Some of the specific tenets of Islam require clarification for use on Mars. The Second Pillar of Islam requires daily prayers facing Mecca. Martian Islam recommends three prayers at dawn, noon, and sunset, facing *Earth* – and, thus, Mecca. Almost all Muslims keep astronomical software on their computer for locating Earth in the sky; those without either eyeball it or approximate it by facing the sun. The Third Pillar requires fasting during the month of Ramadan; Martian Muslims stay in synchronization with the Earth calendar for this purpose. The Fifth Pillar is the *Hajj,* the pilgrimage to Mecca. For a Martian, this is a long trip, and they are very serious about it. Hundreds of the faithful will take the trip together, sometimes leaving entire habitats empty and sealed, awaiting their return. The Hajj inevitably involves coming into contact with Muslims of the less-tolerant branches, but this rarely leads to more than polite disagreements, as the Hajj is considered more important than these issues.

Ancestor Worship

Historically, one of the components of Chinese spirituality was ancestor worship: specific veneration of one's forebears in the hopes that they would provide wisdom and aid. On Mars, this mode of belief has fallen out of favor. Part of this is simply the great physical distance between Mars and the resting places of the ancestors of the nat-born population. It can be difficult to believe you have your noble grandfather's attention when he's buried millions of miles away. The other (more obvious) aspect is that many Chinese Martians don't *have* ancestors, being vat-born. Theoretically, they could honor their deceased gene-brothers . . . but almost all of their gene-brothers are still alive. By and large, Chinese mysticism expresses itself in other forms.

Other Religions

All of Earth's major religions have followers on Mars, including Buddhism, Catholicism, Hinduism, Judaism, Orthodox Christianity, Protestant Christianity, Shintoism, Taoism, Wicca, and Zoroastrianism, along with a hundred others. Their representation on Mars is rarely similar to that on Earth either in percentages of population or in doctrine. Many allegedly heretical sects have emigrated to Mars to escape persecution, and Mars has a higher percentage of angry holy people than almost anywhere else in the System.

One-Person Religions

Two factors push people toward inventing their own synthesized religions. The first is the diversity of transhumans. When other people are visibly and substantially different than you, it can be difficult to find meaning in their beliefs. The flip side of that coin applies to bioroids and anyone else who is "mass produced." Taking on the religion of those around you is just one more way to submerge your identity. Finding yourself means blazing your own trail.

The religions themselves tend to be solipsistic and syncretic, usually focusing on personal ascendance to an idealized posthuman – or even postmaterial – state, through a combination of biotech, internal dialogues with one's ideal self, and adherence to clearly defined disciplines of faith.

Cultural Movements

Mars has changed many of the cultures of Earth and created a few of its own.

Martian Memes

Memetics is a rapidly maturing science in 2100; see pp. TS86-87 for details. Apart from its use in education, many memes are disseminated for ideological reasons.

"Mars Is Heaven"

The two most notable powers backing this meme are China and the Greens. The Chinese wish to maintain their hold on Mars through constant immigration. The Greens obviously believe that more people will lead to accelerated terraforming. This is a tricky meme to spread; even a cursory study of Mars reveals that it is cold, largely barren, and poisonous to the unprepared. This is mitigated through comparisons to the historic American West, the wild plains of western China, and other areas with connotations of open terrain and freedom. The people-with-bio-gliders-as-angels imagery (see p. 16) is also played up.

"Mars Is Full – Go Away"

Organizations like Negative Growth (p. 56), other radical preservationists, and simple "Mars snobs" are behind this meme. Negative Growth simply wants everyone off Mars, and the tens of thousands of new colonists each year are infuriating. Mars snobs don't want to share their world (with its wide open, unspoiled spaces, etc.) with people who have fallen for the "Mars Is Heaven" meme. This meme thrives on images of overcrowded habitats, particularly New Shanghai. In non-Asian countries, the dominance of China is emphasized, triggering xenophobia.

"Brains Are Sexy"

Since most meme engineers are themselves smart, it was only a matter of time before this meme was unleashed. Visible effects include the popularity of brain upgrades, and the fashion for large foreheads (sometimes gengineered, sometimes produced by simply shaving the hairline back a bit). Reinforcement is in the form of popular fiction focusing on brave scientists outsmarting enemies who rely on brute force.

Biotech on Mars

Mars is a hostile environment, but (unlike Venus, Mercury, Titan, etc.) it is one where transhumans can survive while still remaining organic – and, indeed, mostly human. As such, it is *the* frontier of transevolution, a crucible of bio-tech research. Sheer numbers mean that Earth has a lead in the field, but Mars is rarely more than months behind the homeworld. As a result, state-of-the-art biotech, including biomods and production of bioroids, is available in any habitat with a population of a few thousand or better.

Martial Arts

In any artificial habitat, guns are a danger to the whole community. Most governments on Mars restrict the ownership of guns, or at least disallow carrying them inside cities. China has strict rules about weapons ownership, and anything more deadly than a big knife requires a good reason to own.

Further, medical technology in 2100 is easily available, and can fix most injuries perfectly and quickly. Even death isn't necessarily permanent if the body makes it to a medcenter fast enough.

Both of these factors contribute to the popularity of martial arts on Mars. Between 10% and 25% of the population has had some formal training in a martial art. The annual Mars Unarmed Combat Championship is the most popular sporting event on the Martian calendar, comparable to the World Cup on Earth. The 15th annual tourney will happen on Aries 2, m0039 (October 14, 2100). Minor regional tourneys happen throughout the year. There are also a number of illegal events, with fewer restrictions on biomods and higher body counts. The most infamous is called simply the Unlimited Fights, and is held once a month in rotating venues.

In day-to-day affairs, friendly sparring is seen by many as a way to let off steam after a long day. Arguments over different martial arts styles can frequently be heard in bars and cafés, and may sometimes turn into actual fights in a nearby courtyard!

Martian Minimalism

"Heaven and Mars are my home, this land is my dress. So what are you doing in my trousers?"

As one's body becomes more and more adapted to one's environment, possessions such as clothing and shelter become less necessary. At the extreme, one needs nothing but territory to roam. Making the body more self-sufficient is one of the goals of transhumanism. Since the perfect posthuman wouldn't need to own any "stuff," physical possessions are sometimes seen as actively *preventing* personal ascendance to a posthuman state. The more you own, the less posthuman you are.

While not a universal philosophy, minimalism is reasonably popular (though more people espouse it than practice it). In day-to-day affairs, it means living as simply as one can, with a small home, one computer, enough clothing to get by – or perhaps none of those things.

Master Xiao-Yue Zhang

Possibly the best martial artist on Mars, Master (*not* "Mistress") Zhang was deported from China in the early 2080s as a subversive element. She is a strongly built woman with iron-gray hair. She is clearly older than 50, but it's impossible to pin her age down more closely than that. Traditional martial arts society is still slightly sexist, and Zhang is a fierce feminist. While she will teach nonfemales, she prefers to take on woman students.

Zhang is not a public figure, and only those with contacts inside the Martian martial arts community will be able to learn anything about her, let alone find her. If cinematic martial arts are allowed in the game, she definitely qualifies as a "master" for the purposes of the Trained by a Master advantage. Her exact abilities are left to the GM, the better to surprise the players.

Confucianism

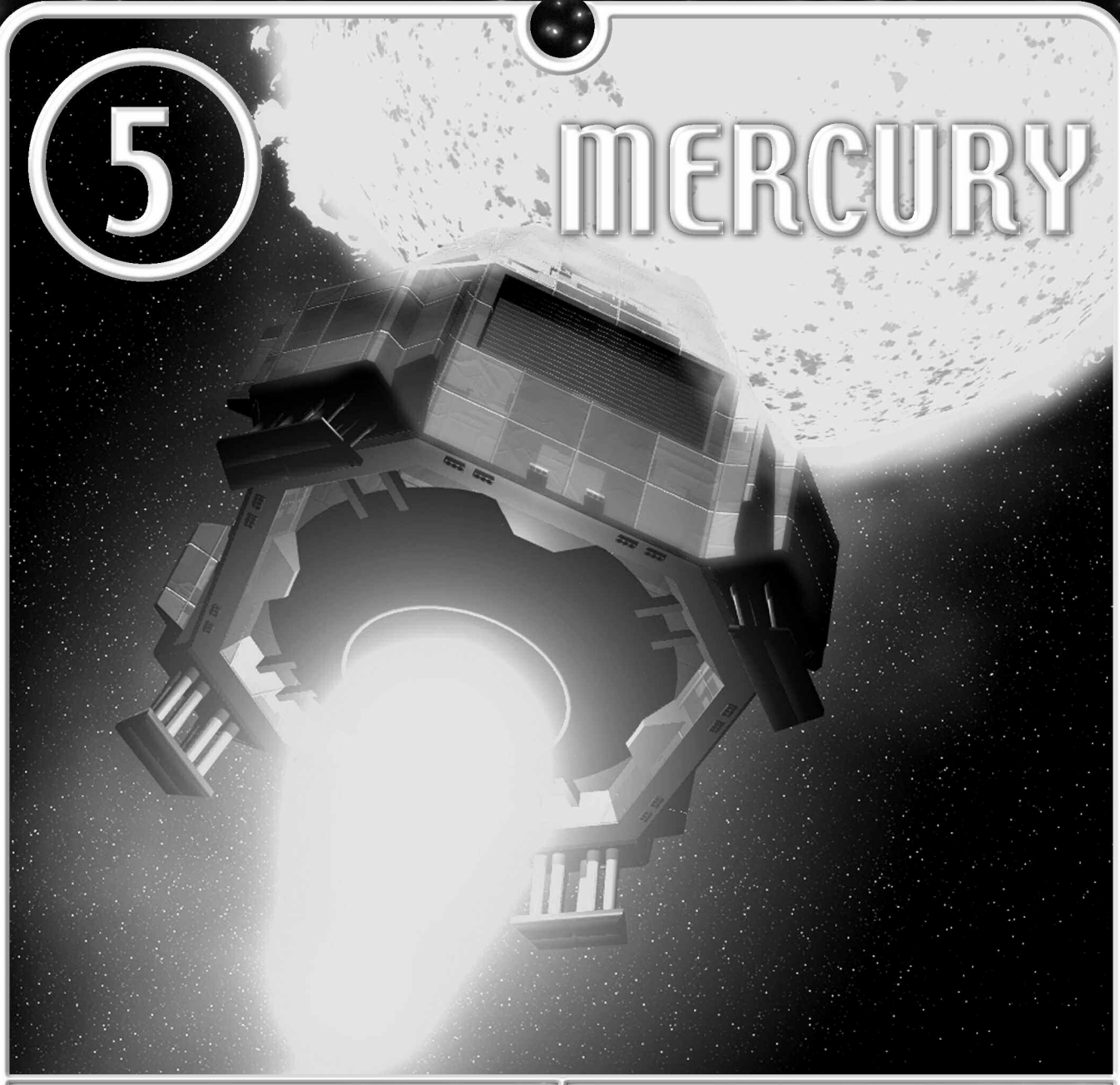
"The Master said, it is only the wisest and the very stupidest who cannot change."

*– **The Analects,** Book XVII*
as compiled by Confucius' disciples

As a philosophy and a meme, Confucianism is alive and well among the Chinese population, and has made major inroads into the non-Chinese colonies as well. Its central tenets state that careful observance of certain rules of propriety (*li*) will allow for ideal relationships (*jen*) among people. The ideal man (*chun-tzu*) follows these rules *instinctively,* though for most people it's understood that years of conscious thought and building of habits are necessary to attain this state. The rules themselves involve love of the truth, respect for learning, the Golden Rule, and humility. The concept of personal ascendance to chun-tzu dovetails nicely with transhumanism. The occasional archaic elements of Confucianism (classism and sexism, to name two) are seen as products of their time and widely ignored.

Confucius himself lived during the 6th century B.C. Because of his fame, faultless Chinese record-keepers have kept track of his genealogy across the intervening 2,600 years to the present, and genes from 80th-generation descendants of the Master have made it into several types of up-grade, parahuman, and bioroid, including the Han Chinese Alpha variant (p. 85).

5 MERCURY



As she ran across the stone plain, her shadow came as a constant surprise.

*Not just because it was **there** – she'd been dropped on the surface close to local noon, and for the first week of her mission, her shadow had been under her. No, the startling thing was how **fuzzy** it was. The Sun was huge behind her, and a large light source casts fuzzier shadows than a small one. She'd been trained on Luna, and was used to shadows you could slice bread on. Still, it made perfect sense, once you stopped to think of it.*

*Not that she **did** stop. She'd left the MLP facility behind the horizon, but the information she'd gathered was very sensitive – they wouldn't stop looking for a while yet.*

"Hey."

The voice from the radio was another surprise. Half her training failed her, and half didn't. Instead of leaping for cover, she stopped – but she did remember how to stop in one-third gee. Step a little higher on the next step, put both feet in front of you, land braced to absorb speed into your legs, remember you've got very little traction . . .

"Wha–?"

She belatedly started to crouch just as the bullet hit. It didn't quite shatter her faceplate, so she had a second to stare at its tip, a mere inch from her face, before the plastic gave and her air rushed away. The last thing her training told her was "Don't turn toward the Sun; without your faceplate it will burn your face to ash." She choked out a sad chuckle as she fell forward – away from the Sun – and died.

The MLP agent who had shot her walked up and took back the teradisk. "Sorry, spy-lady. We're a little more prepared than you thought."

History

Mercury was fully mapped by satellite in the 2010s, revealing no surprises. The first person to set foot on Mercury was Elizabeth Daintith, representing the American *Freyr* mission, in 2043. This was the first manned mission to a planet's surface since Mars, and it was an obvious attempt by the U.S. to regain prestige. In that regard, it was not a success. Mercury failed to excite anyone.

The *Freyr* expedition landed in Purcell crater, near the North Pole, a few days before local sunset. They placed some observation satellites in orbit, flattened and marked a landing pad for future missions, took a lot of rock samples, made some cursory trips to nearby features of interest, and left after two weeks.

Examination of the samples caused a stir. Even the brief tests done on site and in transit revealed large quantities of heavy metals. Not extraordinary amounts, but for a selection of surface rocks, they were a strong indicator that Mercury was rich in valuable metals. The U.S. began planning more manned and unmanned expeditions. Word of the test results, inevitably, leaked out, and other nations began laying plans of their own.

Geography

Mercury is evenly peppered with craters, like Luna. However, it lacks the large maria that mark Lunar Nearside. It has no significant "continents," unlike Venus and Mars. North Polar Mercury's noteworthy features include the Aristoxenus, Desprez, Goethe, and Purcell craters. All four have human habitats in the shadow of their southern rims. In the South Polar region, the major craters are named Boccaccio, Chao Meng-Fu, and Scopas. Boccaccio and Scopas are currently uninhabited.

The largest geographic feature on Mercury is the Caloris Basin, an impact scar about 800 miles in diameter, marked by blocks of mountains at its edges. It is located halfway between the equator and the north pole, along the 180° longitude line. Directly opposite the Basin, in the Guido d'Arezzo region, is an area of grooved and ridged terrain caused by converging shockwaves from the impact that created Caloris. Both areas have proven rich in metals, and are being intensively developed. A smaller impact basin, Tolstoj, is south of the equator in the Western Hemisphere. Prospectors are currently examining the area.

Clocks and Calendars

Mercury's day (59 Earth days) and year (88 Earth days) bear no resemblance to Earth equivalents, and inhabitants spend their time avoiding the Sun anyway. Most of the locals keep time by Greenwich Mean Time.

Mercury's day and year are locked in a cycle of 3 days every 2 years. Combined with its high orbital eccentricity, this creates a unique "hot pole-cold pole" effect. When Mercury is closest to the sun, the point on the equator where it is "high noon" is always 0° or 180° longitude. These are the "hot poles," and they receive over twice as much solar irradiation as the "cold poles" at 90° and 270°. All four of these sites have larger-than-usual weather stations. While usually unmanned, they do incorporate small habitats capable of housing four to six people for about a week.

Snowballs in Hell?

In the late 20th century, evidence of ice was discovered at Mercury's north pole. This was confirmed by robot probes in the early 21st century. This counterintuitive fact arises from a combination of Mercury's low axial tilt, and lack of atmosphere. Since Mercury is only inclined a fraction of a degree with respect to its orbit, at the poles the Sun never rises fully above the horizon, and a low wall (such as a crater rim) can permanently shield the ground behind it from the Sun. The lack of atmosphere means that heat from warmer regions can't be carried to the poles through air movement, only through the ground – and the ground is *not* a very good conductor.

As a result, craters and canyons near the poles of Mercury are well below freezing, and contain a blend of water ice mixed with other substances with low freezing points (such as CO_2), sometimes to a depth of hundreds of yards. The combination of shadowed terrain and water for both consumption and fuel makes the poles of Mercury almost friendly to human residency, and all the large habitats are located at one or the other.

Environment

Mercury rates very high in the competition for "most hostile place in the System." The following sections provide detailed rules for the environment's effect on organic people, cybershells, and technology such as vehicles.

Heat

The most noteworthy feature of Mercury is, of course, the temperature. The mean temperature extremes at the surface are 800° and -300° – covering the entire ***GURPS*** climate range from torrid to frigid! At night, the *Extreme Cold* rules from p. TS58 apply. The day is another issue. Remember that the nights are a month long; very few people are caught by surprise by the dawn.

Burning Fuel

"It's one of the axioms of space travel. Fuel is more valuable deep in a gravity well, so it's more expensive. It doesn't often amount to more than 10 cents on the euro, but it's a real cost. On the other hand, you get more bang-for-the-pound if you burn fuel deep in a well. It provides a bigger effective boost.

"Ergo, the axiom: Buy high, burn low."

– Gabrielle Saint-Laurent, owner-operator of the cargo craft ***Esprit de L'escalier***

Vehicles and Other Hardware

There are two ways to prevent hardware from being damaged by the daytime heat on Mercury. The first is for the entire item to be made from materials with a melting point over 800 degrees. This is usually only possible for simple things like shovels. Complex electronics, and any vacc suit, vehicle, or habitat that is going to support human life, must be heat-proofed. The requirements for heat-proofing are DR 100 and a cooling system (such as is found in any life support system). The cooling system radiates excess heat away on the dark side of the device. Complex devices that are not intended to hold humans still require a cooling system; increase cost and weight of the device by 10%. For robotic vehicles, see p. 127.

If a device has life support or a cooling system, but does not have DR 100, it will absorb heat faster than it can radiate it away, causing damage. For every 10 points of DR (or fraction thereof) it lacks, it takes 1d damage per minute multiplied by its Size Modifier, minimum 1d. For example, a person in a bulky vacc suit (Size Modifier +1) with DR 97 takes 1d per minute. A cybershell with Size Modifier +3 and DR 75 takes 9d per minute.

If the device has DR 100 or more, but does not have adequate life support or a cooling system, it takes 1d damage per minute multiplied by its Size Modifier. If a device has *both* inadequate DR *and* an insufficient cooling system, these effects are cumulative.

Characters

Currently, very few beings in the ***Transhuman Space*** setting have comfort zones that don't include "room temperature"; i.e., around 60°. A character capable of tolerating both Earth and Mercury temperatures needs to have a comfort zone of 800° or more. (Presumably, this will be an infomorph in a cybershell.) This will typically require about 800/HT levels of Temperature Tolerance, which (for HT 10) costs 80 points. It may be cheaper to buy Invulnerability (Heat), which costs 75 points.

Radiation

Nonheat radiation on Mercury amounts to 1 rad/40 minutes, or 36 rads/day. This is not cRad damage, so ordinary PF will protect. A PF of 50 reduces the radiation to negligible levels; shielding sufficient to provide this has negligible weight and cost. During solar flares, however, the radiation becomes a lethal hazard. At Mercury's distance from the sun, flares are 6.6 times as intense as near Earth. Radiation, flare or otherwise, uses the rules on pp. TS59-60.

Other Details

Mercury effectively has no atmosphere. The normal rules for vacuum (p. TS58) apply. Its gravity is within a few percent of Martian gravity; use the rules on p. 33.

All of the surface of Mercury is rocks and dust. Most features are rounded rather than jagged; the extreme temperature changes cause erosion through thermal expansion and contraction. Near the poles, the effect isn't as strong, and there are some needle peaks and knife-edge cliffs in the polar twilight. Mercury is slightly less tectonically active than Earth; the occasional quakes tend to come near dawn and dusk, and are concentrated at the equator.

Organizations and Installations

The U.S. has divided its attention between Mars and Mercury, and has thus come in second on both worlds. As of 2100, the dominant force on Mercury is the European Union, largely represented by France, Spain, and Portugal. Despite the inhospitability of the planet, cheap energy and metallic wealth have led to settlement by tens of thousands of Europeans, mostly miners and support staff for the mines. E.U. facilities are concentrated in Goethe Crater and at Caloris. The U.S. base of operations is Purcell Crater, which is home to several mines. The other nation at the North Pole is Russia; the first Russian team arrived in the 2070s, and their facility is prospering. Brazil has a presence near the Russian base, and they are working together investigating Tolstoj for metals.

China has a small station on Mercury in Chao Meng-Fu crater, and is scouting in the Guido d'Arezzo region. (China chose Chao Meng-Fu partly because it appeared slightly richer in ice than other South Pole craters, and partly because it was named for a famous Chinese painter.)

All the nations have military garrisons in proportion to their mining investment. Mercury is an enormous source of wealth, and the high stakes lead to high paranoia. This paranoia escalated in 2095, when the European freighter *D.W. Sharp* exploded in Mercury orbit, apparently due to containment failure of its antimatter cargo. All five members of its crew were lost. The loading of the *Sharp* had been marked by an incident in which an unauthorized intruder (allegiance unknown) was shot and killed, and naturally the Europeans suspected sabotage. To date, nothing has been proved, but the event did nothing for inter-settlement harmony.

The atmosphere at any facility is tense and guarded. Despite the warcraft of the Force Aerospatiale, PLAN-SF, and USAF constantly orbiting overhead, there have never been open hostilities on Mercury, though spies are caught (and, usually, shot) monthly. No incident comparable to the loss of the *Sharp* has happened since, but there's frequent low-key sabotage, mostly directed against the Chinese. The Chinese government, worried about losing their toehold on Mercury, is responding with increased Bureau 12 presence (p. 41).

Military Forces

The Force Aerospatiale maintains six SDVs, dozens of defense platforms, and many OTVs and smaller craft near Mercury. They are serviced out of Station Gustave Lallier (which is also an antimatter production facility), but must be largely independent, as Lallier's facilities are fairly primitive. The French are occasionally backed up by the Germans and English. The United States keeps two or three SDVs from the 90th Space Wing near Mercury. There is talk of creating a fifth Deep Space Command Space Wing, to specifically cover Mercury and other areas of interest inward of Earth orbit, but for the moment the 90th divides its time between Earth and Mercury. PLAN-SF currently never has more than one SDV and a few smaller craft near Mercury, but the Chinese intend to devote more military attention to Mercury in upcoming years.

Due to the ease of fortifying planetary installations, most of the large spacecraft spend at least half their time patrolling near-Mercury space, and not actually in Mercury orbit. This also keeps tension low – having heavily armed enemy spacecraft orbiting overhead is not calming.

Industries

The only industries on Mercury revolve around exploiting the planet's mineral and energy wealth. Paranoia prevents tourism, and the planet is obviously a complete loss for the production of foodstuffs for export. A few minor factories produce local necessities (e.g., pressure suits), but their output is not sent elsewhere in the system.

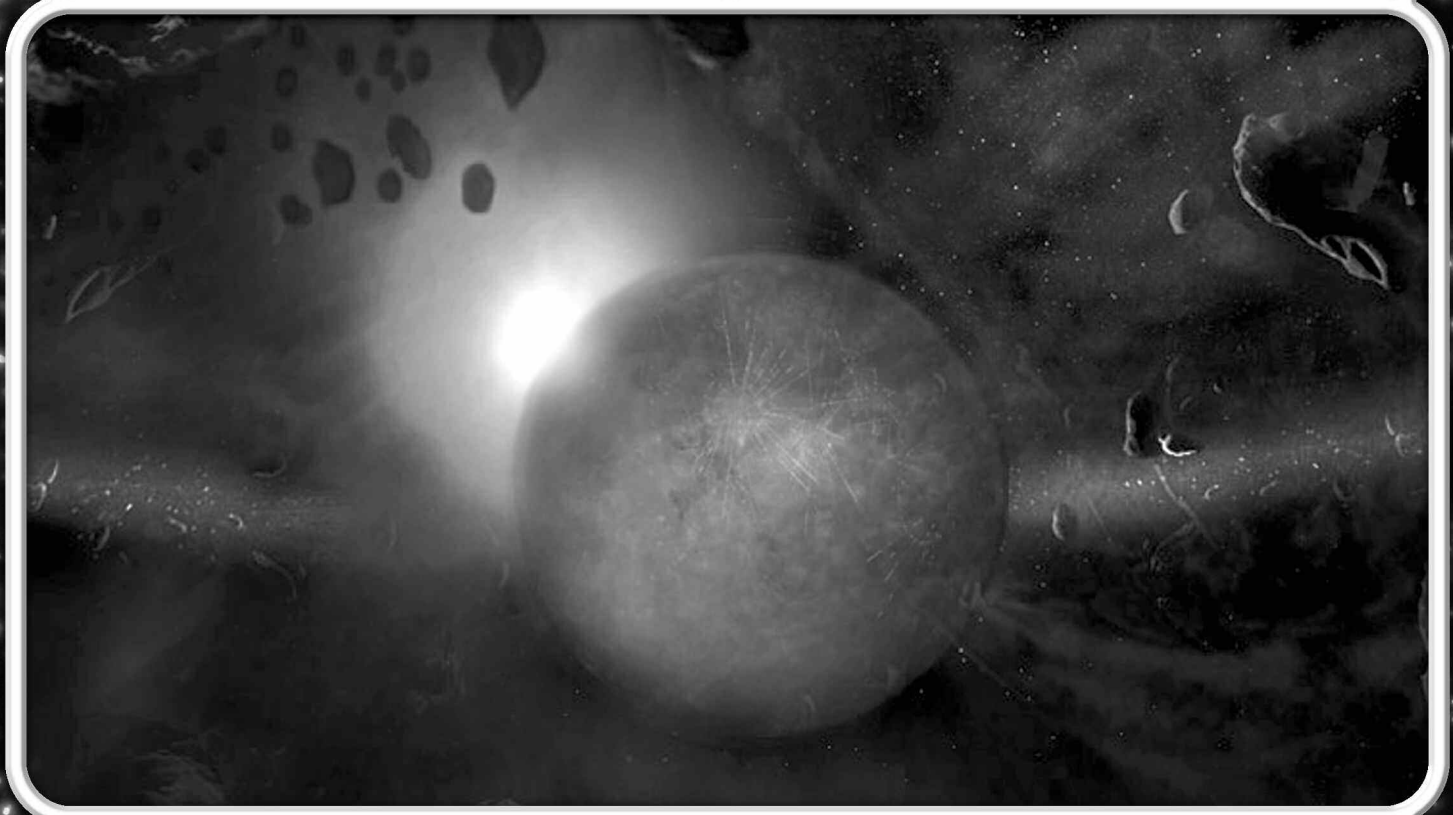
Mines

Mercury is dotted with mining operations, busily turning every 1,000 tons of regolith into 999 tons of slag and 1 ton of valuable material. Mercury is a dense world; theory says that most of the light crust was blown off by the Caloris and Tolstoj megaimpacts. The exposed deposits of metal are rich enough to be exploited for centuries, but the best veins are not near the poles. Unlike the scientific and military facilities, the mines are out in the sun.

Several different styles of mine are in use on Mercury. Open-pit mines are the simplest and safest, but leave the entire digging process exposed to the sky. Other mines have a small facility on the surface and do the rest of the mining purely underground, through tunnels. This improves temperature control, but cave-ins are still a possibility. The rarest type is the fully mobile mine. Essentially a mammoth vehicle, these devices don't attempt to fully exploit any one spot, but instead move from site to site, skimming off the easy-to-reach metals and leaving the rest.

The Lancelot Linear Accelerator

Most minerals shipped from Mercury go the old-fashioned way: in spacecraft. In 2095, the E.U. completed a hundred-mile linear accelerator running to the east of their main habitat in Goethe. Outgoing shipments are bundled into one-ton packages encased in iron and fiberglass shells, and launched at speeds of several miles per second. The package then coasts to its destination, arriving a few months later. The G-forces make it impossible to use the accelerator for antimatter, humans, or anything but homogenous materials like ores, but it is far cheaper than spacecraft, and it has just begun to turn a profit.



Solar Energy

Mercury's proximity to the Sun means it is bathed in immense quantities of energy. This wealth makes Mercury (or Mercury orbit) the ideal site for energy-intensive production processes. There are facilities on Mercury engaged in nuclear isomer excitation, heavy metal and fissionables extraction, isotope separation, fusion-driven isotope manufacture, and several other aspects of the nuclear and radiochemical industry. Some of these facilities are in orbit, while others are on the surface, depending on their

raw material needs. Europe is leading the way in each field, but the other nations aren't far behind.

The Union has also constructed some very large lasers for pushing outward-bound lightsails and other applications, such as melting comets. These lasers are deliberately designed to be difficult to use as weapons. Their beams are quite diffuse by the time they travel as far as Earth at its closest, and would be unable to damage anything with a higher melting point than 200° or so. They are also physically unwieldy, and require some time to aim. Regardless of these restrictions, other nations are quite nervous about these lasers, and their warcraft keep an eye on where those lasers are aiming. The Union has three lasers in Mercury orbit, and one each in the leading and trailing Lagrange points of Mercury's orbit around the Sun. The Chinese are experimenting with direct capture of the helium-3 in the solar wind without high temperature superconductors. If this proves economical, the Union may be able to regain its position as the key supplier of helium for fusion.

MLP, Inc.

Founded in the 2070s by the European magnate Marcus Leif Paxton, MLP is the largest nonnational exploiter of Mercury energy. The company's three surface installations are involved in heavy-metal extraction, but the company is expanding its interests rapidly. MLP puts forth a corporate image of enthusiastic acquisitiveness; oddly, most people find this endearing, in a "capitalism done right" sort of way. Its security is not as good as at the national bases, but it's very close.

Antimatter Production

This is a new module for the Spacecraft Design chapter of ***Transhuman Space*** (pp. TS173-190). It may be incorporated into stations in Mercury orbit, or any habitat or spacecraft that needs to produce antimatter. These facilities produce antimatter both for research and resale. They are typically only found on large, primarily uninhabited space habitats, because of the danger inherent in their design. Antimatter factories have no antimatter storage themselves, beyond that needed for a single day's production; antimatter that is produced must be stored in a Antimatter Bay (p. TS181).

Lab: Primarily intended to produce a quantity of antimatter suitable for research. A lab will produce 0.000001 grams of antimatter each day.

Factory: Factories like this produce most of the antimatter from the Mercury facilities. Each factory will produce 0.001 grams of antimatter each day.

Antimatter Production

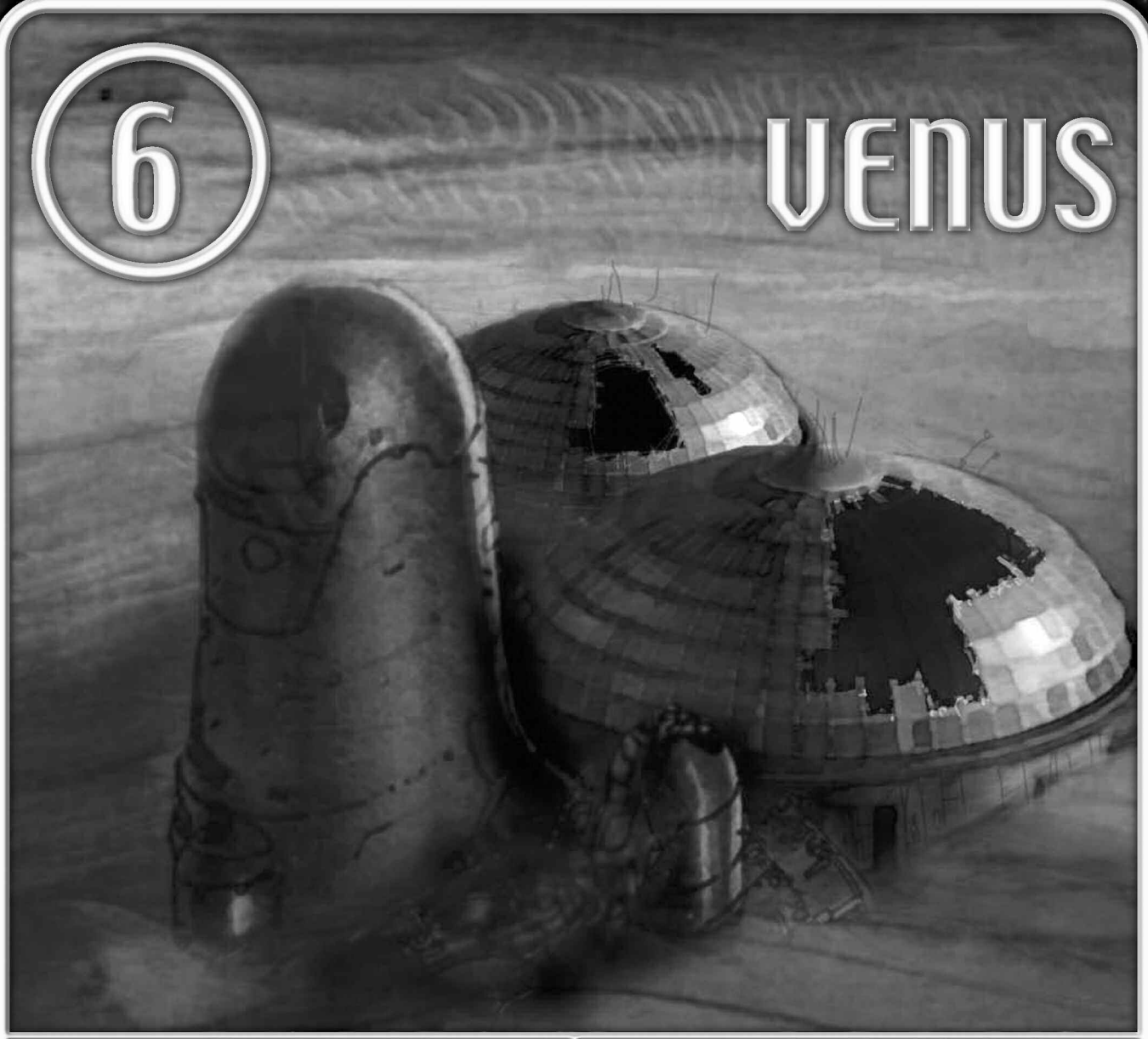
System	*Spaces*	*Mass*	*Cost*	*Power*
AM Lab	1	5	0.2	2
AM Factory	10,000	50,000	2	500

Antimatter Factories

One of the most profitable uses of the energy surplus is the bulk production of antimatter. The theoretical principles behind the production and storage of antimatter were understood in the 20th century, but producing it commercially required too much energy. Mercury's factories churn out antihydrogen at a rate of an ounce or two a month, and ship it in magnetic bottles to consumers throughout the system. Antimatter is an ideal energy source, allowing the liberation of energy from matter with unequaled efficiency. It is thus in demand for applications where energy requirements are high and mass restrictions are stringent, specifically including spacecraft rockets. It also makes an unrivalled explosive, and the possibility of bombs with yields in the teratons means that every antiatom is kept under tight security (not to mention that it is, per ounce, the single most valuable substance known).

Physically, the factories are particle accelerators, powered by acres of solar arrays, slamming normal matter particles together and sorting the pieces for antimatter. The E.U. has many; China, the U.S., and Brazil each have a few. MLP, Inc. plans to open the first corporate antimatter plant in 2102.

6 VENUS



A man and a woman roamed through the wilderness. They took pictures of fractured rockfaces, where cobalt-blue shards were scaling away from the crimson layers underneath. They took turns jumping small chasms, and examined strange stones together. They relaxed in the warmth; they enjoyed the breeze. He turned to her, and extended a class-1 light manipulator to stroke her rear carapace. He used another metal claw to remove a diamond from his secondary storage bin.

"Darling, I brought you out here to ask you something. Will . . . will you marry me?"

She hummed in the low radio band, signifying humor and happiness. "Of course I will."

He placed the diamond in its titanium setting, and together they welded it to her leftmost pincer. In the buttery light of the Venusian sky, it glowed like a coal.

History

Venus was fully mapped by robots in the late 20th and early 21st century. Mixing scattered craters and lava-flows, the terrain was scorched and uninviting. The first manned visit was an E.U. mission, named *Euploia,* landing in 2048. No one stepped out of the spacecraft; the mission planners were unwilling to risk even a hardshell pressure suit failing. The co-leaders of the *Euploia,* Englishwoman Aleda Baker and German Wilmot Altbusser, are technically credited as the first humans on Venus.

The *Euploia's* crew did their exploration through robots – and most of them didn't last very long. The designers had adequately prepared them for the pressure and heat, but the acid in the atmosphere proved more corrosive than expected. Most of the robots failed when the acid ate through pressure seals, causing implosions.

The expedition ended early, but was considered a qualified success. The researchers learned a great deal about the Venusian surface, and study of the failure modes of the robots meant that the next set would be better suited.

The question of whether there would *be* a next set was left in the air for the better part of a decade. Unlike Mercury, nothing of particular value was found on Venus, and the environment was much more hostile. The next visit, by a spacecraft named *Dione,* was also an E.U. endeavor, and landed in 2055. It was launched ostensibly out of scientific interest, but European prestige was also a factor. The *Dione* mission established the core of a permanent facility, named Aphrodite (see p. 72).

To date, other organizations have landed humans on Venus, but few have bothered to establish new permanent facilities. Basic scientific research has thrived under the choking sky, but nothing more valuable than a few veins of precious metal have been discovered. The interplanetary community generally concedes that Venus needs radical alterations to be interesting.

Geography

Venus has two main "continents," Ishtar and Aphrodite, each elevated miles above the surrounding terrain. Ishtar is close to the North Pole, roughly centered on the 0° longitude line. It is marked by unusual north-south grooved terrain at its center (Fortuna Tessera) and a high, flat plateau to the west the size of India (Lakshmi Planum). The Maxwell Montes separate the two, and are some of the highest points on the planet.

Aphrodite is equatorial, also in the Eastern Hemisphere. Its terrain is more chaotic and fractured, particularly the central Ovda Regio and eastern Thetis Regio.

Other points of interest include Beta Regio and Phoebe Regio, located north and south of the equator in the Western Hemisphere. Both exhibit "wrinkled" terrain, and are connected by the 2,000-mile Devana Chasma, a canyon to challenge Marineris. Beta is home to Rhea Mons and Theia Mons, shield volcanoes hundreds of miles across.

Clocks and Calendars

Venus has a year of 225 Earth days and a day measuring 243 Earth days. As on Mercury, most inhabitants keep to Greenwich Mean Time. The terraformers have discussed several ways of giving Venus a more "normal" day. Actually speeding up the planet's spin is currently beyond human – or transhuman – ability, but using orbital mirrors to deliver sunlight or shade "on demand" to the surface is quite plausible.

Terraforming

The terraforming of Venus is regarded by many as an expensive, pointless mistake, but the European public is largely in favor of it. The meme of a lush, friendly, *European* world is quite virulent throughout the Union. Some memeticists have (no more than half-jokingly) suggested that this meme was created by forces hostile to Europe, to divert its funds and attention.

The overarching term for Venusian terraforming is the Eos Initiative, of which the simplest project underway is the Solar Shade. In 2093, the asteroid Pan was diverted into Venus orbit. Construction of several factories, designed to turn the asteroid into a disk thousands of miles across and less than a hundredth of an inch thick, is nearly complete. (More precisely, the Shade will be made of a network of smaller, quasi-independent structures, for flexibility and redundancy.) Once the factories have been tested, mass drivers will boost Pan into the L-1 position between Venus and the Sun, and construction of the Shade will commence. European scientists expect progress to go slowly (particularly since some of the output will be sold commercially as solar sails), but the Shade should be complete in a few decades.

Once the Shade is done, the atmospheric temperature on Venus will drop 9° per year. Before the end of the 22nd century, the CO_2 in the atmosphere should start raining out, forming lakes in the lowlands. By itself, the rain would take a few centuries to reduce the atmosphere to something reasonable. Many terraformers are attempting to speed the process by engineering a coral-like lifeform that will turn CO_2 into carbonate minerals. Another aspect of the Eos Initiative is the introduction of a large quantity of water, probably in the form of Kuiper Belt objects. This is not scheduled until after the atmospheric temperature has dropped below boiling – i.e., more than a century from now. Some of the more esoteric proposals (many of them impossible with 2100 technology) include vast "radiator fins" tens of miles high floating in the upper Venusian atmosphere. With high thermal conductivity, these fins would suck heat out of the lower atmosphere and radiate it into space.

Environment

Venus narrowly edges out Mercury in environmental hostility. The following sections provide rules for characters, vehicles, and other devices exposed to the Venusian atmosphere.

Heat

The surface temperature on Venus is 900°; the same rules apply as for Mercury (p. 64). Because of the thick, heat-retaining atmosphere, temperatures don't vary as much as they do on Mercury, and the difference between day and night is largely the difference

between "insanely hot" and "almost insanely hot." The atmosphere also means cooling systems require a different design. In the thick atmosphere, it's easier to get rid of heat through conduction than radiation. Venus-designed life support systems disperse heat by moving air over coolant pipes, as in a car's radiator. In game terms, cooling systems not designed for Venus are less effective; the device takes 1d damage per hour, multiplied by its Size Modifier, minimum 1d. The same applies for using a Venus-only cooling system on Mercury, or in other locations with similar heating issues.

To function equally well in vacuum or the atmosphere of Venus, a life support or cooling system has its cost, weight, and volume increased by 10%. (If the rule for adding a cooling system to a complex device not intended to hold humans (p. 64) is being used, the net effect is to increase the device's statistics by 11%.)

Cybershelled characters do not need to worry about this distinction. Invulnerability to Heat, or sufficient levels of Temperature Tolerance, will work equally well on Venus or in vacuum.

Pressure

The atmospheric pressure on Venus is 90 atmospheres – roughly equal to being 1,000 yards underwater on Earth. Any human not in a vehicle, habitat, or otherwise encased in a tough shell will be crushed.

Vehicles and Other Hardware

Simple, solid objects (e.g., a pickaxe) are immune to pressure. Any complex device which does not require internal gaps may be pressure-proofed by doubling weight, volume, and cost. This seals it, insulates electronic components, and either eliminates air gaps or fills them with oil. Devices which require air or vacuum gaps (including controls, crew stations, accommodations, environmental systems, and items with long-occupancy access space) must have sufficient (rigid, nonablative) DR to resist the pressure. The required DR can be calculated as (670 × S × F) - 10, where S is the device's Size Modifier (minimum 1) and F is based on frame strength: 4 for an extra-light frame, 2 for a light frame, 1 for a medium frame, 0.5 for a heavy frame, and 0.25 for an extra-heavy frame. If frame strength is unknown, assume "extra-heavy" for things built for Venus, "medium" otherwise. Most devices will have at least 50% more DR than this minimum, both "just in case" and because this DR *does not count* against impacts (e.g., collisions for vehicles) and attacks. It is already going toward resisting the pressure; extra force will overwhelm it.

If a device has less DR than the minimum, it must make a HT roll every minute at +2 to avoid a leak. (If HT is not known, assume a value of 12.) If it has less than half the required DR, the roll is made with no bonus, and a failure indicates *catastrophe* (destruction of the device, death for occupants).

Characters

No one in the ***Transhuman Space*** setting has a native atmospheric pressure much higher than one atmosphere. Surviving in Venusian pressures thus requires either sufficient DR (as for devices, above), or the Pressure Support advantage (p. CI63). Pressure Support at the 15-point level protects completely; at the 10-point level, it is sufficient for anyone with a native pressure of 0.9 atmospheres or more (i.e., practically everyone). With the current state of technology, these advantages are only available to cybershells.

For characters with 5 points of Pressure Support, or none, the following rules apply. Roll a Quick Contest of ST each second, with the air pressure having a ST of 100. Pressure Support at the 5-point level gives +10 to this roll. (If the character *does* have a native pressure of less than 0.9 atmospheres, Pressure Support at the 10-point level gives +15 to the roll.) If the ill-prepared adventurer loses the contest, he takes thrust/crushing damage for ST equal to the amount he lost by. This damage is reduced by any DR that is effective against all crushing attacks.

A character with Pressure Support but low (or no) DR is assumed to be a cybershell with no internal air spaces. Most Venus-capable cybershells will still have some DR, both for general protection and to serve as acid protection (see below).

Acid

Objects without acid-proofing slowly corrode. Thus, even sealed environments capable of resisting the pressure may eventually fail. Habitats must check once per month, and vehicles or suits once per day, for a blowout. (Of course, non-acid-proofed *permanent* habitats on

Preservationists?

There are very few preservationists who are specifically concerned about Venus – probably fewer than 100. Most of the general preservationist communities disapprove of attempts to terraform Venus as a matter of principle, but they are generally busy with the "crises" on Mars and Europa. To date, no one has made a serious attempt to sabotage the solar shade construction facilities, and Venusian terraformers don't have to worry about their personal safety the way Europan ones do.

Venus are rare to nonexistent.) Roll 3d. Subtract 2 for a vehicle with heavy compartmentalization, or 4 for total compartmentalization. High DR reduces the chance of a suit or vehile leaking: DR 30-99 gives -1, DR 100-299 gives -2, DR 300-999 gives -3, and DR 1,000+ gives -4. Vehicles in bad repair or damaged may have a penalty, adding +1 or more. A result of 14-16 means corrosion has caused a slow leak, a 17 is a fast leak, and an 18+ indicates explosive blowout, which will immediately expose the occupants to the atmosphere.

Due to the high pressure, an unpatched leak will blow out at the next check interval. Patching a vacc suit leak requires 3 seconds and a Vacc Suit roll (all vacc suits have a patch kit). Repeated attempts can be made at a cumulative -1. Patching a vehicle or habitat requires a Mechanic roll.

Acid-proofing is available for vehicles, habitats, devices, etc. Acid-proofing either eliminates the chance of corrosion, or gives -10 to the roll, at the GM's choice. To be acid-proofed, a device must first be sealed. Acid-proofing costs $10 and weighs 0.1 lb. per square foot of surface area. If the device has nanocomposite or diamondoid armor (advanced laminate from TL9 or above, in ***GURPS Vehicles*** terms), acid-proofing is free. If surface area is not known, assume acid-proofing adds 10% to cost. For characters, having acid-proofed armor is a 10% enhancement to the Damage Resistance or Pressure Support advantage.

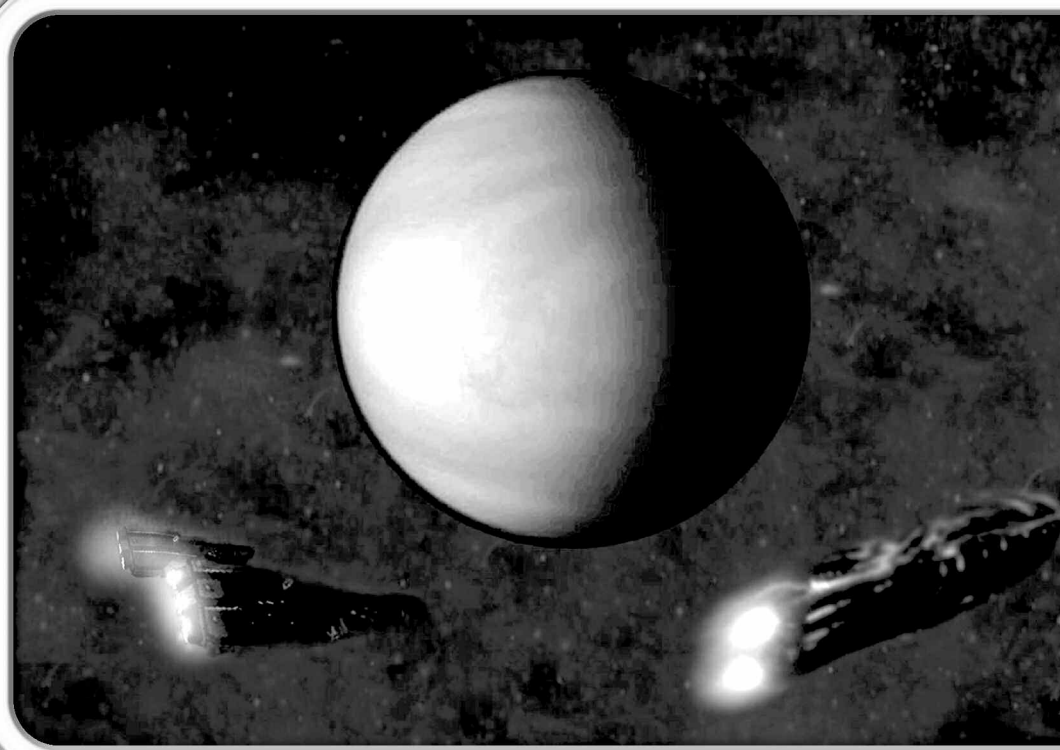
Other Details

The atmosphere is composed of poisonous carbon dioxide with some sulfuric acid. Even apart from issues of heat and pressure, it is utterly unbreathable. Leaks into habitats are either quickly lethal or slowly lethal, at the GM's discretion. Note that, despite the temperature, the Venusian atmosphere is unlikely to start fires; nearly pure CO_2 suppresses most combustion.

Daytime lasts for months, and is illuminated by dim lemon-colored omnidirectional light. Night is pitch black; the stars are never visible from the surface. Weather on Venus includes rare rain in the form of sulfuric, hydrochloric, or hydrofluoric acid. This rain is mostly limited to high altitudes, as it evaporates before getting any lower. There are also occasional lightning strikes (no damage except on a direct hit – which can be as bad as the GM likes).

Venus is tectonically active, and quakes and volcanic eruptions are about as common as on Earth. Lava on Venus tends to be slow and viscous, and is unlikely to surprise an explorer who is paying the slightest attention. The geography includes basalt bedrock, sand dunes, badly fractured terrain, and old lava flows.

The gravity on Venus is over 90% of Earth's gravity. No special rules are necessary.



National Presences

The first people on Venus were European, and they are still the largest single group. In the past decades China, the U.S., and South Africa have sent people and funds into Aphrodite. The population of Venus is reasonably mixed, with no one group overwhelming the others (though the Europeans do act like they own the place).

The European personnel are diverse, but the U.K. and Germany both have several hundred people on Venus. Most of the central administration of Aphrodite is handled by people of one country or the other. The other Union nations are represented to lesser degrees.

The European Space Control Agency (p. TS103) doesn't see the need to give Venus strong defenses, but an SDV from either the Bundesraumwaffe or the RNSS is usually in the vicinity. A small company of cybershelled troops capable of surviving the environment is stationed at Venus. The troops are rotated frequently; typically half are stationed at Aphrodite for security, and half at Anadyomene in case they are needed elsewhere on the planet. To date, these troops have had no mission more exciting than search-and-rescue. ESCA currently has no *combat* orbit-to-surface craft aside from a prototype or two. Development is continuing, but such craft have no clear mission, so progress is slow. There are also two small space defense platforms.

Both China and the U.S. are largely there to "show the flag" and keep an eye on Venusian terraforming. Their personnel rarely have intensive missions of their own, and instead offer to help with other nations' projects. This both lets them keep tabs on what the other powers are up to, and creates goodwill. The other personnel tend to regard them as "friendly spies," and cheerfully accept help on nonsensitive projects.

The other nation with a notable presence is South Africa. Their people are engaged in basic science, in building up the S.A.'s space presence, and in investigating the sparse veins of Venusian diamonds that have been found near volcanoes.

Research Station Aphrodite

Aphrodite is a rambling, hodge-podge facility sitting in a reasonably flat valley south of the crater Joliot-Curie on the Aphrodite land-mass. Most organizations interested in establishing a permanent presence on Venus, instead of building independently, have chosen to buy permission from the E.U. to add on to Aphrodite. The result is a mix of loosely connected structures housing just over 1,000 people.

Aphrodite also has an orbital element, Anadyomene Orbital, which is a space station built in the 2060s. Its primary purpose is to transfer people from spacecraft to specially designed surface-to-orbit vehicles, but it has some repair facilities. It also incorporates a small scientific station, mostly dedicated to monitoring the atmospheric observation satellites.

It seems insane for Europe to sponsor two space megaprojects – the Olympus space elevator and the Eos Venus terraforming – but there is method to their madness. They are not distinct projects! Both are supported not merely by the space development lobby, but also by preservationist leaders. Why? Because the Olympus beanstalk will pull humanity into space in numbers we'd never seen before. Islandia and the Lagrange colonies are the first stage – but Venus is their ultimate destination. They believe Olympus and Eos can achieve the hitherto impossible goal of exporting Earth's population and industry into space, fulfilling the radical preservationist dream of a garden Earth, emptied of mankind.

– Eos: The Secret Plan to Depopulate Earth,
by C. Eric Gideon (TSA Web, 2099)

Aphrodite itself is incredibly sturdy, mostly subterranean, and quite cramped. Most structures are built as either domes or cylinders, and this prevents simple internal layouts. Newcomers routinely get lost in the twisting maze of little passages. The social atmosphere is one of slightly forced joviality; everyone feels they should band together against the glowering elements outside, but the pressure seems to dampen people's moods.

Other Installations

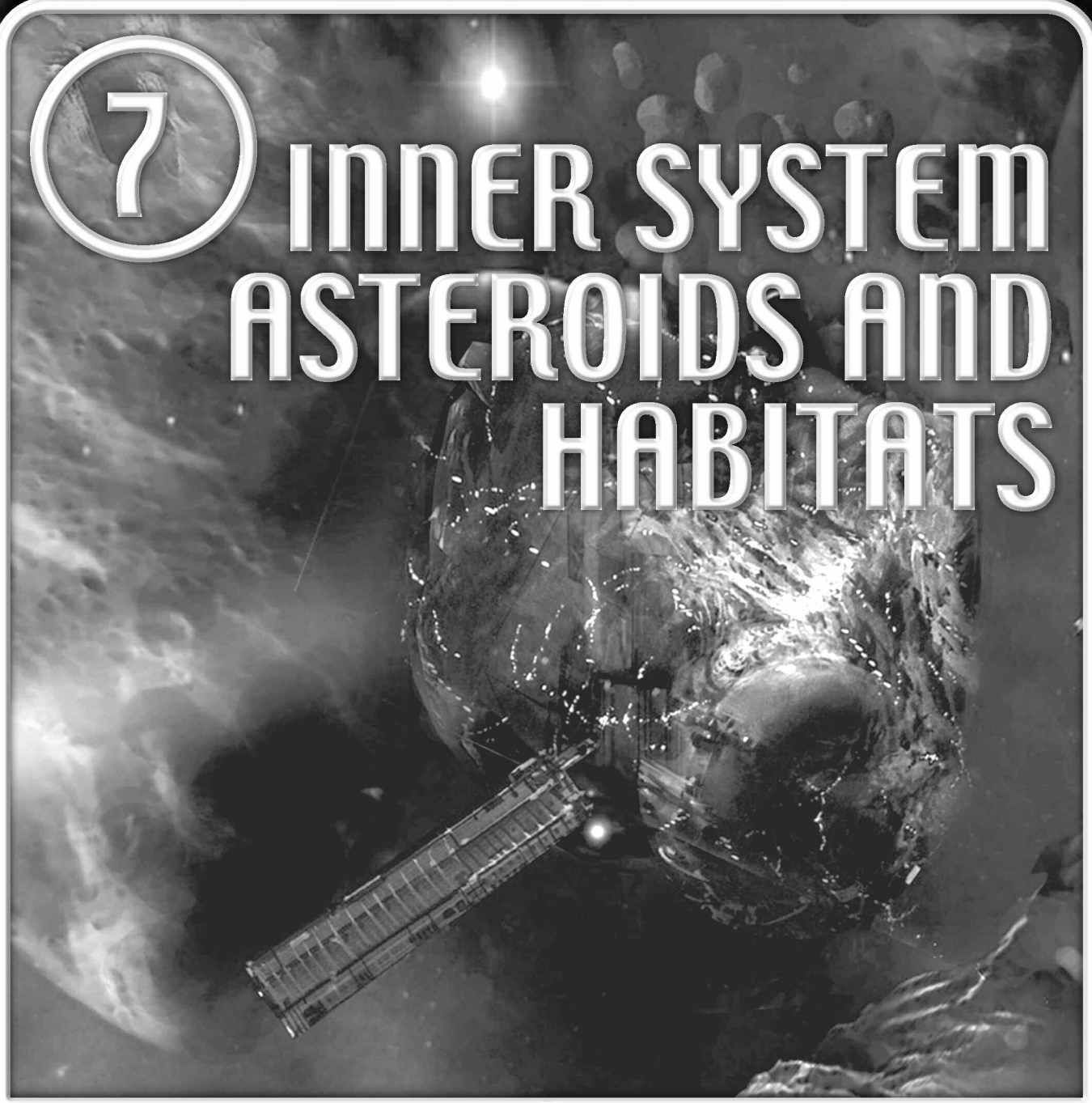
There are a few other scientific facilities, none with a crew of more than a hundred. These researchers visit Aphrodite regularly to get a dose of "big city" atmosphere.

The Transpacific Socialist Alliance has a secret base near Rhea Mons. Its mission is unknown. It may be spying on Aphrodite and other facilities for scientific data, conducting research into a nanotech or biotech method for terraforming the Venusian atmosphere, or it may simply be a military facility. The TSA is clearly interested in increasing its space presence, and they may intend to claim a majority stake in the future of Venus. The *existence* of the TSA base is known; despite the use of stealthy craft, it's impossible to have vessels entering and leaving the atmosphere without being observed eventually. No one has managed to locate the base more closely than "probably near Beta Regio," though. Some rumors of "Unidentified Venusian Objects" among the Aphrodite staff can probably be attributed to sightings of long-range stealth TSA cybershells.

Cybershell Tourism

Venus sees some regular tourism; at any given moment, about 3% of the population of Aphrodite is tourists. For cybershells, however, Venus is *the* entertainment destination in the System. This is presumably because, with the right body, they can enjoy the Venusian environment in a way organic transhumans can't. The E.U.'s tourist relations bureau keeps half a dozen rentable cybershells designed for the conditions (p. 86), and many visiting "uploads" bring their own custom models. An outer casing that has been etched by acid in the Venusian atmosphere is actually *stylish* in certain cybershell communities.

7 INNER SYSTEM ASTEROIDS AND HABITATS



"The Sun is life," said the minister.

"The Sun is life," said the small congregation.

"It shines on the plants, releasing the chemical energies of life."

"The Sun is life."

"It beams down on the animals, giving them warmth."

"The Sun is life."

"It melts the ice, bringing us water."

"The Sun is life."

"It blesses our solar panels, providing us with the energies to maintain our home, here in the vacuum of space."

"The Sun is life."

"Let us pray."

The minister gestured, and the blinds drew back from the window behind him. The Sun shone through, filling a third of the sky. The congregation basked in the light, and knelt in prayer.

I don't know how much longer I can do this, *thought the minister.*

The inner solar system is a small neighborhood. Everything is a (relatively) short flight from Earth. The Sun's light is still strong enough to use as a sole source of power. Real estate is a bit lacking – there are only five bodies big enough to be spherical – but the number of space stations grows every month.

Inner System Asteroids

Inner system asteroids, also known as near-Earth asteroids (NEAs), are asteroids whose orbits take them within the orbit of Mars – and, in some cases, which cross the paths of Earth or the other planets of the inner System. Like their far more numerous sisters in the Belt and outer System, inner-System asteroids can be divided into three groups based on their composition:

C-type Carbonaceous: Made up of carbon and complex organic compounds; very dark. Useful for certain types of construction projects; e.g., the Elevator (p. 27).

S-type Stony-Iron: Rocky, silicate material, lacking in carbon. Silvery-grayish.

M-type Metallic: High in metals. The most valuable type, making up less than 10% of all asteroids. Usually silvery-grayish, but can vary widely in color.

There are also a few rarer types, such as V-type basaltic asteroids (believed to be chunks knocked off the Main Belt asteroid Vesta).

There are about a thousand inner system asteroids 1/2 mile or more in diameter – making their population only a tiny fraction of the millions of Main Belt asteroids. Even so, it's still a lot of raw material. The inner system asteroids can also be divided into three populations by orbit:

Amor asteroids orbit between the Earth and Mars. They include Amor itself (diameter 0.6 miles), Ganymed (25 miles in diameter, the largest of the NEA asteroids), and Eros (20 by 8 by 8 miles, the second-largest NEA).

Apollos cross Earth's orbit, sometimes coming even closer than Luna. For many, their furthest distance from the Sun is in the Belt proper. Apollo asteroids include Phaeton (4 miles in diameter, in a highly eccentric orbit, the dead nucleus of a former comet), Icarus (0.9 miles in diameter, comes closer to the Sun than Mercury), and Apollo itself (0.9 miles in diameter).

Aten asteroids circle mostly inside Earth's orbit, and are relatively small. At their farthest from the Sun, they may cross Earth's orbit. The Aten group includes Aten itself (diameter of 0.5 miles), Hathor (1 mile in diameter), and Ra-Shalom (2 miles in diameter, the largest Aten asteroid).

These asteroids have (in astronomical terms) short lifespans before they hit a planet: between 10 and 100 million years. Thus, there shouldn't *be* any; they should all have collided with something long ago! Scientists of the 21st century have several theories for how they are replaced, mostly involving catastrophic collisions or outer system asteroids being "kicked" into the inner System by Jupiter.

Large asteroids (over 15 miles in diameter) may have tiny moons, typically about 1/20 the size of their primary, and often of differing composition. Those with an interest in asteroids – for science, prospecting, or construction – love these "two for one" deals, and the variety of materials they provide.

During the 21st century, there were many who urged that asteroids that come near Earth be moved or destroyed, to prevent the destruction of Earth civilization. Nothing much came of this. By 2100, any asteroid or comet that stood a chance of hitting Earth would be detected long before there was any risk, and could be easily diverted. (But see *Gabriel,* p. 121.) However, several asteroids in Earth-crossing orbits have been moved via mass driver to L4 and L5, to provide raw materials for space industry and colonization. The NEAs were thoroughly surveyed by swarms of robot prospector spacecraft between 2020 and 2050. A few dozen inner system asteroids have been colonized by homesteaders, while others have been mined of valuable minerals, than abandoned. Groups seeking isolation are more likely to head to the Main Belt (see pp. TS39-42).

Military Bases

Just because it's a *small* neighborhood doesn't mean it's a *friendly* one. Most space traffic goes through the inner System, either roving among Mars, Earth, and the Main Belt, or crossing from one outer-System destination to another on the far side of the Sun. The space-faring powers spend a lot of money keeping their spacecraft safe.

The problem with protecting travel routes is that they are constantly in flux. As planets change their relationships, different paths become more economical. Further, anything that isn't in solar orbit doesn't stay there long – and an orbital position between, say, Earth and Mars is at a different speed from both planets and rarely near either. Thus, the "geography" of space says that there *aren't* any good places to build "forts" where they can protect travel routes. Designers have figured out a few compromises. Important cargos are escorted by spacecraft based at the source or destination. A few orbits between Earth and Mars have minor resonances with both planets, and are therefore close to the travel routes often enough to be economical sites for bases. A third technique is placing a facility in an elliptical orbit that meets Earth at its lowest, and Mars at its highest. Unfortunately, there's no natural orbit that does this consistently; forcing it requires a lot of propellant. Further, the base takes a long time to go from one end of its path to the other, and is only in a position to guard a given vessel for a fraction of its trip.

Besides spacecraft, the other things worth protecting are "property" — planets, asteroids, and other stations. The defenses of Mars, Venus, and Mercury are described in their respective chapters. Individual asteroids are rarely worth a whole military base, and usually get only one or two spacecraft. A habitat valuable for nonmilitary reasons will usually *also* be a military base; you don't build two stations when one will do.

Goibniu Base

The asteroid Goibniu is an M-type Amor asteroid (see p. 75) half a mile in diameter. Even for an M-type, it is unusually rich in metals. It is mostly iron, with thick veins of platinum, iridium, magnesium, silver, gold, and even some radioactives. The United Kingdom claimed Goibniu in 2084, and Vosper-Babbage quickly set up a mining installation – and (since the Pacific War was ongoing at the time) a small military base to defend it. The mining operations concentrated on the more valuable metals, and the asteroid quickly became riddled with tunnels and excavations following veins of ore. By 2097, Goibniu's interior was a beehive-like maze – and the valuable metals were just about gone.

At this point, the military base became Goibniu's prime purpose. A few extra structures were erected, and Goibniu became a training ground. In the miles of tunnels, the United Kingdom's Royal Marine Commandos are taught how to handle themselves in zero-G, how to think three-dimensionally, and how to take and hold territory.

As of 2100, Goibniu has only served as a training base for three years. Thus far, two classes of Goibniu graduates have gone on to regular service. They are already proving to be uniquely up to the challenge of 22nd century combat. For more information on the Royal Marine Commandos, see p. TS105.

Dala Kadavara Station

This rock is a C-type Aten asteroid. Claimed by the South African government in 2077, it was quietly declared off-limits. Publicly, it is used for mining and weapons testing; this is sufficient justification for the 100-mile "no-fly" zone that South African space patrol vehicles enforce. Spysats often notice minor explosions on or near Dala Kadavara.

The truth is that the explosions are a front; Dala Kadavara Station houses South Africa's "black labs," researching publicly unacceptable weapons. Examples include nanoviruses, target-seeking pathogens, and "macro" threats like warbeasts and exotic combat bioroids. The inhabitants (military scientists, plus some associated with South African biotechnology companies) stay there for years at a time. South Africa is very serious about protecting Dala Kadavara's secrets, and thus far has been successful.

Habitats

Habitats not located in orbit around a planet are lonely places. Typically, they were built by groups of transhumans with unusual philosophies or politics calling for isolation. Of course, some of these societies are merely antisocial.

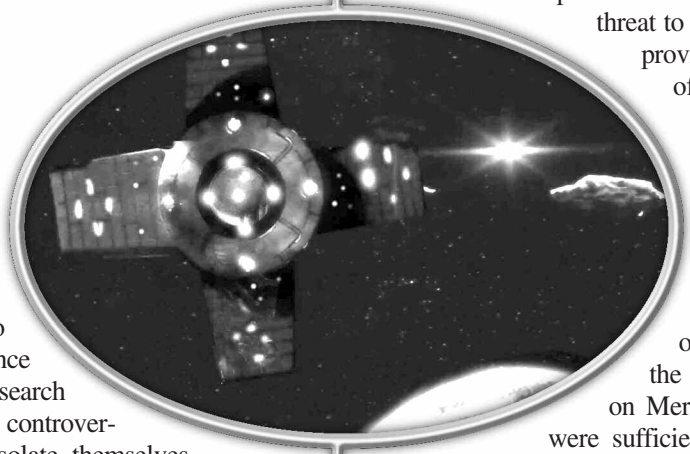
Saint Lwanga Monastery

Named for the patron saint of African youth, this holy retreat is a small cylinder habitat in the L-5 point of the Earth-Sun system, 93 million miles from the homeworld. The inhabitants are mostly of African descent, 30% unmodified humans, and of all genders. They are of a Catholic sect regarded as slightly divergent by Rome, but not quite heretical. Their philosophies include a great deal

of meditation, maintaining physical health, and, frequently, vows of silence. Most of the monks (the term is used for all genders) come to St. Lwanga's because they are troubled in spirit and seek seclusion. After a few weeks, or decades, they leave again. Monks usually come out more centered, healthier, and a lot quieter than when they went in. The current population of the monastery is 1,000.

When the trading routes pass near Saint Lwanga's, they do some business in food, hand-carved statuary made from asteroidal rock, and some extraordinary poetry. Former residents sometimes become traveling do-gooders, known for their peaceful silence and great physical strength. They will not lift a hand in self-defense, but will defend the helpless by any means necessary (though they will look for a peaceful solution first, of course).

Station 0.5



This beehive habitat (p. TS40) houses a society of 500 researchers investigating fractal consciousness. Their theory is that there is some essential quality of sapience that exists no matter how much an intelligence is divided. As some of their research (even when self-inflicted) is controversial, they have chosen to isolate themselves. Their station orbits between Earth and Venus.

The population of the station is made up of philosophers, psychologists, doctors, physicists, roboticists, memeticists, geneticists, wetsurgeons, and scientists from a dozen other arcane professions. (There is also a hired support staff of 100, including hydroponics farmers, life support engineers, etc.) Their experiments range from inducing multiple personality disorder through psychotherapy and drugs, to creating new forms of gestalt AI, to growing four-lobed brains and seeing how they think. For the research that involves intelligent subjects, they have a small supply of volunteers . . . and the willingness to experiment on themselves and each other. They are welcoming to visitors, if a bit evangelical, and trade in exotic AIs, new consciousness-altering drugs, and a lot of basic research.

Inhabitants (former or current) of Station 0.5 can have almost any mental "disorder," and are unlikely to want to change. Apart from simple multiple personalities, other possibilities include stroke-like symptoms, split-brain issues, and manic-depressive disorder. In addition to organic people, the station has purchased a number of bush robots (p. TS73) and given them boosted, quirky personalities. Strange new forms of divided intelligence emerge from Station 0.5 routinely.

Miscellaneous

Other stations in the inner System include trading posts, research facilities, and the occasional abandoned habitat. Some can be quite unusual, while others are fairly mundane.

Church of Sol Station

The U.K. constructed the Solar Study & Observation Facility in 2048, placing it in an orbit inside Mercury's, about as close as then-current technology could handle. The station served as both a pure-science facility and an early-warning station watching for solar flares. At the time, these unpredictable bursts of energy were a threat to space travel, and the SSOF provided a few minutes or hours of warning, its radio message traveling barely ahead of the radiation it was warning against.

By the mid-2080s, advances in radiation shielding had made the SSOF's corona-grazing orbit seem like overkill, and the various "weather" stations on Mercury and in Mercury orbit were sufficient to the task. The SSOF continued to serve as a science facility for a while, but the cost of maintaining and supplying the station was high. In 2090, the U.K. closed the facility.

In 2091, the Church of Sol opened it again. The Church was founded by Yale Martin, a solar scientist who wanted to continue his work. A quirk of British law allowed him to buy the station cheap – if he was using it for religious purposes. He assembled a quick precis of the Church of Sol's religious beliefs, published them, and declared himself a minister. His few converts were fellow scientists who either wanted space on the station or appreciated a good joke.

Today, the station is home to about 20 people. Three-quarters of them are scientists engaged in solar research. The other five are, apparently, actual converts to the Church of Sol. Martin made his "bible" publicly available, and the simple and harmless faith it described appealed to some people. (The Church doctrine revolves around the Sun as the source of life, bringing light to others through good deeds, and understanding the Universe as the key to enlightenment. The constant puns on "light" were intentional on Martin's part.) As a result, the station's support staff is made up of converts. The scientists pay them well and humor them. Martin is somewhat bemused, but takes his responsibility seriously. He doesn't abuse his position, and holds a short service every Sunday.

8 CHARACTERS

"No, I won't be able to proceed for another few hours. The target is clearly still awake. 2300, at the earliest."

"Roger," responded the voice in her ear. "Are you secure at your current location?"

"I think so," replied the agent of the SIA. "This cafe is open all night, and I should remain undisturbed. Most people find my newest biomods – disturbing."

"Including me. I understand body art – hell, you've seen my zebra stripes – but those spots you've got just look leprous."

"Greetings, maiden!"

"Ah, what was that?"

"Hold on," said the spy. "A very drunk man, apparently Chinese, with a sword, is falling on my table."

"With a ***sword****?"*

"May I sit, and together we will explore the possibilities of the night?"

"Thank you, but I'm waiting for someone," said the spy.

"Yes, you're waiting for a possible Preservationist saboteur to go beddy-bye," whispered her implanted communicator.

"Not now!" she subvocalized.

"Then we shall wait together! Boy, bring beer! The lady's cup is dry."

"I was drinking ***coffee****."*

"Then we shall remedy that. You need a good dose of alcohol to appreciate the stories I have to tell."

"I'm sure there are plenty of those," she sighed.

"This is good; I'm recording. See if he's got anything spicy."

Character Types

Mars and the other worlds of the inner solar system are home to a near-infinite variety of people. Many of the character types from ***Transhuman Space*** are appropriate, especially colonists, explorers, miners, and scientists. More character types are given below, along with elaborations on some existing ones.

Aerospace Pilot

As on Earth, the flyboys of Mars consider themselves a breed apart. The red planet is one of the few inhabited worlds besides Earth where the atmosphere is thick enough to support winged flight. Both Rust China and America/Mars have several wings of spaceplanes defending their skies and sharing orbital space. Today, pilots only see combat against criminals and terrorists. Tomorrow, there may be war, and those who control the skies control the planet.

Advantages: Combat Reflexes, of course! Good pilots may have a positive Reputation. Other choices include Absolute Timing, Acceleration Tolerance, Allies, Danger Sense, Military Rank, and 3D Spatial Sense.

Disadvantages: Duty is quite likely. Other possibilities include Fanaticism, Impulsiveness, Jealousy, Overconfidence, and Proud.

Skills: Piloting, obviously, along with Gunner, Computer Operation, and possibly Mechanic and Electronics Operation.

Biotech: Many biomods improve reaction time, such as nerve boosters (p. TS165). Many aerospace pilots are bioroids; the Felicia (pp. TS116-117) and Chronos series (p. BIO48) make fine pilots. An aerospace pilot may also *be* his vehicle; see the Strix (pp. TS124-125) and Ying UCAVs (p. 86).

Agent

This character type represents field agents of Bureau 12, the SIA, or another intelligence agency. Agents are prolific on both Mars and Mercury, and not unknown on Venus.

Chinese field agents are competent and dedicated. To date, all human Chinese operatives on Mars are trained on Earth, and most are Earthborn. About 25% are bioroids, and a third of those were literally bred to the job. Since agents have to be able to fit in anywhere, no generalizations about physical appearance are possible, but all are in top physical condition, and virtually none are normal humans.

Agents of the SIA are similarly able-bodied and agile-minded, though no agents *per se* are bioroids. If a specific mission has a role best filled by a bioroid, one will be used, but they are treated as tools, not equals. SIA agents tend to be less specialized than Bureau 12's people, but exceptions can be found on both sides. The SIA also makes more use of digital intelligences as agents.

Attributes: An agent's attributes *must* all be good, or he stops being a field agent until he's "fixed."

Advantages: All agents must take their agency as a Patron (25 points base cost). Some degree of Legal Enforcement Powers is typical. Advantages such as Alertness, Combat Reflexes, Danger Sense, and Language Talent are helpful.

Disadvantages: A Duty to the agency is required. Disadvantages may include Curious, Enemies, Fanaticism, Paranoia, and Secret.

Skills: Acting and Thief/Spy skills are key, but an agent may need to be an expert in *anything.* Agents on Mercury will have Vacc Suit and a greater emphasis on Engineering skills, for detecting and perpetuating sabotage.

Biotech: Almost anything, especially concealable biomods.

Areologist

Areology is the study of Martian geology. This section mostly describes a *field* areologist; one who goes out and digs. "Lab" areologists work on samples retrieved by field areologists. They do important work, but are less suited to be adventurers.

Areologists spend most of their time in the wilderness, far from help. After espionage agents, they are the group most likely to stumble on something meant to be secret. Areologists *may* be preservationists (p. 81), but just as many don't care, or are also terraformers themselves!

Many of the suggestions under *Scientist,* p. TS113, hold true for areologists. Other guidelines:

Advantages: Absolute Direction is rarely necessary, with GPS so common, but when you need it, you *really* need it. Fit and similar advantages are possible.

Disadvantages: Shyness and other antisocial disadvantages are good for the loner. Laziness is unlikely.

Skills: Geology (Areology), obviously. Chemistry, Hydrology, Physics, and Prospecting are also likely. Among nonscience skills, Climbing, Driving, Hiking, and Survival (Desert) all play roles.

Biotech: Andraste (p. 97), and, frequently, the Ruanmao biomod (p. 97) to help with the cold.

Areomancer

"Geomancy" is the English term for the Chinese art/science of *feng shui,* a traditional way of determining the best geographic location for anything from a grave to a factory. By 2100, geomancy has been absorbed by non-Chinese cultures, transmuted, and returned to alter its own roots. While it still has elements of its original mysticism, a good geomancer combines the skills of a surveyor, architect, interior designer, and ergonomics expert.

On Mars, the art is known as *areomancy.* The challenge of a brand-new planet – with thinner air, lighter gravity, different color palettes in the landscape, and wide-open terrain – enchanted practitioners of *feng shui,* and there are gigabytes of texts on how to apply the old art to the new world.

If called in to assist with, for example, a personal residence, a good areomancer must be able to choose a site for a building, accounting for the physical, aesthetic, and spiritual lay of the land. He then provides guidelines on the layout of the building. ("The food systems must never be visible from the airlock.") Choice of interior color is important, as is placement of furniture.

An areomancer will inevitably speak of the dragon-lines in the ground, and other spiritual issues, during his job. He may or may not believe in them, but so long as the end result is a solidly placed, easy-to-live-in, beautiful home, it doesn't much matter.

An areomancer is not a typical adventurer, but a good one may be consulted by the rich and powerful, and work on the design of important buildings such as gene-banks and military installations. They also spend a lot of time in the wild, locating good sites for new buildings. There's almost certainly one around any place where digging is being done in Chinese territory, and you never know what an excavation might turn up.

Advantages: Absolute Direction helps one to get a "feel" for a site, as does the improved version, 3D Spatial Sense. Versatile helps with many artistic skills. A truly good areomancer will have a positive Reputation, and probably Wealth as well. One who is retained by a particular rich individual will have a Patron.

Disadvantages: If dragon lines and such are superstition in the campaign, but the character believes in them, a Delusion may be appropriate, depending on much it affects his work. Areomancers who want to make a living do *not* exhibit Impulsiveness; placing a grave just right should take time. Some may have odd quirks – or even Phobias – about badly designed buildings, sitting askew to the window, etc.

Skills: The best areomancers will have Appreciate Beauty, Architecture, Area Knowledge, Cartography, Diplomacy, Fast-Talk, Geology (Areology), Professional Skill: Interior Design, Philosophy, Physiology, Psychology, Savoir-Faire, Surveying, Theology, and probably other Artistic skills.

Biotech: There are no solid guidelines; some will place an emphasis on the practical (Ruanmao, p. 97), others on the fashionable (glow-in-the-dark skin, p. 99).

Freedom Fighter

There are many different kinds of people trying to create a free and independent Mars. See p. 55 for some sample organizations. A PC freedom fighter will probably be oriented toward nonviolent techniques, including using politics and media to spread the "Free Mars" meme. Occasional carefully planned acts of sabotage are not out of the question.

Advantages: Positive Appearance, Charisma, Reputation, and Voice all help covert others to the cause. For a freedom fighter engaged in illegal activities, Night Vision and Sanctity are good choices. All kinds of rebels can use Allies and Ally Groups.

Disadvantages: Enemies and negative Reputations are likely. Serious dedication to the freedom of Mars can be expressed as Fanaticism, Obsession, and Sense of Duty.

Skills: The public figure can use Social skills, especially Diplomacy, Fast-Talk, and Politics. A few extra languages can't hurt. The saboteur should concentrate on the Thief/Spy category, and perhaps a few Combat/Weapon skills.

Biotech: No generalizations can be made.

Miner, Mars

Mars is home to many dedicated diggers. The classic "grizzled prospector" has a place, though "grizzled" in this setting may mean "genetically part grizzly bear" . . .

A miner's goal is discovering mineral wealth, turning it into cash, and retiring, preferably young. Most miners barely make a living (though the salesmen who sell them their equipment often get rich on the commissions). They spend a lot of time away from civilization, and if there's anything interesting to be dug up, a miner will probably be the one to do it. (Hellas (p. 25) is a prime example.)

Advantages: Danger Sense protects a miner against claim-jackers. For focusing on lengthy tasks like digging, Single-Minded is helpful.

Disadvantages: Weird and Odious Personal Habits are traditional, as is Paranoia. Low Wealth is common, and may lead to Greed. Many of the antisocial disadvantages like Loner can explain the miner's choice of occupation. If the miner doesn't have Single-Minded, Attentive may take its place.

Skills: Start with Prospecting and Geology, of course. Traveling across the wilderness calls for Hiking or a Vehicle skill. An especially well-trained miner may have Planetology. Other useful Outdoor skills are Climbing and Survival. Selling your ore often calls for Merchant.

Biotech: Andraste (p. 97), of course, and possibly Ruanmao (p. 97). Infomorphs in the more rugged types of cybershells (e.g., Polypede, p. TS123) can also be miners.

Miner, Mercury

On Mercury, miners tend to be members of large teams; working on Mercury is expensive, and beyond most individuals' means. The job is less glamorous, but the paychecks are regular.

Advantages: As skilled workers in an out-of-the-way location, miners on Mercury often have some level of Wealth, but nothing to spend it on. Single-Minded remains a possibility.

Disadvantages: Personal Paranoia is quite common on Mercury, though it tends to be a side-effect of the *institutional* paranoia, rather than an individual aberration. As for Mars miners, Greed and Attentive are possible.

Skills: As for a Mars Miner, plus Vacc Suit.

Biotech: Few biological modifications are useful, but some are cybershells.

"Of Independent Means"

It can be a great deal of fun to play someone who is absolutely stinking rich. Mars has fewer truly wealthy people than Earth, per capita, but the ones it does have tend to be more eccentric and interesting. Transhumanism is about exceeding the limits of "mere" humanity, and vast quantities of money certainly give the possessor abilities beyond most people.

Advantages: Begin with Filthy Rich and tack on as many levels of Multimillionaire as you want. Other advantages may include Patron, Status, and a good Reputation.

Disadvantages: The rich often make Enemies, and sometimes have a bad Reputation. Greed and Miserly can explain how the character got their wealth – or Generosity and Spendthrift may be where it's all *going.*

Skills: A character who made the money himself may have a very high skill to explain it; a Professional Skill or Economics are possibilities. The rich can have *very* unusual hobbies, justifying anachronistic skills like Fencing or Airshipman.

Biotech: With money no object, wealthy characters can get the most exotic biomods or extravagantly powerful cybershells, including custom work. Go wild!

Martian Preservationist

Some of the most active preservationists in the system are on Mars. Martian organizations like Negative Growth (p. 56) are among the oldest and most entrenched of these organizations. They also have more powerful enemies.

Most preservationists are nonviolent. As a philosophy, preservationism has a cocktail-party chic, but few follow through. The percentage who commit destructive acts is small, and even then many avoid hurting people in favor of attacks on infrastructure.

Precisely what a given preservationist is fighting varies, but on Mars they are most strongly opposed to terraforming projects and the introduction of life to Mars. Other preservationist hot buttons, like modifications to human genetics, are a low priority on Mars.

Advantages: Members of organized groups will often have Patrons, Allies, Ally Groups, or Claim to Hospitality.

Disadvantages: Enemies, or Secrets, are obvious. (Remember that it's rarely appropriate to take both; if you have a Secret, you don't have personal Enemies yet.) A Duty is possible. Fanaticism (or even Extreme Fanaticism) and Obsession are good for the most radical, as is Callous. Cannot Harm Innocents works for those who take the middle road.

Skills: Thief/Spy skills are important, though the less violent, more political types may put their emphasis on Social skills.

Biotech: Few generalizations can be made, though many adapt themselves to Mars through biomods like Andraste (p. 97).

Recurver

In a society of plenty, people often *recurve;* i.e., abandon their current occupation (in which they have reached a plateau), and begin a new one, which may be less financially rewarding but offers a chance to learn new skills. This can be as simple as changing divisions at a corporation, or as complex as moving to a new world to reattend college. With lifespans well over a century, many people recurve repeatedly in their lives, and collect an eclectic combination of skills.

Advantages: Recurvers sometimes pick up Cultural Adaptability, G-Experience, or Versatile along the way. A *very* weird combination of previous careers might require Unusual Background.

Disadvantages: Impulsiveness, Distractible, and Short Attention Span are possible, but *not* required; changing jobs every decade or so is hardly impulsive! Broad-Minded, Curious, and Xenophilia are good choices. Since recurvers don't pursue wealth, Struggling or worse is not unknown. Hidebound, Incurious, Obdurate, and similar disadvantages are unlikely.

Skills: There are no hard-and-fast guidelines for recurver skills. Diversity – sometimes apparently nonsensical – is key.

Biotech: Recurvers are usually not bioroids – bioroids tend to have an easier time finding their niche. Biomods can be quite varied, and some recurvers change their bodies as often as they change professions.

Student

The University of Mars is full of young people just beginning the adventure that will be their lives. Aspiring areologists and up-and-coming terraformers have the opportunity to study under the most knowledgeable teachers in the System, and outside the dome lies an entire planet to learn from – and experiment on. Undergraduates at U. Mars have remarkable freedom compared to their counterparts of the 20th century; with lifespans rocketing upward, no one expects a student to spend only four years in college, and the notion of schools acting *in loco parentis* died decades ago. This all combines to create an environment where everyone *wants* to learn, and gets every opportunity to do so.

Advantages: Independent Income (p. TS131) can represent a scholarship or helpful parents. A benevolent professor can be a Patron. Other suggestions include Language Talent, Less Sleep, and Mathematical Ability.

Disadvantages: Low levels of Wealth are typical. Broad-Minded, Clueless, Compulsive Behaviors, Curious, Nosy, and Overconfidence are all possible as well.

Skills: These depend on the student's field of study, but Research and Computer Operation are always good choices. Living in Nix Olympica usually leads to learning Vacc Suit early on. Many students pick up some interesting Social skills while attending university, including Acting, Carousing, Fast-Talk, and Sex Appeal.

Biotech: Few generalizations can be made, though Andraste (p. 97) is surprisingly *un*common. The university is surrounded by near-vacuum, and many young people don't get invasive biomods until they decide what to do with their lives.

Terraformer

A terraformer is a scientist with skill in the theory or practice of making worlds more Earth-like. The current emphasis in terraforming is on biotech techniques, and the best-paid 'formers are thus biologists and geneticists. Brute-force techniques such as dropping comets on planets are still used, however, and there's room for many different kinds of scientist under the terraforming banner. *Macro* terraformers are the rock-droppers. They also work with orbiting mirrors and sun shades. They like to think big, and are regarded as unsubtle by their counterparts. *Bio* 'formers alter worlds through bacteria and other microscopic life. They tend to count on the self-replicating properties of life to get the job done on time. *Ground-workers* are those responsible for local-scale "civil engineering," such as bursting and redirecting aquifers, and other jobs that involve relatively small portions of the planet (mesocosms). They also generally build and maintain hardtech solutions like CFC factories (p. 11). The scientists who place nonmicroscopic plants and animals on the surface are derogatively known as *landscapers,* and prefer to be known as zoologists, botanists, etc.

Many of the suggestions under *Scientist,* p. TS113, hold true for terraformers. Other guidelines:

Advantages: Altering planets takes a long time; Longevity is useful for someone who wants to see a project through (though in 2100, it's almost redundant).

Disadvantages: Impulsiveness as a disadvantage would produce a *frustrated* terraformer, impatient with geological time scale. Megalomania is not impossible; changing worlds to suit oneself can give anyone a god complex. A sufficiently outspoken and public terraformer may have preservationist Enemies. "Won't

work on planets with native life" is a potential quirk. (If the character also actively tries to *stop* others, he may also be a preservationist (p. 81).)

Skills: Terraforming expertise starts with Planetology (Earth-like) (p. CI157). Other skills depend on specialty. Macro 'formers will have Astronomy, possibly a few points in Planetology (Rock/Ice worlds) and Planetology (Hostile Terrestrial), and probably a few points in Engineer (Macrostructures). Bio terraformers will have Biochemistry, Genetics, and probably Chemistry. For ground-workers, Cartography, Geology, Hydrology, and Surveying are important. Landscapers have Agronomy, Botany, Ecology, and/or Zoology. Other skills which may be of use to any terraformer include Meteorology, Physics, and possibly Xenobiology, depending on the world.

Biotech: Ziusudra parahumans (p. TS118) make *excellent* terraformers; with their lifespans, they have time to see it through.

Several fools – no, I mean several tourists – usually go together, and divide up the expense, and thus make it light.
– Mark Twain, A Tramp Abroad

Tourist

Casual tourists rarely come to Mars. The long space trip and lethal atmosphere scare many away. This doesn't stop hundreds of people every week from visiting, but they tend to be *dedicated* tourists, ready to dig in and see what Mars has to offer.

Advantages: Frequent tourists often have Comfortable Wealth or better. Absolute Direction can be very useful. Many tourists seem to *lack* Common Sense.

Disadvantages: Again, the tourist stereotype can include Absent-Minded, Compulsive Carousing, Cowardice, Gullibility, Impulsiveness, Intolerance, Overconfidence, Stubbornness, and Weirdness Magnet. Curious is almost required!

Skills: Photography and Video Production (see p. 91). A tourist who pays attention will have Area Knowledge skills for the places he's been.

Biotech: Few generalizations can be made. Most tourists will *not* be able to breathe Martian air unaided.

Triad Enforcer

Some members of the Martian Triads can be suitable as PCs. The ethical component of their situations will be complex, to say the least, but some of the most intriguing heroes of fiction come out of criminal backgrounds.

Advantages: Patron (Martian Triads), of course (see p. 89). A Triad may have an Alternate Identity, or even be Zeroed. Contacts and other social advantages like Allies may help the gangster stay informed.

Disadvantages: A Duty to the Triads is standard. Negative Reputation and Enemies are obvious candidates. Violent disadvantages like Bad Temper, Berserk, Bully, On The Edge, or even Sadism give the character a dark side to struggle against.

Skills: Thief/Spy skills and Combat/Weapon skills should top the list, with Social skills like Fast-Talk and Intimidation on there as well.

Biotech: Most Triads will have a few combat biomods (such as Whirling Claws o' Death, p. 98), as well as some that improve life expectancy (such as Auxiliary Heart, p. BIO67).

Triad Professional

The Triads are more than just thugs; their membership includes brilliant bioroid designers, anti-police counter-espionage experts, and a flotilla of accountants and administrators. For these professionals, life can be very similar to their counterparts on the right side of the law . . . just better-paid, and with a higher risk of jail, or worse.

Advantages: As for Triad Enforcers.

Disadvantages: Again, a Duty to the Triads is standard. For a few poor people whose skills were in *very* high demand, this may be an Involuntary Duty. Other potential disadvantages include Greed and a Secret.

Skills: Choice of skills depends on the chosen profession. Thief/Spy skills are appropriate for the anti-police expert, while a range of Science skills is needed to pirate and improve bioroid designs.

Biotech: Few generalizations can be made, but Triad professionals can usually get whatever biomods they want, cheap.

Truckers

Many who love the Martian wilderness choose to have their minds uploaded to cybershells in the form of cargo vehicles. Typically these are trucks, like the example on p. 102, but some choose hoppers or even zeppelins. Once so transformed, they spend their time moving goods across Mars, and enjoying the landscape as it rolls by.

Note that the various advantages and disadvantages associated with the Truckers' Guild are not necessarily possessed by every member. For example, it's possible to be a capital-T Trucker and not have the Code of Honor . . . and if your co-Truckers become aware of this, they might stop being an effective Ally Group, without actually kicking you out of the Guild.

Advantages: See *Ghost Mind Emulation,* p. TS120, and *Machine Body,* p. TS131, for the advantages associated with a artificial body and brain. Advantages that suit the lifestyle include Contacts and Favors. An actual member of the Truckers' Guild (p. 54) will have an Ally Group, possibly Claim to Hospitality (typically at the 5-point level), and sometimes a positive Reputation.

Disadvantages: Mistaken Identity is possible, since cargo vehicles are mass-produced. The long trips can lead to Attentive or Staid, the urge to see over the horizon may be caused by Curious, and a desire for solitude on the road may be the Loner, Reclusive, Shyness, Solipsist, or Uncongenial disadvantages. Members of the Guild may have Sense of Duty (Truckers' Guild) for -5 points, and some have the Truckers' Code of Honor (see p. 90).

Skills: Vehicle skills, such as Driving and Piloting, are not necessary when the vehicle is the driver's *body;* DX may be used. However, the skills may still be taken, both for their knowledge aspects (e.g., traffic laws), and to improve control in the same way skills like Jumping and Running work for organic humans. Navigation and Administration (to arrange for cargos) are good. Most cybershelled people understand their own bodies well enough to have Mechanic. Truckers will usually also have an assortment of Area Knowledge skills.

Biotech: None.

Xieh ("Mercenary")

The Chinese have their own variant on the knight-errant, called the *xieh.* The traditional xieh is a knight and swashbuckler, but differs from the knight in his lustiness and from the swashbuckler in his viciousness. An expert fighter, he will pursue the vendettas of the wronged, steal from the rich and give to the poor, and fight tirelessly against tyranny. He will also get blind drunk in the filthiest dives, make unwelcome advances upon those he finds attractive, and does not have "mercy" in his vocabulary.

On Mars, the term "xieh" refers to veterans of the Pacific War. When that war ended, any honorably discharged Chinese veterans who wanted to emigrate to Mars were automatically accepted, partly as a reward for service and partly to beef up the defense of the Chinese colony cheaply. The Chinese government had (justified) worries about TSA interference with the colony.

Many of the veterans were, and are, suffering from war-related psychological problems such as post-traumatic stress disorder. These "shell-shocked" soldiers have found that the traditional role of the xieh suits them; violence, sex, and alcohol are easy to understand. They usually claim to be unemployed mercenaries, and many of the more competent actually find work with the Europa Defense Force or other organizations. Others live a nomadic life of short-term jobs and drunken debauchery.

Advantages: Any of the combat-oriented advantages such as Combat Reflexes and High Pain Threshold are good. Some of the more even-tempered xieh have positive Reputations in their home habitats.

Disadvantages: A xieh's psychological problems can be represented by Amnesia, Berserk, Bloodlust, Chronic Depression, Flashbacks, Guilt Complex, Nightmares, and Post-Combat Shakes. Their self-destructive behavior can include Alcoholism, Compulsive Carousing, Gluttony, Impulsiveness, Lecherousness, On the Edge, and Overconfidence. Their remaining moral code may be covered by Cannot Harm Innocents, Code of Honor, and Sense of Duty. Outside Chinese territory, xieh will have a negative Reputation as uncouth, violent louts. Some will have Enemies, either from the war or more-recently acquired. Most physical disadvantages would either have prevented the character from joining the military, or been cured while they served. A few nasty, intractable conditions caused by TSA nanoviruses are possible, best expressed as Terminally Ill.

Skills: Combat/Weapon skills are necessary, most likely including Guns and Judo, though many xieh have also picked up some Broadsword. Social skills like Carousing, Fast-Talk, and possibly Leadership are also probable. Assorted Thief/Spy and Military skills (including Strategy and Tactics) can represent their training.

Biotech: Any combat-oriented ones. Many are bioroids, including Chinese knock-offs of the Chronos series (p. BIO48).

Transhuman Characters

Almost all of the diverse branches of humanity are represented in the inner System. The following sections introduce a variety of new racial templates.

Being Transhuman on Mars

Mars is arguably *the* crucible of transhumanism. It is unique in the System, in that humans need to be modified only slightly to survive there; every other world is either airless, far too hot, or much too cold. Thus, Mars places *survivable* evolutionary pressure on humans, and they are flowering under that impetus.

There are few other places where transhumans feel more at ease. Mars is a place that has pushed them, molded them, and, at last, welcomed them. It is a desert Eden closed to baseline humans. It is home.

Han Chinese Alpha Upgrade Variant — *25 or 27 points*

Attribute Modifiers: HT +1 [10].

Advantages: Attractive [5]; Disease Resistant [5]; Longevity [5]. *Women only:* Easy Childbirth [1]; Light Menses [1].

Features: Taboo Traits (Genetic Defects, Mental Instability).

Date: 2055. ***Cost:*** $40,000.

The Han Chinese are the most common ethnic group in China, and among the upgraded on Mars, this is the most common genotype. It's also used as a baseline for many types of bioroid and parahuman. Licensed from Biotech Euphrates by Xiao Chu, this specific variant has a few additions for women, but lacks the heightened dexterity of the original Alpha upgrade (p. TS115).

Han Alphas generally do not regard themselves as a separate society. They're common enough on Mars that they think of themselves as "Martian" first, "Chinese" second, and "Alpha-Series" third or lower.

Mars Adapt ("Red Bear") — *77 points*

Attribute Modifiers: HT +1 [10].

Advantages: Andraste biomod (p. 97) [14]; Decreased Life Support (Requires less water) [10]; Extra Fatigue +3 [9]; Nictating Membrane 1 [10]; Temperature Tolerance 4 [4]; Toughness (DR 2) [25].

Disadvantages: Overweight [-5].

Features: Taboo Traits (Genetic Defects). Home gravity of 0.38 G.

Date: 2082. ***Cost:*** $156,000.

These parahuman gene sequences are available from Colonial Genetics and Xiao Chu. An "adapt" is suited to walking around Mars as if it were temperate Earth; they can breathe the air, enjoy the cold, survive for long periods without water, and aren't seriously inconvenienced by most sandstorms. They have tougher skin, thicker body hair, and are noticeably padded with fat. They are occasionally known by the nickname "red bears."

Adapts are common, making up some 10% of the population. They have a definite cultural identity, seeing Mars as *their* home. Most other inhabitants, in their eyes, are guests (though usually welcome ones). Many are, or claim to be, preservationists. Almost all have a genuine love for Mars, and are happiest out enjoying its beauty.

The Temperature Tolerance advantage here is biased toward cold. The upper limit is 70°; the lower limit is 15 - (HT×4)° (-29° for someone with HT 11).

Zhiminde — *21 points*

Attribute Modifiers: ST-1 [-10]; HT +1 [10].

Advantages: Andraste biomod (p. 97) [14]; Disease-Resistant [5]; Extra Fatigue +1 [2].

Features: Altered Sex Ratio (2:1 female-male births); Taboo Traits (Genetic Defects, Mental Instability, Unattractive). Home gravity of 0.38 G.

Date: 2058. ***Cost:*** $50,000.

This was the first Mars-optimized parahuman design, replaced in later years by the Yousheng (p. TS117) and similar models. At the time it was created, even the modifications included in the Andraste biomod were insufficient to survive the low-pressure, low-oxygen atmosphere of Mars, but the forward-thinking designers knew that it would not be too many more years before the Zhiminde parahumans could breathe Martian air. Just as for the Yousheng, the reproductive modifications ensure rapid population growth.

High Arcadian Centaur Cybershell — *173 points*

Attribute Modifiers: Upper body, ST +3 (Limitation: No jumping bonus, -5%); lower body ST +16 (Limitation: No Fine Manipulators, -40%) [71]; HT +2 [20].

Advantages: Attractive [5]; DR 5 [15]; Enhanced Move (Running) 1 [10]; Four Legs [5]; Machine Body [37]; Radio Speech [25]; Sanitized Metabolism [5].

Disadvantages: Inconvenient Size [-10]; Social Stigma (Valuable property) [-10].

Features: May have up to a Complexity 8 compact mainframe computer.

Date: 2085. ***Cost:*** $100,000 + computer.

This is a cybershell designed to look like a "natural" centaur, in the tradition of Greek mythology. High Arcadia (p. 28) obviously needed centaurs to give their park its proper feel, and the company's geneticists have not yet managed to produce an organic centaur (though they're working on it very hard). Several hundred exist in High Arcadia. About a third of them are "extras," with NAIs. They do not interact with guests, but are used for crowd scenes and the like. Another third are subsapient, and interact with guests in limited contexts. The last third are fully sapient, and may serve as "native" guides for groups of guests. Like cyberdolls (p. TS122), many cannot tan, bruise, etc. Some models intended for the combat city of Sparta *can* sweat and bleed (although loss of blood is not lethal, merely messy).

High Arcadia does not want any emergent intelligences or ghosts in their centaurs, and their security measures to prevent direct access to the centaur brains are tight. They also have the patent on the design, and are very unlikely to sell one . . . though anything is possible, if the price is high enough.

Upper body ST is used for grappling, swinging weapons, or throwing things. Lower body ST is used for kicking, using the table on p. B140.

Seeker Missile — *160 points*

Attribute Modifiers: ST -9 [-80]; DX +2 [20]; HT +2 [20].

Advantages: Acceleration Tolerance [10]; Combat Reflexes [15]; Doesn't Breathe [20]; DR 15 [45]; Flight (Limitation: Cannot hover, -15%) [34]; Infravision [15]; Machine Body [37]; PD 4 [100]; Radio Speech (Enhancement: Laser, +40%) [35]; Super Flight 7 [140]; 3D Spatial Sense [10]; Telescopic Vision 4 [24].

Disadvantages: Deafness [-20]; Inconvenient Size [-15]; Legless [-35]; Limited Endurance (1 minute) [-100]; Mistaken Identity [-5]; No Manipulators [-50]; No Sense of Smell/Taste [-5]; Reduced Hit Points -8 [-40]; Social Stigma (Barbarian) [-15].

Features: Self-Destruct (As for a particular 60mm warhead, see *Smart Warheads,* pp. TS158-159). Tiny computer (Compact, Complexity 5).

Date: 2082. ***Cost:*** $26,000 + computer.

A small "brilliant" missile. It can be carried in a backpack or vehicle-launched, and with appropriate AI (usually nonsapient) can hunt and destroy targets with minimal human intervention. Hainan Aerospace's Fei Ming ("flying midge"), a 3'-long streamlined cylinder, is typical. It has Speed 750-800 (1,500-1,600 mph) giving it a range of about 25 miles.

J-56 Ying Transatmospheric UCAV — *1,053 points*

Attribute Modifiers: ST +15 (Limitation: No Fine Manipulators, -40%) [90]; HT +3 [30].

Advantages: Acceleration Tolerance [10]; Chameleon 5 (Enhancements: Infrared, +50%; Radar, +50%) [70]; DR 120 [360]; Extra Encumbrance [5]; Extra Hit Points +15 [75]; Flight (Enhancement: Space acceleration: 0.3 G, +20%; Limitations: Small wings, -10%; Limited use: 2 hours, -30%) [36]; Injury Tolerance (No brain) [5]; Machine Body [37]; PD 4 [100]; Radio Speech (Enhancement: Laser and radio, +40%) [35]; Radiation Tolerance PF 10 [14]; Spectrum Vision [40]; Super Flight 5 (Limitation: Limited use: 2 hours, -30%) [70]; 3D Spatial Sense [10]; Telescopic Vision 6 [36]; 360-degree Vision [25]; Vacuum Support [40]; Weapon (10mm Emag, p. 108, LC 0) [100].

Disadvantages: Dependency (On high-tech maintenance; infrequent; weekly) [-40]; Inconvenient Size [-10]; Limited Endurance (6 hours) [-10]; Mistaken Identity [-5]; No Manipulators [-50]; No Sense of Smell/Taste [-5]; Social Stigma (Barbarian) [-15].

Features: Complexity 6-8 microframe computer. Internal Weapons Bay (carries 200 lbs., anything carried counts as encumbrance).

Date: 2092. ***Cost:*** $1,080,000 + computer.

Built for PLAN-SF by MAST, Ying ("Hawk") UCAVs are similar to the French-designed Strix (pp. TS124-125), but intended to be dropped from SCVs in Mars orbit. (See p. 106 for a typical Chinese SCV.) A Ying can glide into the atmosphere, engage its target, and then return to low orbit for resupply. It uses metal-oxygen chemical rockets in space, switching to turbofans in atmosphere. A Ying is 10' long, and consists of a broad, flat wing with a long tail. The tips of the wing and tail are marked by rocket exhausts. In Martian atmosphere, it can fly at over 700 mph; it is not as fast as a Strix, but it is somewhat tougher. In space, "top speed" is meaningless, of course, but a J-56 can accelerate at 0.3 G for 10 minutes. Typical weapon fit is a 10mm Emag (p. 108) with 1,000 rounds, plus a bomb bay with 200-lb. capacity. It weighs 950 lbs.

Venus-Capable Cybershell — *343 points*

Attribute Modifiers: ST +2 [20]; HT +2 [20].

Advantages: Doesn't Breathe [20]; DR 20 (Enhancement: Acid-resistant, +10%) [66]; Extra Legs (Four total) [5]; Machine Body [37]; PD 3 [75]; Pressure Support [10]; Radio Speech [25]; Temperature Tolerance 80 [80].

Disadvantages: Mistaken Identity [-5]; Social Stigma (Valuable property) [-10].

Features: May have up to a Complexity 8 compact mainframe computer.

Date: 2090. ***Cost:*** $35,000 + computer.

This is the simplest, cheapest cybershell suitable for the Venusian environment. It is the type available for infomorph tourists to rent at Research Station Aphrodite (p. 72) for $35 per day. It is an ugly bundle of parts sprouting four legs, two arms, and a sensory cluster. It is roughly the same size as a human.

May-I Bioroid — *25 points*

Attrbute Modifiers: HT +1 [10].

Advantages: Alertness +1 [5]; Attractive [5]; Bioroid Body [0]; Cool [1]; Language Talent +2 [4]; Lightning Calculator [5].

Disadvantages: Hidebound [-5].

Date: 2074. ***Cost:*** $97,000.

This type of bioroid gets its nickname from the phrase "May I help you?" Produced by Xiao Chu as the ZR-12, they are intended for service work that requires what would have been known in earlier centuries as "the human touch," and is today known as "biorelations." They often serve as store clerks, administrative aides, or servants. These bioroids are common and legal in both Rust China and America/Mars. The Hidebound disadvantage is unintentional, but present in about 75% of all May-Is; the manufacturer is working on fixing this. May-Is successfully manufactured without Hidebound sell for $5,000 more.

Being a Bioroid on Mars

On Mars, the attitudes toward bioroids in a given colony tends to parallel the homeland. At a glance, America/Mars and Rust China seem to have similar attitudes, but the truth is more complex. In the American colony, bioroids are legally less than human, and their indentures are long. While mistreating a bioroid is illegal, "good treatment" does not include respect, and the laws can be laxly applied. Possibly to prevent public sympathy for their situation, there are tight legal restrictions on how smart and human a bioroid can be. In Rust China, on the other hand, bioroids are the *zhongdian renkou,* the "special population," and have better standing. When created, they are automatically indentured to whoever commissioned their creation (their "employer") for a period of 2 to 10 Martian years. The employer may be a corporation or Rust China itself; it may not be an individual. Further, the indenture is transferable, and bioroids who request a transfer are occasionally obliged. Bioroids are legally protected from abuse, and entitled to good care. Once their indenture is over, they are free citizens. The few all-European Martian habitats, as in the European Union itself, prohibit creation of bioroids. Other colonies vary among these situations.

Social attitudes towards bioroids vary along similar lines. Free bioroids may experience occasional prejudice in Rust China, but are just as likely to be accepted as fellow fighters in the battle against a hostile environment. Free bioroids will likely find attitudes in America/Mars condescending at best.

The most common types of bioroids produced are those adapted for physical labor in the outside environment. Factory workers and service personnel are also common.

As everywhere, there are bioroid liberation movements on Mars; see p. TS91. There is an "underground railroad" between areas where bioroids are treated poorly and those where they're treated well, but it is sporadic and not entirely effective. A bioroid's previous owner is quite likely to track him down, and Rust China and America/Mars have a (highly controversial) extradition treaty. Any habitat that harbors escaped bioroids, and refuses to extradite them, is likely to find its economic position increasingly precarious.

Martian Triad–Produced Bioroids

A sizable percentage of Triad profit comes from manufacturing and trafficking in bioroids; see p. 57. These are some of the more popular models. Note that the Triads began bioroid manufacture in the late 2080s; any illicit bioroids older than that were produced by a different criminal organization.

Tiaoqi Series Bioroid — *69 points*

Attribute Modifiers: ST +4 [45]; HT +2 [20].

Advantages: Alcohol Tolerance [5]; Bioroid Body [0]; Hard to Kill 1 [5]; Rapid Healing [5]; Toughness (DR 2) [25]; Unfazeable [15].

Disadvantages: Callous [-6]; Disturbing Voice [-10]; Gigantism [-10]; Hidebound [-5]; Hideous [-20].

Date: 2086. ***Cost:*** $141,000.

These bioroids are designed for enforcer and "bouncer" duties. They are physically intimidating, and have the strength to back it up. In appearance, they are huge and solid, with hands like clubs, low brows, and beady eyes. Their voices are grating and harsh. Note that "Taboo Traits (Genetic Defects)" included in the Bioroid Body advantage does not include the "defects" that are intentional, such as Hideous.

Valkyrie Series Bioroid — *101 points*

Attribute Modifiers: ST +1 [10]; DX +2 [20]; HT +2 [20].

Advantages: Beautiful [15]; Bioroid Body [0]; Breath-Holding 1 [2]; Charisma +2 (Limitation: Scent-based, -20%) [8]; Combat Reflexes [15]; Disease-Resistant [5]; High Pain Threshold [10]; Less Sleep 2 [6]; Pheromone Control [25]; Resistant to Poison [5].

Disadvantages: Bad Temper [-10]; Gluttony [-5]; Impulsiveness [-10]; Lecherousness [-15].

Date: 2088. ***Cost:*** $173,000.

This combatrix bioroid is a combined pleasure model and combat model, popular in the role of bodyguard. All Valkyries are female. They are made with control over both sex and dominance pheromones, giving them Pheromone Control and scent-based Charisma. Gluttony is an unexpected side effect.

Pleasure Models

Many pleasure models, both male and female, are based on the bootleg Eros series, and are available in a variety of physiological types. There is also a seemingly endless supply of variants, fine-tuned for individual fantasies. Several examples are listed below. A full list of custom bioroids, and the kinks they are designed for, is *well* beyond the scope of this book. (Note that all variants, unless specified otherwise, have Taboo Traits (Genetic Defects).)

Eros Series Bioroid **40 points**

Attribute Modifiers: ST -1 [-10]; HT +1 [10].

Advantages: Bioroid Body [0]; Deep Sleeper [5]; Disease-Resistant [5]; Light Hangover [2]; Pheromone Control [25]; Sanitized Metabolism [5]; Sex Appeal +3 [3]; Very Beautiful/Handsome [25].

Disadvantages: Impulsiveness [-10]; Lecherousness [-15]; Unnatural Feature (Exaggerated sexual characteristics) [-5].

Date: 2082. ***Cost:*** $112,000.

Based on a discontinued Xiao Chu design, the Eros series was one of the first bioroids to be produced by Earth-based criminal syndicates. It has since become a mainstay of the Martian Triads.

Budget Model **-17 points**

Attribute Modifiers: ST -1 [-10].

Advantages: Bioroid Body [0]; Disease-Resistant [5]; Sex Appeal +3 [3]; Beautiful/Handsome [15].

Disadvantages: Impulsiveness [-10]; Lecherousness [-15]; Unnatural Feature (Exaggerated sexual characteristics) [-5].

Date: 2082. ***Cost:*** $55,000.

This variant is much cheaper to manufacture, and still gets the job done.

Girl/Boy Next Door Series **22 points**

Attribute Modifiers: ST -1 [-10]; HT +1 [10].

Advantages: Bioroid Body [0]; Deep Sleeper [5]; Disease-Resistant [5]; Light Hangover [2]; Sanitized Metabolism [5]; Beautiful/Handsome [15].

Disadvantages: Impulsiveness [-10].

Date: 2083. ***Cost:*** $94,000.

This type of bioroid lacks the exaggerated anatomy of the Eros series, and has a psyche closer to baseline. It finds favor with people looking for a sweet, "ordinary" companion.

Huli Series Bioroid **66 points**

Attribute Modifiers: ST -1 [10]; DX +1 [10]; HT +1 [10].

Advantages: Acute Hearing +1 [2]; Bioroid Body [0]; Deep Sleeper [5]; Disease-Resistant [5]; Double-Jointed [5]; Fur [4]; Perfect Balance [15]; Pheromone Control [25]; Sanitized Metabolism [5]; Beautiful/Handsome [15].

Disadvantages: Impulsiveness [-10]; Lecherousness [-15].

Date: 2087. ***Cost:*** $138,000.

Among Asian clientele, this is by far the most popular "furry" pleasure model. These foxboys and -girls are common sights in brothels. While they have the luxuriant coat and pointy ears of foxes, they lack sharp teeth and claws, and do not have night vision.

Nyame Series **57 points**

Attribute Modifiers: HT +2 [20].

Advantages: Bioroid Body [0]; Deep Sleeper [5]; Disease-Resistant [5]; Hermaphromorph [2]; Pheromone Control [25]; Sanitized Metabolism [5]; Beautiful/Handsome [15].

Disadvantages: Lecherousness [-15]; Unnatural Feature (Hermaphrodite) [-5].

Date: 2090. ***Cost:*** $152,000.

This is an exotic hermaphromorph model, produced in small quantities. Most are androgynous, with elfin faces and small breasts; this subtype has the *Bishonen Look* +0% modification to its Beautiful advantage. Instead of getting a +2 reaction modifier from one sex and +4 from the other, androgynous Nyame get +3 from either gender. Other subtypes may appear solely male or female when clothed, and have the standard Beautiful or Handsome advantage.

Submissa Series Bioroid **65 points**

Attribute Modifiers: HT +3 [30].

Advantages: Bioroid Body [0]; Disease-Resistant [5]; Sanitized Metabolism [5]; Sex Appeal +3 [3]; Toughness (DR 1) [10]; Very Beautiful/Handsome [25]; Very Rapid Healing [15];

Disadvantages: Lecherousness [-15]; Unnatural Feature (Exaggerated sexual characteristics) [-5]; Weak Will -1 [-8].

Date: 2085. ***Cost:*** $137,000.

For people who prefer their sexplay energetic, this variant has a beefed-up body and heals quickly.

How to Make a Slave

The Triads take pleasure in coming up with different ways of making a bioroid obedient and accepting its fate. The Slave Mentality disadvantage is generally avoided; while brutally effective, it reduces the bioroid's effective intelligence to the point where a nonsapient AI would be cheaper for the same purpose. Instead, other, lesser disadvantages are encoded to create a bioroid *susceptible* to being enslaved; these include Confused, Edgy, Indecisive, Selfless, and Weak Will. A few physical disadvantages are often useful as well. Addiction or Dependency can make the bioroid physically dependent on a substance the owner controls – often not a "drug" in any normal sense, just a difficult-to-obtain chemical that the bioroid needs, or else he suffers.

Some mental disadvantages are hard or impossible to create genetically, but still useful when creating slaves. They can be instilled through training and "brainwashing," and include Codes of Honor ("Obedience before all else."), Delusions ("I only have value as property."), and Fanatic.

Advantages, Disadvantages, and Skills

Some elements of ***GURPS*** character creation require elaboration in the setting of ***In The Well.*** Page references to the ***Transhuman Space*** core book refer to the hardback.

Advantages

Claim to Hospitality *see p. CI21*

In a hostile environment, it can be argued that *everyone* has this advantage. When someone is out on the surface of Mars, and his oxygen is running out, refusing him shelter is tantamount to murder. Thus, unless there's an actual hotel or other form of public housing nearby, very few people will turn a stranger away from their door. In this setting, this advantage should be bought primarily for its reaction bonuses, not as an easy way of getting shelter.

Contacts *see p. B234*

In Rust China, many things that would be done through bureaucracy in America are handled through guanxi (p. 40). Contacts are critical for a guanxixue expert.

Legal Enforcement Powers *see p. TS212*

Top agents of Bureau 12, the SIA, and other "spy agencies" have Legal Enforcement Powers at the 15-point level. Most civil authorities (i.e., the police) are relatively low-powered, with 5 points of Legal Enforcement Powers. Corporate security personnel will also usually be at the 5-point level, or lower.

Patron *see p. TS214*

The Martian Triads have a base cost of 25 points as a Patron; not only is the organization wealthy, but it has contacts in exactly the areas most PCs need them.

Military and intelligence organizations are not necessarily Patrons to their members. If the organization will come to the character's aid, *even when he's off-duty,* then it's a Patron. Assuming this is the case for a given PC, Bureau 12, the SIA, and the militaries of China and the United States are worth 25 points (base cost) as Patrons. For smaller nations, or the espionage divisions of corporations, the cost will be lower.

Xiao Chu and Colonial Genetics are examples of corps that *do* act as Patrons to their employees, though this usually does not extend beyond offering legal and economic advice, helping the character find a place to live, or *possibly* short-term loans of money and noncombat equipment. Thus, although they are huge corporations, their base cost as Patrons is only 10 points. Most other firms (including Mars Interplanetary and the MDC) are not Patrons.

The Journal of Areoscience is a potential Patron; it is very good at arranging travel and accommodations for its regular contributors, and characters can consult its staff on virtually *any* scientific question. Base cost is 10 points.

Rank and Status *see pp. TS128, TS212*

Status works per the table on p. TS128. The levels on Mars go up through Status 6 (Chief Administrator/Governor); on Mercury, Venus, and most space stations, it doesn't exceed Status 5.

Both Military Rank (p. B22) and Administrative Rank (p. CI19) are important in this setting, and each grants one level of Status per three levels of Rank. Administrative Rank loosely follows the same progression as Status: Administrative Rank 1 is a low-level manager, and Rank 5 is the head of a corporation. For example: Chief Administrator Lanqing Wang has Administrative Rank 6 for 30 points; he's the head of a large bureaucracy with power over the entire Chinese colony, and influence back on Earth. These 6 levels of Rank give him 2 free levels of Status. Since he is also the political leader of Rust China, his total Status is 6; as a ***GURPS*** character, he must pay 20 points for the 4 additional levels of Status he has, above the 2 he gets free from Administrative Rank.

Security Clearance *see p. CI29*

On Mars, this advantage is worth 5 points/level for Rust China and America/Mars, and 2 points/level for other organizations. On Mercury, citizens of the European Union pay 5 points/level, others pay 2 points/level.

Style Familiarity *see p. CI30*

If martial arts are going to play a significant role in the campaign, this advantage is appropriate. It's also fairly easy to acquire; knowing where cafés the local martial artists hang out, and spending time observing their disputes, is a good justification for buying this advantage.

Tenure *see p. CI31*

The University of Mars does not grant tenure, for several reasons. First, the organization of the University is too *ad hoc* for there to be a tenure mechanism in place. Second, no one on Mars wants to be in the position of *having* to pay someone for no work. Third, U. Mars is the only game in town, and potential professors have no other real options.

Wealth *see p. TS213*

As in ***Transhuman Space,*** standard starting wealth for ***In The Well*** is $30,000. On Earth, people in Fourth and Fifth Wave countries like China and the United states actually tend to average higher than this (see p. TS127). On Mars, and in other space habitats, the situation is made complicated by the vast amounts of expensive infrastructure (life support, spacecraft) that are keeping the people alive. Estimates of personal wealth that include infrastructure say everyone living off-Earth is fabulously wealthy! For the purposes of role-playing, however, life-support equipment and such are not counted as personal wealth. "Average" wealth is, indeed, $30,000 for the average Martian, Mercurian, or Venusian.

The unit of currency in Rust China is the *revaluated yuan* (Y), usually just called the "yuan"; there are 10 yuan to the dollar (Y10 = $1). Prices in this book are expressed in dollars.

Curiously enough it was he himself who suggested lunacy and not mere eccentricity as the secret of his strange conduct.
– Sir Arthur Conan Doyle, "Captain of the Polestar"

In Rust China, few honest citizens have more than Comfortable Wealth, or Wealthy at most. Hard work *will* make life easier, but it won't lead to true opulence. (*Dishonest* Chinese citizens may have any level of Wealth they can grab.) Planet-wide culture (and Chinese culture in particular) tends to frown on having more than you need (see *Martian Minimalism,* p. 61). People in the public eye tend to live simply. There are some very notable exceptions to this (see *The Millionaires of Mars,* p. 47), but they're rare.

Disadvantages

Code of Honor *see p. B31*

Truckers' Guild: Charge a fair price. Deliver cargo on time. Support other truckers. Provide aid and assistance to other travelers. *-5 points.*

Delusions *see p. B32*

"The Church of Sol is a real religion" is a Delusion worth -5 points. See p. 77.

Enemies *see p. TS214*

A violent Free Mars faction, or radical Preservationists, are worth a base of -20 points as Enemies. The Triads are worth -30 points.

Evil Twin *see p. CI77*

Bioroids and cybershells of the same series do not necessarily look alike . . . but many do. This disadvantage is still silly, but it's quite possible for a bioroid to have a twin with a conflicting agenda.

Fanaticism *see p. TS217*

Not all Greens or Preservationists have this disadvantage; despite the propaganda, there are reasonable people on both sides of the issue. The core members of the Ares Conspiracy *are* Fanatics (those that are still alive). Similarly, most members of the violent Free Mars organizations are Fanatics, while the peaceful ones mostly aren't.

Lunacy *see p. CI92*

This disadvantage is totally inappropriate in a campaign set predominantly on Mercury or Venus (no moons), and very silly for a Martian campaign. If the GM allows it, he and the player need to specify which moon affects the victim, or if both do. Remember that Deimos is *fixed* in the sky over New Shanghai, and Phobos passes from horizon to horizon in just a few hours, waxing and waning rapidly.

Phobias *see p. TS218*

Traveling in the Space Elevator causes a Fright Check at -3 every time an acrophobic character goes near a window and the car is within a few hours' travel of the ground. (Above that point, it's more like being in a spacecraft than a really tall building.) Claustrophobes can also be affected by being in a building they can't get out of, but there's no modifier to the roll.

Reputation *see pp. TS212-213*

Being a known aggressive Green can lead to a Reputation -1 in "polite society" (usually a "large class"). Frequency of Recognition depends on how vocal you are. Preservationism in itself is less likely to cause a negative reputation, though any philosophy taken to extremes will lead to hostility from others.

Outside of Rust China, being a known or suspected member of the Triads is a Reputation -2 (or worse) from "law-abiding citizens," a large class. *Inside* Rust China, any Reputation, positive or negative, will depend on the individual Triad-member's actions.

Skills

Area Knowledge *see p. TS220*

The "planet" level of this skill, as it appears in the ***Basic Set,*** specifies that the character is only aware of people with Status 7+. This assumes a heavily populated, non-colonial world where there *are* people with that Status! For this setting, it should be taken to read "Knowledge only of people of the highest Status level on that world."

Areology *see p. B61*

Areology is a word used by people in this setting to describe a scientific discipline, but it is not a separate ***GURPS*** skill. It is instead an optional specialization of Geology (p. B61).

Engineer *see p. TS221*

A new specialization of this skill is *macrostructures,* used for building anything that compares in size to a planet, such as solar shades and orbital mirrors.

Falconry *see p. B46*

This is the skill used for training and controlling Mars hawks (p. 112).

Photography *see p. B47*
and Video Production *see p. CI130*

In this setting, these skills have less to do with technical details (such as the obsolete skill of developing film) and more to do with composing a good shot and telling the computer to record the image. They can also involve applying simple special effects to a recording, editing things out, and skimming through hours of footage looking for the one perfect moment to frame and hang on the wall.

Planetology *see p. CI157*

This skill is actually four skills, depending on world type. For the purposes of this skill, Mercury is a "Rock/Ice World," Venus is "Hostile Terrestrial," and Mars is "Earth-like." Historically, Mars also fell into the "Earth-like" category *before* terraforming began, though just barely.

Style Analysis *see p. CI135*

In a campaign with a significant martial arts flavor, this skill is appropriate. See *Style Familiarity* (p. 90).

Survival *see p. TS224*

Most of the major variations of this skill have a role on Mars, including Arctic, Desert, Island/Beach, Mountains, Plains, Swampland, and Woodlands. (Jungle and Radioactive are useless.) The Mars versions of these skills default to the Earth versions at -2 and vice versa. These outdoor skills cannot be used on Mercury or Venus.

Survival (Habitat): This new variant on the Survival skill covers the physical part of staying alive in a single *large* structure, such as space colony or moon base. It is very similar to the Survival (Urban) skill (p. CI153), and they default to each other at -2. A specialist in Survival (Habitat) can distinguish what different ducts are likely to carry, find the nearest airlock, know the best hiding places, and be aware of dangers like pressure leaks.

Terraforming

Terraforming, like Biology (p. B60), is much too broad a field to be encompassed by one skill. See p. 83 for skill suggestions for a terraforming scientist.

New Skill

Hydrology (Mental/Average)
Defaults to Meteorology-6

Hydrology is the science dealing with the waters of the Earth or other bodies – their properties, phenomena and distribution. It includes the hydrologic cycle: precipitation, evaporation and runoff to rivers, oceans and lakes, whether from soil or vegetation. A hydrologist could also answer questions about flood control, irrigation, erosion, glaciers, currents and so on.

(Variants of this skill for other liquids exist, such as Methology for Titan's seas. They default to Meteorology-8, and to Hydrology or each other at -3.)

Languages

Mandarin Chinese (M/A) is spoken by nearly all Rust Chinese. The few other Chinese dialects in use (Cantonese, etc.) are different enough to be effectively separate languages, and should be taken as such.

Martial Arts

Martial arts are in use on Mars, though they need not be the focus of the game. If the GM decides to include them, he must decide whether to allow the cinematic abilities. ***Transhuman Space*** is a *realistic* setting technology-wise, but that doesn't preclude some cinematic martial arts abilities.

As a guide, those cinematic abilities which merely represent physical feats above what is normally possible may be allowed. This can be justified both by the unusual abilities of transhumans and by the low gravity of Mars. Appropriate cinematic abilities include the advantages Iron Hand, Trained by a Master, and Weapon Master, and the skills Blind Fighting, Body Control, Breaking Blow, Dislocating, Pressure Points, Push, Throwing Art, and Zen Archery. Virtually all cinematic maneuvers are allowed. The skills Blinding Touch, Drunken Fighting, Flying Leap, Hypnotic Hands, Light Walk, Power Blow, and Pressure Secrets are borderline, and may be allowed at the GM's discretion. Skills which defy the laws of physics or depend on psionic abilities, are not permitted, including Flying Fists, Hand of Death, Immovable Stance, Invisibility Art, Kiai, Mental Strength, and Precognitive Parry.

Zhua *11 points/15 points*

The *Zhua* martial arts style is unique to Mars – and, indeed, would not work well on other worlds. The low gravity of Mars allows unusual martial arts feats, including the Jump Over maneuver (below). On planets with substantially more or less gravity, DX penalties for unfamiliar gravity (p. 34 and pp. TS53-54) should be *doubled* when using this style.

In use, Zhua involves balancing on one's toes, with one foot far in front of the other. The feet are used mainly for moving, the hands for attacking. Throws are not emphasized, as falls rarely hurt the opponent. Similarly, given the confusing variety in body types displayed by transhumans, Body Language is relegated to a secondary role. For those so equipped, this style allows for the use of claws in combat.

Zhua is taught throughout Rust China. Teachers can be found elsewhere on Mars, though they are not as common.

The point cost listed above assumes the martial artist has put 1 point in every primary skill and maneuver; the second cost includes cinematic skills and maneuvers. Secondary skills are typically not taught until the student has gained a basic mastery of the primary skills, and optional skills may or may not be taught at all. For more detail on martial arts styles, consult ***GURPS Martial Arts.***

Primary Skills: Acrobatics, Boxing, Jumping, Karate.

Secondary Skills: Body Language, Judo.

Optional Skills: Breath Control.

Maneuvers: Elbow Strike, Feint (Boxing), Jab, Jump Kick, Jump Over, Roundhouse Punch, Spinning Punch.

Cinematic Skills: Breaking Blow, Flying Leap, Power Blow.

Cinematic Maneuvers: Springing Attack.

New Maneuver: Jump Over (Average) Defaults to Jumping-4 or Acrobatics-4 Prerequisite: Jumping or Acrobatics; cannot exceed prerequisite skill level

This is a maneuver off the Jumping or Acrobatics skills, representing training in jumping *over* an opponent. It is only a realistic maneuver if the jumper's high jump (p. B88), *adjusted for gravity,* exceeds his foe's height. (On Mars, someone with ST 12 has a high jump of 5'9". For simplicity, the GM may assume that on Mars anyone with ST 12 or better may jump over any more-or-less human opponent, and not bother determining every combatant's height.)

To Jump Over, take the *Move* maneuver with intent to evade – but instead of slipping by the opponent, you go over him! This tactic requires a successful roll vs. Jump Over *and* costs 4 Move points (which may rule it out for heavily encumbered people). If the roll fails, the attempt to evade failed. If the roll succeeds, the jumper is at +5 on the Quick Contest of DX to evade (p. B113).

(GMs who are using the Chambara Fighting rules from ***GURPS Martial Arts,*** *Second Edition,* pp. 64-65, will note that this is nearly identical to a Chambara jumping evasion. If the GM is using Chambara rules, this maneuver is redundant and should not be used in the campaign.)

Some of the other Zhua maneuvers appear in ***GURPS Martial Arts,*** but not in ***GURPS Compendium I.*** For ease of reference, they are included here.

Officer Zhang was new to Mars, but as a veteran of Beijing's streets, he knew how to deal with rioters. Most of the New China student protestors had scattered, but he'd picked out their leader – a teenage Yousheng girl – and chased her into a blind alley. Now the unarmed hooligan looked about wildly, then balanced on her toes as if wishing she could fly!

Zhang grinned, hefted his shock-baton, and stepped forward . . . and the girl charged! As he raised his club to strike, she suddenly leaped, impossibly high, passing over his head! "Bye, bye, gunjin!" the girl shouted. "Free Mars!" Before the stunned Zhang could react, she'd vanished down the street. A block away, Qi Shu paused to catch her breath, grinning like a fox. Her time studying Zhua under Master Li had not been wasted after all.

Spinning Punch (Hard)
Defaults to Karate-2
Prerequisite: Karate; cannot exceed Karate skill level

This is the hand-attack equivalent to the Spin Kick (pp. CI171-172). It uses the same game mechanics, but damage is equal to normal punching damage.

Springing Attack (Average)
Defaults to Acrobatics-3
Prerequisites: Acrobatics and Karate

The martial artist using this maneuver must first adopt a low, crouched position; this requires a Karate roll. The intention behind this crouch is to store energy and spring forward in an explosive, powerful attack. On the turn following the crouch, the martial artist can roll against his Springing Attack; on a success, his next attack will do +2 damage. An ordinary failure means the martial artist loses his balance and is at -2 to DX and active defenses; a critical failure will cause the attacker to fall down!

If ***GURPS Martial Arts*** is available, the Cat Stance and Head Butt maneuvers are also appropriate for the Zhua style, as is Flying Jump Kick for cinematic Zhua.

Names

Nat-born people are usually named by and after their parents, as they have been for millennia, acquiring a given name and a family name. About one in eight change their names sometime between ages 10 and 25, frequently settling on a single name of personal significance.

Bioroids are named either by the crèche where they are decanted and educated, or by the individual who ordered them produced. In Chinese territory, a given crèche will give all its "children" the same last name, providing an artificial family and a network of contacts in later life. Some American crèches follow this technique, but just as many pull names out of a computer-generated hat. Bioroids are even more likely than nat-borns to adopt a new name after a few years.

On Mars in 2100, Chinese names are written personal name first, surname last. Common Chinese surnames include Chen, Gao, Guo, Huang, Li, Liang, Lin, Liu, Lu, Ma, Sun, Wang, Wu, Xu, Yang, Ye, Zhang, Zhao, Zhou, and Zhu.

Chinese personal names are extremely varied, and frequently unique. They are typically two syllables, assembled from a large stock of popular words. Common name-components for men include An, Chia, Chiang, Da, De, Guang, Huan, Huang, Nian, Pao, Qiang, Rui, Shi, Shun, Tai, Wen, Wu, Xiang, Xiong, and Zhi. For women, common components include Chin, Hong, Hua, Li, Lian, Ling, Ming, Mei, Mu, Qin, Qing, Shu, Si, Wei, Xia, Xiao, Ying, Yu, Yue, and Zhen. They can be combined in any order, and may or may not be hyphenated. (Some can also cross gender, but doing so without creating an unintentionally inappropriate name requires an understanding of Chinese custom and language beyond the scope of this book.) One-syllable names are also possible. Not every Chinese citizen has a purely Chinese name, of course. Combinations like Mei Sue Lu or Chiang Abd al-Basit are not common, but do exist. A guide to pronouncing Chinese is on p. 136.

American names are even more varied in 2100 than they are in 2002. Due to their rising population, Hispanic-derived names are somewhat more common. Apart from this, no generalizations can be made.

9 TECHNOLOGY

"As we near the end of this historic race, I think it's time to look back over the preceding weeks, and see what a remarkable feat these athletes have accomplished."

"I couldn't agree more, Xu. The First Olympus Biathalon has been remarkable. The days spent climbing the cliffs at Olympus base are trying enough under the best of circumstances, but these competitors did it carrying explorer's trikes on their backs."

"For those watching from Earth, the idea of scaling kilometers of wall with a bulky three-wheeler hanging from your shoulders may seem insane, but remember the lower gravity."

"Let's not sell these boys and girls short. Even at 0.38, those trikes are just as awkward."

"Then came the second part of their journey, pedaling ***up*** *the slope to the summit on the trikes they'd carried all that way."*

"And these athletes prepared for it. They've all received muscle grafts in the finest clinics, and their lungs are the size of both our heads together."

"As you can see on the video feed, the leader, young Foma Reis, is approaching the finish line. He's had a comfortable lead for the past day, but he's not slacking up. Records are being established today."

"Look at his leg muscles go! Doric, would you say?"

"Give the man credit. Those legs are nothing less than Corinthian columns."

This chapter is a catalog of personal gear, biomods, vehicles, and other equipment suitable for an ***In The Well*** campaign.

Prices

For items listed in this chapter, the prices given are for the location where the item is most commonly used. Venus suit prices are for Venus, climbing gear prices are for Mars.

Luxury items are very expensive anywhere in the solar system but Earth. Advances in minifacturing (p. TS69) allow many luxury goods to be manufactured anywhere there is a 3D printer, but frontiers like Mars have little excess manufacturing capacity; the 3D printers are too busy printing tools to make toys. Further, some luxuries can't be produced by minifacturing, such as genuine French wine.

As a guideline, the price of anything that isn't necessary for day-to-day life is, at a minimum, *doubled* outside Earth and near-Earth space. The more esoteric of frivolous the item, the greater the multiplier, up to about a tenfold increase in price. Note that the item doesn't have to be necessary for the daily life of the *purchaser;* it merely has to be in common use. Many people on Mars don't need respirators, but those who do create sufficient demand to keep the price reasonable.

Personal Gear

Almost all the gear from ***Transhuman Space*** is available on Mars and in the rest of the inner System as well, as is much equipment from ***GURPS Space*** and the ***GURPS Ultra-Tech*** series. In the following sections are a few items unique to Mars, Venus, or Mercury.

Mercury Suit

Unusual conditions require unusual protection. A nanoweave vacc suit is fine for many environments, but under Mercury's sun, the heat and radiation will burn through even a heavy suit.

A Mercury suit is a heavily-armored, mirror-surfaced, nanoweave vacc suit. It includes a PD 2, DR 100 body, a life-support pack (p. TS152), and a PD 4, DR 100 helmet (otherwise similar to the helmets on p. TS160). Add +1 to PD against light-based weapons. Total weight is 62 lbs., total cost is $5,750. LC 2.

Venus Suit

This is a hard-shell powered vacc suit, similar to the battlesuits on p. TS160 but not designed for combat. It is tailored to keep a human alive in the deadly Venusian atmosphere. A Venus suit includes an acid-proof coating, specially sealed joints, and very heavy armor to resist the pressure. It provides PD 4, DR 200, ST 50, and Move 7. (The high ST is necessary to get the suit back on its feet, should it fall over.) The suit includes life support (including provisions in paste form) for one day. It is powered by twin E-cells, which can sustain the suit for 14 hours of continuous walking – or until the life support fails, if the occupant does not move around as much. Other features include a radio with a range of 10,000 miles, and a set of passive electromagnetic sensors spaced around the head, allowing night and 360° vision. Venus suits weigh 1,100 lbs., and cost $255,000. LC 2.

Rock-Climbing Gear

Rock climbing has always involved specialized gear. On Mars in 2100, the equipment is almost hypertrophied for the task at hand.

Pitons: A piton is a spike with a ring on it through which a rope can be run. Modern pitons adjust to the shape of the crack they're in and report on their status via v-tags. They come loose on command. While a piton will report if it is obviously loose, it is physically impossible for it to check its stability under load, so the climber must also do a check manually. Used properly, pitons give +2 to Climbing. Ten pitons weigh 1 lb. and cost $100.

Smartboots: This footwear is amazingly tough, but still provides tactile feedback about the rock conditions to the wearer. In addition, the boot can change shape to give a better grip, and can grow crampons (points on the bottom for digging into ice) or a forward-placed spike, on command. They give +1 to Climbing or +2 on ice. If used in combat, they do thrust+1 impaling damage. PD 2, DR 20, 2 lbs., $500.

Smartgloves: Like smartboots, these gloves are tough, but do not impair the sense of touch. They extrude claws upon command. On ice, they give +1 to Climbing. On rock, any bonus is negligible. If used in combat, they do swing-2 cutting or thrust impaling damage. PD 1, DR 10, $50, negligible weight.

Harness: This tough biphase webbing wraps around the waist and chest, and is designed both to keep a climber upright in the event of a fall and to offer multiple points for attaching gear and tying into a rope. Harnesses are self-adjusting, and include an isolated layer of genegineered bacteria that luminesce if exposed to air, indicating dangerous cuts or abrasions. They give +1 to Climbing. 1 lb., $50.

Ice Axe: These tools often serve merely as fancy walking sticks, but can be used to cut steps, climb vertical frozen walls, or stop a climber's potentially disastrous slide on ice. The modern axe is self-adjusting, and can go from straight-handled to bent-handled, or from pick to hammer to adze to literal walking stick, on command. It provides a +1 to Climbing skill. While designed for ice, these axes are tough enough to cut rock if the user has the strength. If used as a weapon, they require Axe/Mace skill. They do swing+1 damage, which may be cutting, impaling, or crushing, depending on configuration. 2 lbs., $500.

Other Gear: Rope, autograpnels, and other gear appears in the *Technology* chapter of ***Transhuman Space.*** For triple cost, rope can have the same abrasion-indicating bacteria described under *Harness,* p. 95. In addition, most climbers will wear a full helmet (p. TS160), and probably other protective gear, depending on the environment.

All of this gear provides the listed bonus to Climbing skill; rope, used correctly, provides an additional +2. These bonuses (including potential bonuses from the Rock Reader, below), cannot raise Climbing skill to more than 4 more than the user's *actual* skill, but *can* offset penalties due to the difficulty of the climb! For example, Misato has Climbing-12, and enough gear to give her a +6 to skill. If she's climbing an ordinary mountain (normally at the unmodified skill), she rolls vs. a 16 (her skill +4, the maximum). If she's scaling the sheer escarpment around Olympus (-3 or worse), she rolls vs. a 15 (her skill of 12, minus 3 for difficulty, plus 6 for gear). See p. B89 for more climbing rules.

Climbers can be divided into two philosophical groups. The first is the "leave no trace" group, who believe in having a minimal impact on the terrain, and the second is those who are simply interested in the climb, and don't care about leaving scars on the rock. On Mars, both groups are represented. Serious Preservationists, and many areologists, fall into the first group. Climbing in a "leave no trace" style imposes a -2 penalty, which does not reduce a climber's maximum adjusted skill. (E.g., if Misato wanted to leave an ordinary mountain unmarked, and was using the same gear as above, her adjusted skill would still be 16; 12, minus 2 for philosophy, plus 6 for gear.)

Software

This section discusses software about Mars, and other helpful little programs.

The Lonely System Guide to Mars

This is the most popular interactive hypertext tourist guide to Mars. It covers areography, history, culture, and details like where to shop in Robinson City. It's surprisingly informative, and has the skill Area Knowledge (Mars)-14, though it will be at a small penalty for anything that isn't a tourist destination. Complexity 4, $200.

Soil Reader

Designed for amateur areologists, this program works in conjunction with a camera and virtual interface. While the user is looking at the ground, it superimposes details such as soil type, probable causes of erosion, evidence of ancient water flows, and details on any visible tracks. It's not terribly sophisticated, but provides a +1 to appropriate Areology rolls. If used on other worlds, it would provide entertaining mistakes, and no bonus. Complexity 4, $5,500.

Rock Reader

This software package is less of a toy and more of a tool. Like the Soil Reader, it examines and displays information, but the Rock Reader's emphasis is on helping rock climbers. It can assess rockfaces for stability and recommend good handholds. While some climbing hobbyists argue that it takes all the fun out of climbing, others use it religiously. It also sees use by the military and search-and-rescue personnel. It gives +2 to Climbing skill. Complexity 4, $5,500.

As you leave the spaceport's terminal B, you'll nearly always be confronted by a group of Peruvian Martian immigrants selling terrible paintings of Martian landscapes, supposedly done by early pioneers. I don't know why the Peruvian gangs have a lock on this particular business at Port Lowell – it's just this weird ethnic thing, like the American ghosts who control the robo-cabs, and the Triad gangs that run the bioroid temp agencies.

– Lonely System Guide to Mars

Biomods

The following biomods are all common on Mars, and most are available elsewhere in the System as well.

Andraste Mars-Tolerance Biomod 14 points

This is the most common biomod on Mars, existing in 35% of the population. Originally developed by Colonial Genetics, similar biomods are available from most major genecorps. It consists of several modifications. The most obvious is the enlarged lungs; someone with the Andraste biomod will be noticeably barrel-chested. This allows them to treat the "very thin" air of Mars as if it were merely "thin." Inside, the lungs have been redesigned to function like a bird's, allowing a continuous flow of air through parabronchial tubes. Further, fetal-form hemoglobin maximizes oxygen affinity. These modifications reduce the required partial pressure of oxygen. (Since this allows someone with Andraste to function longer than a normal human if life support systems stop working, it is represented as Decreased Life Support. However, they technically require as many oxygen molecules per hour as a normal human – they're just better able to extract it from bad air.) The lung secretes carbon dioxide into the alveoli, maintaining a normal acid-base state in the bloodstream and tissues. The only disadvantage of this last modification is a doubling of basal metabolic rate – the lung has to work hard to keep the CO_2 from being absorbed, given the current composition of the Martian atmosphere. This increase means that after spending time in a high-CO_2 environment, people with Andraste are *very* hungry. Most eat large meals all the time, on principle.

People with this modification find Earth-normal air annoyingly thick, but not incapacitating, and may stop breathing for half a minute at a time, due to the "excess" of oxygen. This can startle observers, but is not harmful.

The Andraste biomod is designed to be widely compatible with other biomods or genemods. By itself, it is not regarded as a "lifestyle choice," and people with this biomod do not consider themselves a subculture.

Statistics: Low-Pressure Lungs [0], Filter Lungs (Filters CO_2 instead of particulate matter, +0%; Nuisance Effect: Increased Life Support (Doubled food requirements), -20%) [4], Decreased Life Support (Reduced oxygen partial pressure requirements) [10].

Operation: $14,000 (5 weeks to grow lungs, ribs, glands, etc., 7 weeks recovery). LC 6.

Note: Many organizations on Mars (including the Chinese government and the Mars Development Corporation) will partly subsidize this operation for their members, paying 20% or more of the fee.

Ruanmao Biomod 29 points

People who spend a great deal of time in the wilderness (such as areologists) often get this simple biomod. Its users almost always have the Andraste biomod as well.

Statistics: Thick Fur (p. CI56, includes PD 1, DR 1, and Temperature Tolerance 2).

Operation: $10,000 (one week to take effect after transformation virus is injected). LC 6.

Notes: Polar-bear white is currently popular, and leopard spots are a timeless classic. During the week the fur is growing in, the subject will be at -2 to DX, IQ, and skills due to the constant itching.

NERV Drug Regimen Varies

This drug improves reflexes and coordination through alterations to the neuro-endocrine system. To increase DX by 1, the user must take NERV for half as many weeks as the cost of +1 DX. E.g., to increase DX from 13 (30 points) to 14 (45 points) requires seven and a half weeks of NERV doses (half of the 15-point difference.) After gaining the DX, he must roll vs. HT. On a success, there are no side effects. On a failure, the user gains a level of Reduced Manual Dexterity (p. CI83); the drug has improved overall agility, but failed to make the neural connections needed to improve fine motor coordination. On a *critical* failure, the user takes neural damage due to an accidental overdose, and takes (1d/2)+1 (round down) levels of Reduced Manual Dexterity instead of just one.

Availability: $1,000 per week. LC 5. "Street NERV," at half cost, is similar, but the HT roll is at -4.

Testicle Tuck -1 or 2 points

*You want to know how powerful memes can be? Smack yourself in the jewels. Your genetic material is a self-replicating meme, and the pain you're feeling is nothing less than a vicious warning: "Don't you **dare** prevent me from self-replicating."*

*– Csaba Janosi, **Info-Tyrants***

This biomod has several options. The cheap version also makes the recipient sterile. For a little more money, the blood vessels are rerouted to prevent this. Further, the recipient may have inert plastic spheres implanted where his testicles originally were; this provides a more natural appearance. This latter option does not affect point cost, dollar cost, or length of the procedure.

Statistics: Injury Tolerance (No Vitals) (Limitation: Groin only, -60% [2]. The cheap version adds Sterile [-3], for a total cost of -1 point.

Operation: $1,000 (and 10 days). Treat as Eunuch while recovering from surgery, but no bed rest is required. LC 6. Cheap version is $250 (and 5 days), LC 6.

"Kung Fu" Biomods

The Martian renaissance in martial arts has encouraged the development of a wide array of biomods designed to enhance fighting ability. These loosely fall into two categories: "tourney-legal" and "street." The most prominent martial arts competition on Mars is the Mars Unarmed Combat Championship. The sponsors have strict and detailed rules about permitted biomods or genemods. The broad summary is that modifications that improve dexterity are permitted, as are minor enhancements to strength and physical resilience. Grossly enhanced strength and enhancements such as claws are not allowed.

Tourney-Legal: Guan Di Biomod Varies

The Guan Di biomod (named for a Chinese god of war and righteousness) is a common tourney-legal enhancement. Guan Di transhumans generally seem full of energy, though few other generalizations about personality can be made. Some are good-natured tricksters, others are always looking for someone to beat up. They usually associate with each other in the context of martial arts dojos and competitions.

Statistics: Bone Stimulation (+1 Extra Hit Point) [5], Muscle Reinforcement (+2 ST) [Varies], Testicle Tuck (men only, p. 95) [2], and a NERV regimen (p. 95). Total cost is 7 points for men, 5 points for women, plus the cost of +2 ST.

Operation: $16,000 (5 weeks recovery) for men, $14,000 (5 weeks recovery) for women. LC 5.

Note: Doses of NERV begin immediately after the surgery.

Other enhancements that are tourney-legal include Muscle Grafts (p. BIO63) up to +2 ST, Neural Augmentation (p. BIO73), and limited use of Super-Steroids (p. BIO75). The Bio-Booster biomod (p. TS161) is specifically *not* allowed.

Street: Whirling Claws o' Death Biomod Varies

Kung fu enhancements for "street" fighters go by many names, most quite colorful. This is a typical example. These enhancements are for people who have to fight to survive – or want to act like they do. Claw-enhanced transhumans enjoy fighting, and are often Hotshotted (p. BIO71) to relish it even more. Friendly fights are done with claws retracted – in theory. Using claws effectively in hand-to-hand combat requires training. The *Zhua* martial arts style is one technique (p. 92).

Statistics: Bio-Booster (p. TS161) [27], Bone Stimulation (+1 Extra Hit Point) [5], Boosted Heart (p. TS161) [9], Muscle Reinforcement (+6 ST) [Varies], Sharp Claws [25], Testicle Tuck (men only, p. 95) [2]. Total cost is 68 points for men, 66 points for women, plus cost of +6 ST.

Operation: $70,000 (5 weeks to grow parts, 14 weeks recovery) for men, $65,000 (5 weeks to grow parts, 12 weeks recovery) for women. LC 5.

Notes: The same Testicle Tuck option is available as for the Guan Di biomod.

"Eunuch" Biomod Varies

People who have undergone this biomod prefer to be known as "Stabiles," but their lack of interest in sex has encouraged the popular nickname. It includes a brain-tissue graft to enhance IQ, and psychosurgery to add certain advantages and disadvantages. In its most popular form, it also includes suppression of head hair (to make the bulging skull more obvious). Note that eunuchs are *not* necessarily infertile, though they rarely seek out sex. Eunuchs often also pursue a course of nootropic drugs (p. BIO74).

It's a mistake to think everyone with a Eunuch mod is a corporate drone or romantic burnout. When I had a job at the Chop Shop at New Shanghai, maybe half our patients were Triad enforcers . . . They'd get Whirling Claws o' Death and all that, but a lot of gunjin wanted to be Stabiles, make 'em stone cold killers. One guy was so tough he didn't ask for anesthetic, had it done while he was awake. He had balls . . . well, not any more . . .

– Lonely System Guide to Mars

People opting for the Eunuch biomod are often career-driven workaholics looking to optimize themselves for their jobs. A smaller group have been emotionally burned in romantic relationships, and are looking to get out of the hormone-driven part of being human. Eunuchs aren't overly social, but when they *do* choose to be, they prefer each other's company, due to the absence of complex, confusing emotional signals they no longer quite understand. Some non-Callous Eunuchs seem themselves as "saner" than gland-driven humans, and try to assume a guardian role to their handicapped brothers and sisters out of *sagesse oblige.* The percentage of Eunuchs in the government is higher than in society at large.

Statistics: Brain Tissue Graft (p. BIO71, +2 IQ) [Varies], Composed [5], Killjoy (Limitation: Doesn't increase docility, -40%) [-9], Low Empathy [-15], Unnatural Feature (Bulging forehead) [-5]. Total cost is -24 points, plus cost of IQ.

Operation: $32,000 (2 weeks to grow brain tissue, 3 weeks recovery). LC 5.

Notes: Some Eunuchs come out of the operation with the Callous disadvantage. Others end up with higher versions of Composed, such as Collected or Imperturbable. The variation has no obvious cause, and does not seem to be based on the subject's preoperation personality.

Zero-Point Features

These are biomods which cost no character points; they are usually purely decorative, and often go in and out of fashion.

Glow-in-the-Dark Skin, Hair, or Eyes — *0 points*

Early in the 21st century the possibility of adding phosphorescent jellyfish DNA to mammals was demonstrated by scientists in France. There are three degrees of "glow"; at the first level, the affected part glows only under UV "black light." At the second degree, the part "absorbs" any light when exposed to it, and "releases" it for a while in the dark. The third degree is trickier, and involves chemically produced light (such as that found in lightning bugs). This involves implanting new organs, and can only be used for eyes or selected spots on the skin. For all versions, some variations in tint are available: blue, yellow, and green are the most common.

Operation: For operations involving just hair or skin, $2,000, 4 days to grow, 2 days recovery. For eyes, $4,000, one week to grow, one week recovery (the subject can leave the hospital after one day, but will be blind until the full time has elapsed). Double all costs and times for a third degree glow. LC 6.

Purring Voicebox — *0 points*

Minor changes to larynx and vocal cords allow humans to purr like cats. The purring can be consciously controlled, but is difficult to suppress when the recipient is pleased (roll vs. Will not to purr when happy). Purring can give a +1 to skills like Sex Appeal or Erotic Art, depending on the target's preferences. It can optionally make the altered person Easy to Read (p. CI89); it's easier to tell when the subject is happy. If the person doing the "reading" knows the person can purr, it's also easier to tell when they're upset, by the absence of purr! These minor effects are considered to cancel each other out for purposes of character points.

Operation: $2,000, 3 days to grow, 3 days recovery. LC 6.

Tetrachromatism — *0 points*

This is the ability to see a wider range of colors, and involves replacing the retina with one possessing four kinds of cones. The biomod may give a +1 to distinguishing (for example) two different kinds of flowers or birds, as the user can better see minor variations in color. It doesn't help with Heraldry or professional design skills, as in those areas color distinctions invisible to most humans are pointless.

Operation: $4,000, one week to grow, one week to recover, as for glow-in-the-dark eyes. LC 6.

Vehicles

These are air and ground vehicles. Noted vehicles conform to the *Wheeled Vehicle Modular Design System* (p. 124).

Key

The following vehicle descriptions list components in a format intended to make them easy to use in play, rather than the design-sequence format used in earlier ***GURPS*** books. The following information describes the system used here.

Abbreviations

The abbreviation for body is *Bod.* Other abbreviations in use include *Tur* for turrets, *Whl* for wheels, and *Wng* for wings.

Subassemblies: The number following each subassembly is the targeting bonus to hit.

Powertrain: Describes the size and type of all propulsion and lift systems, power plants, and energy banks.

Fuel: For fuel, gives the amount, type (with Fire number in parentheses), type of fuel tank, and "routine" or "cruising" endurance. For energy banks, provides endurance data under various conditions.

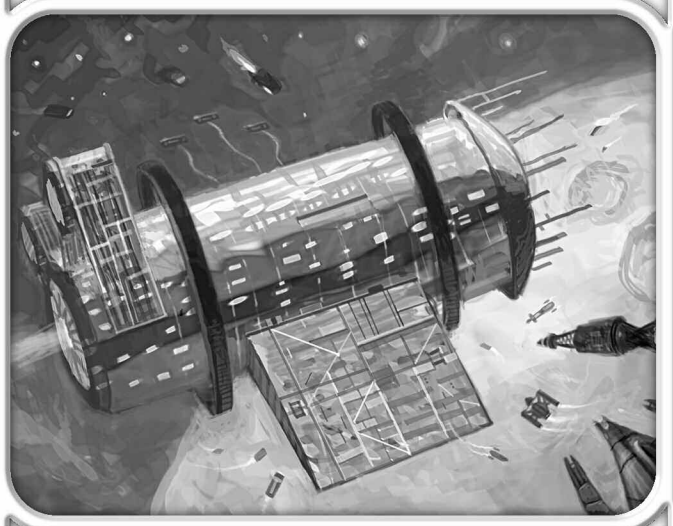
Occupancy: Each number is followed by an abbreviation. CCS is a cramped crew station, NCS a normal crew station, and RCS a roomy crew station. Passenger seats use CS, NS, and RS for cramped, normal, and roomy positions, respectively. An exposed position precedes the normal abbreviation with an X (for instance, XNCS for an exterior normal crew station). Cycle crew stations will be listed as XCS.

Cargo: Gives capacity in cubic feet. Each cubic foot generally holds 20 lbs.; exceptions are noted.

Armor: Vehicles without this notation have no armor. F indicates frontal armor, RL right and left, B back, T top, and U underbody. If the entire subassembly has the same armor, only one value will be listed. Special circumstances will be detailed just below the tabular columns of armor values.

Weaponry: Vehicles without this notation have no integral weapons. For those that do, the location notation also gives the facing of the weapon, per *Armor.* All weapons are assumed to have full stabilization (cancels up to -3 in movement penalties). Weapons in turrets have universal mounts, while weapons in the body have casemate mounts. Exceptions will be detailed in the descriptive text. Ammunition listings include all shots stored on the vehicle, not just rounds in a magazine. For energy weapons, the value indicates shots stored in energy banks. Energy needs for energy-using slugthrowers are detailed in the descriptive text. Following each weapon is the targeting modifiers provided by all the vehicle's supporting systems. For Acc and other weapon statistics, see the weapons table (p. 108).

Equipment: Grouped by location, these are the gameplay-essential accessories to the vehicle; others will be described in *Design Notes,* below. For HPs and power usage of individual components, consult ***GURPS Vehicles.***



Statistics: *Dim.* is a rough indication of dimensions, usually height×width×length. *Lwt.* is loaded weight; *Lwt. on [Planet]* is loaded weight under the gravity for the listed planet. The lowercase letter before a performance rating indicates a mode of travel: *g* is ground, *a* is air, *w* is water, *s* is space, *u* is underwater, and *m* is mag-lev train performance. E.g., *gSpeed* is top ground speed, and *aMR* is the aerial maneuver rating. For those without ***GURPS Vehicles,*** to determine turning radius per p. B139, square the vehicle's current speed then divide by (40×MR). For air vehicles, stall speed is given both for Earth and for the planet where the vehicle is most commonly used. For ground vehicles, off-road statistics are similarly given for both Earth and the appropriate planet.

Design Notes: A compilation of everything else: the vehicle accessories and data that rarely come up in play, but are useful for reverse-engineering the design.

Vehicles, Land

As on Earth, for day-to-day affairs, most Martians travel by land.

Explorer's Trike

The trike is a three-wheeled hybrid motorcycle/tricycle. The wheels are powered either by battery or by pedals. The connection between the pedals and wheels does not use a mechanical chain, but a "smart fluid" system that buffers some of the effects of the terrain but allows enough feedback that the rider can "feel" the road. The trike is designed for trips of a few hours to days away from a base camp, and is popular among prospectors, areologists, and tourists. It is driven using the Bicycling skill.

Subassemblies: Body +1; three off-road Wheels +0.
Powertrain: 1-kW all-wheel-drive drivetrain; 0.4-kW muscle engine; two rechargeable D-cells with 10 kWh total capacity.
Fuel: D-cells can power trike for 10 hours.
Occupancy: XCCS ***Cargo:*** 5 cf internal, 10 cf external

Equipment

Body: Tiny Complexity-5 computer (includes NAI-4 running Bicycling-12 skill set); Radio with 1,000-mile range.

Statistics

Size: 3'×3'×3' *Payload:* 500 lbs.
Ewt: 170 lbs. *Lwt:* 670 lbs. *Lwt on Mars:* 255 lbs.
Volume: 26 cf *Maint.:* 266 hours *Price:* $4,895

HT: 12 *HP:* 34 [Bod] 18 [each Whl]

Mars Ground Performance, Maximum Load, Battery-Powered:

gSpeed: 30 *gAccel:* 1 *gDecel:* 10 *gMR:* 1.75 *gSR:* 3
Very Low GP. Off-Road Speed 20.

Mars Ground Performance, Light Load, Battery-Powered:

gSpeed: 40 *gAccel:* 2 *gDecel:* 10 *gMR:* 1.75 *gSR:* 3
Very Low GP. Off-Road Speed 27.

Mars Ground Performance, Maximum Load, Pedaled:

gSpeed: 17 *gAccel:* 1 *gDecel:* 10 *gMR:* 1.75 *gSR:* 3
Very Low GP. Off-Road Speed 11.

Mars Ground Performance, Light Load, Pedaled:

gSpeed: 25 *gAccel:* 1 *gDecel:* 10 *gMR:* 1.75 *gSR:* 3
Very Low GP. Off-Road Speed 17.

Design Notes: Structure is light, aluminum, and robotic. Improved suspension, computerized controls. Performance varies depending on load, and whether the battery or pedals are powering the vehicle. The "light" figures assume the only payload is a 200-lb. (Earth weight) passenger. The "maximum" figures are for a full 700-lb. load. The output of the pedals is 0.02 kW×ST; a generous 0.3 kW is assumed here. When running on batteries, 1 kW is the figure used. Ground pressure is 1,228 on Earth, 467 on Mars.

Light Martian Rover

This is a small two-passenger vehicle with some cargo space. The light rover can handle day trips across the surface, and also serves as a "family car" in the cities. The engine is designed for alcohol, but can burn synthetic gasoline if necessary. The limited life support could keep two people alive for a week. The vehicle has no airlock, so opening the door unseals it. It is driven using Driving (Automobile).

Subassemblies: Body +3; Turret -3; four off-road Wheels +1.

Powertrain: 32-kW all-wheel drive; 32-kW closed-cycle turbine engine; four rechargeable E cells with 80 kWh total capacity.

Fuel: Two ultralight self-sealing 20-gallon alcohol fuel tanks (Fire 7); two ultralight self-sealing 45-gallon LOX fuel tanks (Fire 10); 18 hours endurance.

Occupancy: 2 RCS ***Cargo:*** 20 cf

Armor	F	RL	B	T	U
Bod:	3/10	3/10	3/10	3/10	3/10
Tur:	3/10	3/10	3/10	3/10	3/10
Whl:	3/10	3/10	3/10	3/10	3/10

Equipment

Body: Tiny Complexity-5 computer with backup (includes NAI-4 running Driving (Automobile)-11 skill set); Radio with 1,000-mile range; Limited life-support system (10 man-days).

Tur: 12-mile PESA; 4.5-mile AESA.

Statistics

Size: 4'×5'×9' *Payload:* 1,896 lbs.
Ewt: 2,945 lbs. *Lwt:* 4,841 lbs. *Lwt on Mars:* 1,840 lbs.
Volume: 180 cf *Maint.:* 78 hours *Price:* $65,276

HT: 12 *HP:* 263 [Bod] 4 [Tur] 45 [each Whl]

gSpeed: 65 *gAccel:* 3 *gDecel:* 15 *gMR:* 1.5 *gSR:* 5
On Mars, Low GP. Off-Road Speed 35.

Design Notes: WVMDS design. Midsize body and 0.05 VSP turret with medium titanium frames. Wheels have improved suspension and smartwheels. Armor is titanium and body is sealed. Ground pressure is 2,662 on Earth, 1,012 on Mars.

Heavy Martian Rover

A beefed-up version of the light rover, this vehicle can carry more people and cargo, and make longer trips. The passenger seats can be folded up, gaining 20 cf of cargo space each. It is driven using Driving (Automobile).

Subassemblies: Body +4; Turret -3; six off-road Wheels +2.

Powertrain: 96-kW all-wheel drive. 112-kW closed-cycle turbine engine. Four rechargeable E cells with 80 kWh total capacity.

Fuel: Two ultralight self-sealing 45-gallon alcohol fuel tanks (Fire 7); two ultralight self-sealing 105-gallon LOX fuel tanks (Fire 10); 12 hours.

Occupancy: 2 RCS, 4 RS ***Cargo:*** 110 cf

Armor	F	RL	B	T	U
Bod:	3/10	3/10	3/10	3/10	3/10
Tur:	3/10	3/10	3/10	3/10	3/10
Whl:	3/10	3/10	3/10	3/10	3/10

Equipment

Body: Tiny Complexity-5 computer with backup (includes NAI-4 running Driving (Automobile)-11 skill set); Radio with 1,000-mile range; Limited life-support system (42 man-days).

Turret: 12-mile PESA; 4.5-mile AESA.

Statistics

Size: 5'×7'×13' *Payload:* 5,938 lbs.
Ewt: 9,493 lbs. *Lwt:* 15,431 lbs. *Lwt on Mars:* 5,864 lbs.
Volume: 600 cf *Maint.:* 56 hours *Price:* $125,076

HT: 12 *HP:* 600 [Bod] 4 [Tur] 75 [each Whl]

gSpeed: 65 *gAccel:* 3 *gDecel:* 15 *gMR:* 1.5 *gSR:* 5
On Mars, Low GP. Off-Road Speed 35.

Design Notes: WVMDS design. Extra Large body and 0.05 VSP turret with medium aluminum frames. Wheels have improved suspension and smartwheels. Armor is titanium and body is sealed. Ground pressure is 3,395 on Earth, 1,290 on Mars.

Security Variant

The simple addition of armor and a larger turret turns the heavy rover into an armored fighting vehicle, suitable for guerrilla campaigns or police use. While not a true tank, it can stand up to most civilian weapons easily.

Modifications: Replace turret with a 0.5-VSP turret (17 hp, -1 Size Modifier), containing a 10mm Emag and 7,460 rounds of APS ammunition, as well as sensors. Change armor to foamed alloy, and increase to PD 4, DR 200. Reduce cargo to 60 cf and change 4 passenger seats to 10 folding cramped seats. Both crew stations add a HUDWAC. New statistics:

Statistics
Size: 5'×7'×13' *Payload:* 6,288 lbs.
Ewt. 36,077 lbs. *Lwt:* 42,365 lbs.
Lwt on Mars: 16,099 lbs.
Volume: 600 cf *Maint.:* 42.7 hours *Price:* $236,610

HT: 8 *HP:* 600 [Bod] 17 [Tur] 75 [each Whl]

gSpeed: 40 *gAccel:* 2 *gDecel:* 15 *gMR:* 1.5 *gSR:* 5
On Mars, High GP. Off-Road Speed 10.

Cargo Truck

The "18-wheeler" of Mars, these vehicles are used for medium-priority freight to areas not served by the trains. Though capable of off-road travel, they tend to stay on the pavement due to their size. The cargo space is 10' × 10' × 40' – the same size as a standard packing container. The Trucker's Guild (p. 59) often load themselves into this type after upgrading the computers. A cargo truck is driven using the Driving (Heavy Wheeled) skill.

Subassemblies: Body +6; Turret -3; 10 off-road Wheels +4.
Powertrain: 960-kW all-wheel drive; 976-kW closed-cycle turbine engine; 96 rechargeable E cells with 1,920 kWh total capacity.
Fuel: Two ultralight self-sealing 650-gallon alcohol fuel tanks (Fire 7); two ultralight self-sealing 1,520-gallon LOX fuel tanks (Fire 10); 20 hours.
Occupancy: 2 RCS ***Cargo:*** 4,000 cf

Armor	F	RL	B	T	U
Bod:	3/15	3/15	3/15	3/15	3/15
Tur:	3/15	3/15	3/15	3/15	3/15
Whl:	3/15	3/15	3/15	3/15	3/15

Equipment
Body: Tiny Complexity-5 computer with backup (includes NAI-4 running Driving (Heavy Wheeled)-11 skill set); Radio with 1,000-mile range; Limited life-support system (42 man-days); One-man airlock.
Turret: 12-mile PESA; 4.5-mile AESA.

Statistics
Size: 12'×16'×28' *Payload:* 117,124 lbs.
Ewt: 46,936 lbs. *Lwt:* 164,060 lbs.
Lwt on Mars: 62,343 lbs.
Volume: 6,000 cf *Maint.:* 25 hours *Price:* $630,419

HT: 9 *HP:* 3,000 [Bod] 4 [Tur] 180 [each Whl]

gSpeed: 60 *gAccel:* 3 *gDecel:* 15 *gMR:* 1.5 *gSR:* 5
On Mars, High GP. Off-Road Speed 15.

Design Notes: WVMDS design. Immense body and 0.05 VSP turret with medium aluminum frames. Wheels have improved suspension and smartwheels. Armor is titanium and body is sealed. Ground pressure is 9,023 on Earth, 3,429 on Mars.

Mobile Habitat

This is a mobile home for six, with built-in science lab. The specific Scientific Skill the lab is designed for (Geology (Areology), Botany, etc.) must be specified when the vehicle is built. The mobile habitat includes three small cabins for two, cooking facilities, a cramped bathroom, and a small seating area behind the driving compartment. The mobile hab includes expansion space for another cabin, or for replacing the science lab with a minifacturing workshop. Installing another cabin, or switching one lab for another or for a shop, takes a month and incurs labor costs equal to 10% the price of the new assembly. A mobile hab is driven using the Driving (Heavy Wheeled) skill.

Subassemblies: Body +6; Turret -3; 10 off-road Wheels +4.
Powertrain: 960-kW all-wheel drive. 976-kW closed-cycle turbine engine. Two rechargeable E cells with 40 kWh total capacity.
Fuel: Two ultralight self-sealing 1,170-gallon alcohol fuel tanks (Fire 7); two ultralight self-sealing 2,740-gallon LOX fuel tanks (Fire 10); 36 hours.
Occupancy: 2 RCS, 4 RS ***Cargo:*** 200 cf

Armor	F	RL	B	T	U
Bod:	3/15	3/15	3/15	3/15	3/15
Tur:	3/15	3/15	3/15	3/15	3/15
Whl:	3/15	3/15	3/15	3/15	3/15

Equipment
Body: Tiny Complexity-5 computer with backup (includes NAI-4 running Driving (Heavy Wheeled)-11 skill set); Radio with 1,000-mile range; Limited life-support system (84 man-days); Science lab; Three cabins; One-man airlock.
Turret: 12-mile PESA; 4.5-mile AESA.

Statistics
Size: 12'×16'×28' *Payload:* 71,380 lbs.
Ewt: 81,716 lbs. *Lwt:* 153,096 lbs.
Lwt on Mars: 58,177 lbs.
Volume: 6,000 cf *Maint.:* 15.5 hours
Price: $1,653,319

HT: 9 *HP:* 3,000 [Bod] 4 [Tur] 180 [each Whl]

gSpeed: 65 *gAccel:* 3 *gDecel:* 15 *gMR:* 1.5 *gSR:* 5
On Mars, High GP. Off-Road Speed 16.

Design Notes: WVMDS design. Immense body and 0.05 VSP turret with medium aluminum frames. Wheels have improved suspension and smartwheels. Armor is titanium and body is sealed. 500 cf expansion space. Ground pressure is 8,420 on Earth, 3,200 on Mars. 41.95 cf of waste space in body.

Monorail Train

The Equatorial Railway (p. 21) and its spurs tie the planet together. This section lists some typical train cars. All use magnetic levitation, powered from the rail. All also have batteries sufficient to keep the car airborne while it coasts to a stop, if the power to the train is cut off. (If the *rail* loses power, the train will lose lift and slam into the track.) When a train is being controlled manually, it is driven using the Driving (Locomotive) skill.

Unlike the trains of the early 21st century, these cars are often sent out solo; i.e., not in "trains" at all. Since each is self-propelled, there is no need for a powerful engine to pull unpowered cars behind it. That said, they *can* be coupled, and typically are when several are going to the same destination.

Boxcar

A simple cargo container, with a small computer brain.

Subassemblies: Body +6.
Powertrain: Mag-lev lifters with 47,000 lbs. lift; 480 kW electric contact power generators; four rechargeable E cells with 80 kWh total capacity.
Fuel: E cells can power car for 10 minutes.
Occupancy: – ***Cargo:*** 4,000 cf (rated for 24 lbs. per cf)

Armor	F	RL	B	T	U
Bod:	3/15	3/15	3/15	3/15	3/15	

Equipment

Body: Tiny Complexity-5 computer with backup (includes NAI-4 running Driving (Locomotive)-11 skill set); Radio with 1,000-mile range; Two 12-mile PESA [F/B]; Two 4.5-mile AESA [F/B]; Explosive pin and remote control hitch on front and back.

Statistics

Size: 10'×10'×40' *Payload:* 96,000 lbs.
Ewt: 36,255 lbs. *Lwt:* 132,255 lbs.
Lwt on Mars: 50,257 lbs.
Volume: 4,022 cf *Maint.:* 65.9 hours *Price:* $368,336

HT: 7 *HP:* 2,276 [Bod]

mSpeed: 195 *mAccel:* 1 *mDecel:* 10 *mMR:* 0.25 *mSR:* 6

Design Notes: Structure is medium, aluminum, and robotic. Armor is aluminum. aDrag is 1,517.

Passenger Car

Used for short trips of less than a day.

Subassemblies: Body +6.
Powertrain: Mag-lev lifters with 31,000 lbs. lift; 350 kW electric contact power generators; 72 rechargeable E cells with 1,440 kWh total capacity.

Coach class out of New Shanghai is always an adventure. Instead of rich tourists, my companions were a dour military bioroid from the PLAN Marines, two pharmers who couldn't stop talking about pregnant spider goats, and – sitting next to me – a hulking Red Bear Mars adapt who was a professional fossil hunter named Olympica Jones. She had fascinating stories to tell, but I wish she hadn't shed all over my new suit.

– Lonely System Guide to Mars

Fuel: Batteries can power life support for three days, and are more than sufficient to decelerate to an emergency stop from top speed.
Occupancy: 40 RS (four abreast, aisle down middle)
Cargo: 850 cf (rated for 24 lbs. per cf; overhead compartments and cargo area under passenger area)

Armor	F	RL	B	T	U
Bod:	3/15	3/15	3/15	3/15	3/15

Equipment

Body: Tiny Complexity-5 computer with backup (includes NAI-4 running Driving (Locomotive)-11 skill set); Radio with 1,000-mile range; Limited life support (120 man-days); Two cramped toilets; Two 12-mile PESA [F/B]; Two 4.5-mile AESA [F/B]; Explosive pin and remote control hitch on front and back.

Statistics

Size: 10'×10'×40' *Payload:* 28,400 lbs.
Ewt: 47,849 lbs. *Lwt:* 76,249 lbs.
Lwt on Mars: 28,975 lbs.
Volume: 3,575 cf *Maint.:* 64.6 hours *Price:* $382,808

HT: 9 *HP:* 2,105 [Bod]

mSpeed: 180 *mAccel:* 2 *mDecel:* 10 *mMR:* 0.25 *mSR:* 6

Design Notes: Structure is medium, aluminum, and robotic. Armor is aluminum. Body is sealed. Seats have improved access (p. VXi23). aDrag is 1,403.

Sleeper

These cars have small cabins, and are used for longer, multi-day trips. Each includes a small dining area and comfort facilities.

Subassemblies: Body +6.
Powertrain: Mag-lev lifters with 28,000 lbs. lift. 300 kW Electric contact power generators. Fourteen rechargeable E cells with 280 kWh total capacity.
Fuel: Batteries can power life support for two days, and are more than sufficient to decelerate to an emergency stop from top speed.
Occupancy: 6 standard 2-person cabins
Cargo: 1,000 cf (rated for 24 lbs. per cf)

Armor	F	RL	B	T	U
Bod:	3/15	3/15	3/15	3/15	3/15

Equipment

Body: Tiny Complexity 5 computer with backup (includes NAI-4 running Driving (Locomotive)-11 skill set); Radio with 1,000-mile range; Limited life support (24 man-days); Two 12-mile PESA [F/B]; Two 4.5-mile AESA [F/B]; Explosive pin and remote control hitch on front and back.

Statistics

Size: 10'×10'×40' *Payload:* 26,400 lbs.
Ewt: 50,793 lbs. *Lwt:* 77,193 lbs.
Lwt on Mars: 29,333 lbs.
Volume: 4,066 cf *Maint:* 65.5 hours *Price:* $372,908

HT: 12 *HP:* 2,292 [Bod]

mSpeed: 165 *mAccel:* 4 *mDecel:* 10 *mMR:* 0.25 *mSR:* 6

Design Notes: Structure is medium, aluminum, and robotic. Armor is aluminum. Body is sealed. aDrag is 1,528.

Vehicles, Air

With limited waterways and an incomplete network of roads, air travel is vitally important to life on Mars.

Ballistic Ramjet

This medium-sized long-range airplane is used for fast transport between widely separated areas of Mars. The design has proven very adaptable, and is easily configurable into a light transport or executive vehicle.

The design uses the fission air-rams to exit the atmosphere (takes 15 minutes) and then coast on a ballistic path to its destination. The small metal-oxygen rocket is for maneuvering in the upper atmosphere or low orbit. The basic airframe is a streamlined delta lifting body 50' in length and 30' wide. It can carry 9.6 tons of cargo and passengers. Space performance is using the metal-oxygen rocket; air performance is using the fission air ram. The battery powers all systems for 4 hours.

Crew: Pilot (Pilot (Aerospace)). The cockpit mainframe is usually loaded with a LAI-6 infomorph using a Pilot (Aerospace)-14 Skill Set.

Design: Streamlined delta (8 spaces, carbon composite, medium frame, responsive, smart, lifting body), cDR/cPF 1.4/1F, 1/1S, 1/1B (carbon composite armor).

Modules: New cockpit; small PESA; small fixed radar [F]; 1 compact fission-air ram; 0.025 compact metal-oxygen rocket; 0.5 tanks (ultralight, metal-oxygen); 3 passenger seat; large entry module; small entry module; 0.1 battery; 1 cargo (5 tons).

Statistics: EMass 39; CMass 54; LMass 59. Cost M$12.56. cHP 30. Size Modifier +6. HT 12. Maintenance Interval: 11.3 hours. RRA 0.

Performance: sAccel: 0.11 G, Burn Endurance: 0.13 hours (7.8 minutes), Burn Points: 5, Delta-V: 0.16 mps. Air Speed: 3,285 mph (1 mps), Stall: 145 mph.

Variants: By removing the passenger seats an additional 1,500 cf of cargo can be carried. EMass 35, CMass 60, LMass 65. sAccel 0.1 G, Delta-V 0.14 mps. Stall 155 mph.

Hopper

This medium-lift VTOL-capable aircraft serves a similar role on Mars as helicopters do on Earth. It is available with various customizations and design options. The design below is for the typical "stock" model.

The hopper is controlled using the Piloting (Vertol) skill and has a top speed of 600 mph. The craft carries enough fuel for 2 hours, giving it a nominal range of over 1,200 miles – but many of its trips are to destinations far from civilization, where it may not be able to refuel, effectively halving its range. All performance stats are for operations on Mars.

Subassemblies: Body +5; two standard Wings +3; two engine Pods +3; three retractable Wheels +2.

Powertrain: Two 16,000-lb. vectored ducted fans for thrust and lift in pods. One 4,000-lb. ducted fan for thrust. 9,050 kW high-performance closed-cycle MHD turbine. Rechargeable D cell with 5 kWh total capacity.

Fuel: Two 1,820-gallon hydrogen ultralight self-sealing fuel tanks in body (Fire 10); 3 hours. Two 910-gallon liquid oxygen ultralight self-sealing fuel tanks in wings (Fire 10); 2 hours.

Occupancy: 2 RCS ***Cargo:*** 250 cf, in Body

Armor	F	RL	B	T	U
Bod:	3/10	3/10	3/10	3/10	3/10
Wng:	3/10	3/10	3/10	3/10	3/10
Pod:	3/10	3/10	3/10	3/10	3/10
Whl:	3/10	3/10	3/10	3/10	3/10

Equipment

Body: Small Complexity-6 computer with backup (includes LAI-6 running Piloting (Vertol)-14 skill set); Two radios with 10,000-mile range; Limited life support systems (10 man-days); Inertial navigation system with backup; IFF transponder; Compact fire extinguisher; Two-man airlock; Vehicular parachute (25,000 lbs); Flight recorder; 36-mile PESA [F]; 45-mile AESA [F]; Two 12-mile PESA (left-back, right-back); Two 4.5-mile AESA (left-back, right back); Terrain-following radar; Crashwebs on all crew stations.

Statistics

Size: 7'×20'×30' *Payload:* 19,031 lbs.
Ewt: 16,612 lbs. *Lwt:* 35,644 lbs.
Lwt on Mars: 13,545 lbs.
Volume: 1,996 cf *Maint.:* 7.67 hours *Price:* $6,789,560

HT: 12 *HP:* 1,185 [Bod] 431 [each Wng]
77 [each Pod] 108 [each Whl]
aSpeed: 600 *aAccel:* 55 *aDecel:* 76 *aMR:* 19 *aSR:* 6
Stall Speed 0. Vectored fans switch completely from lift to thrust above 10 mph.

Design Notes: Structure is carbon composite with a medium frame. It is robotic with good streamlining, sealed, and retractable wheels. Armor is metal matrix composite. Controls are computerized, with backup. aDrag is 489. Volume/areas are 1,510 cf/790 sf on body, 180 cf/287 sf each wing, 25 cf/52 sf each pod, and 76 cf/108 sf for the wheels.

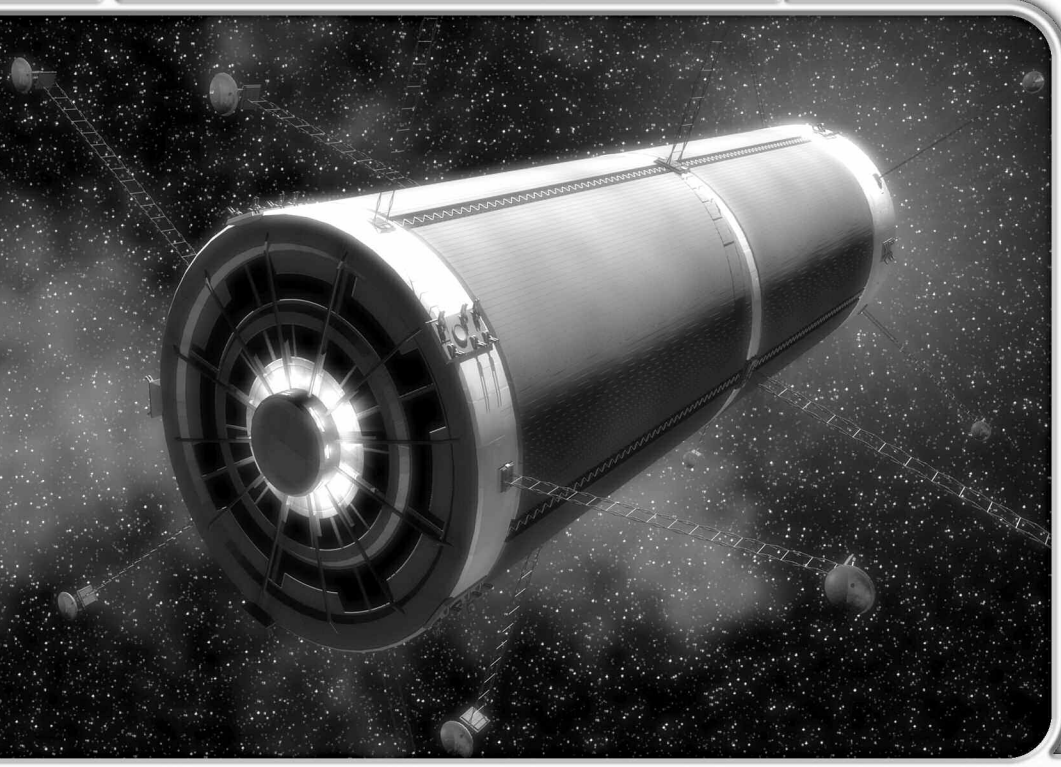
Vehicles, Space

This section describes a few of the spacecraft in use by the PLAN-SF in Mars orbit. The format is the same used in the spacecraft rules from ***Transhuman Space.***

Gang Lung-Class SCV

The *"Gang Lung"* ("steel dragon") class is the largest space control vehicle currently in service. Designed in 2088, and entering production in 2090, the PLAN Deep Space Fleet has eight vessels as of 2100, with three more in various stages of construction. Three of the vessels are stationed out of Phobos where they serve as a training cadre and integral part of Rust China's space defense. The names of the vessels stationed at Mars are the *Hei Lung* ("black dragon"), *Feng Lung* ("wind dragon"), and *Xing Lung* ("star dragon").

The vessel's design is a squat cylinder 455' long by 130' wide. The entire vessel is built around the massive spacedock hangar, leaving little room for crew accommodations. Typical payload for the vessel is 5,357.2 tons, including 20 munitions packages, 1,000 tons of carried craft, and loaded external cradles. There are 39.2 spaces remaining for future upgrades.



Crew: Commander (Leadership, Shiphandling, Tactics); Pilot (Piloting (Low-Performance Spacecraft); Navigator (Astrogation, Electronics Operation (Communications, Sensors); 2 Weapons Officers (Gunner (Beams), Gunner (Railgun)); 25 Engineers (Mechanic (Fusion Drive, Robotics, etc.)); 2 Medics (Diagnosis, Physician, Surgeon). Often 80 battlesuit-equipped marines.

Design: Cylinder hull (15,138 spaces, metal-matrix composite, heavy frame, smart), cDR/cPF 35/5F, 10/2S, 15/2B (metal-matrix composite armor). Hull radiators (115 ksf). LCD coating.

Modules: New command bridge; 2 large ladar; 2 large PESA; 2 fixed medium radar [F/B]; 200 HI fusion pulse drive; 2,100 tanks (ultralight, nuclear pellets); 4 10-MJ heavy laser towers [S]; 10 2.5-MJ light laser towers [S]; 2 coilguns [F/F]; 8 cabin; 20 bunk room; light storm shelter (2-space; encloses bridge, cPF 100); 2large entry module; minifac workshop; 2 medium robot arms (ST 430 each); hall; spacedock hangar (400' long, 110' wide, 110' high: 9,680 spaces); 8 vehicle bays (*Zhengyang* AKV: 150 tons, 0.08 ksf, 6 spaces each); 10 external cradles (250 tons each); 2 surgery; 1 battery; 100 cargo (500 tons).

Statistics: EMass 19,619; CMass 37,576; LMass 50,176. Cost M$1,781.65. cHP 6,490. Size Modifier +8/+10. HT 12. Maintenance Interval: 0.95 hours. RRA 100.

Performance: sAccel 0.02 G, Burn Endurance 262.5 hours, Burn Points 1,890, Delta-V 57.75 mps. No air speed.

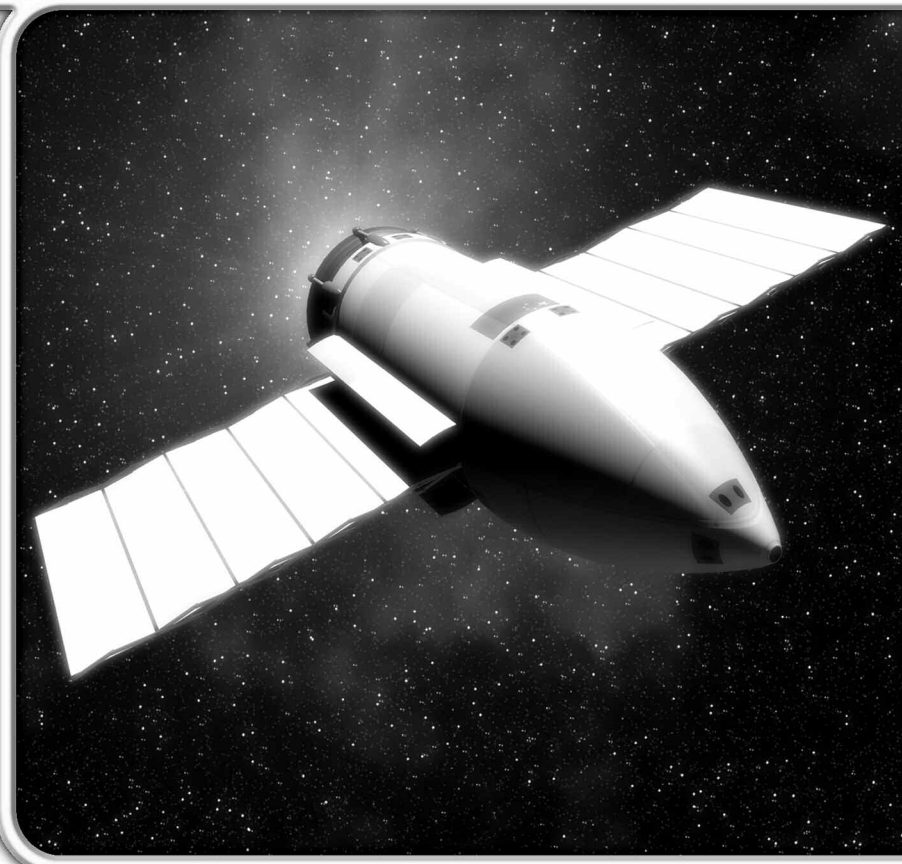
Zhengyang-Class AKV

The *Zhengyang* ("righteous energy") is the standard autonomous kill vehicle used on all PLAN Deep Space Fleet vessels and facilities. The basic frame is almost identical to the SIM-7 *Predator* (p. TS192), which is not surprising since both designs are based on the earlier *Gang Shou* ("steel hand") AKV used during the Pacific War. It lacks the *Predator's* streamlining and has a simpler overall design, but has greater combat persistence, carrying twice as many munitions packs.

Statistics are identical to the *Predator* except as noted here. Heavy hull; delete smart and streamlining. Modules: replace new unmanned with old unmanned and add 0.5 cargo with one spare munitions pack. Armor becomes cDR 60F/10S/15B, cPF 20F/2S/2B (metal matrix composites). M$14.9, cHP 41, EMass 114, Maint 5.2 hrs, sAccel 0.21 G, Burn Endurance 2.5 hrs, Burn Points 211, Delta-V 5.8 mps.

Vehicular Weapons

The tables on p. 108 list combat statistics for the vehicular weapons mentioned in this chapter, as well as some that are available using the *Wheeled Vehicle Modular Design System* (p. 124).



Performance and Environment

The performance of vehicles is affected by variations in environment. The important factors are atmospheric pressure and temperature, and gravity.

Off-Road Speed of Ground Vehicles

In lower gravities, a vehicle has a lower ground pressure, and thus better off-road performance. Multiply Earth ground pressure by local gravity, and consult the chart on p. VE130 to determine new off-road speed.

Stall Speed of Air Vehicles

The lowest speed an air vehicle can safely fly at and maintain lift is affected by both gravity and air pressure. Multiply Earth stall speed by 0.97 to get Mars stall speed. Multiply by 0.10 to get Venus stall speed. (The general formula is to multiply stall speed by the square root of local gravity, then divide by the square root of local atmospheric pressure.)

"10-second burn – now!" Captain Li Yan barked. The Hei Lung's pulse drive flared, a final course-correction that matched velocity with the terrorist-hijacked comet.

"Go! Go!" The huge cargo bay doors open, and the first wave of battlesuited PLAN Marines were released, free falling toward the comet's icy surface . . .

Only an exercise? Today, yes. But the air of grim purpose of the Hei Lung's crew underlines the seriousness of the threats that PLAN-SF faces when defending Mars . . .

– "Steel Dragons Keep the Peace,"
***New Shanghai Examiner**, Nov 2, 2099*

Guns

Name	*Type*	*DAM*	*SS*	*Acc*	*1/2D*	*Max*	*mMax*	*RoF*
4mm Emag w/APS	Cr.	5d×3(2)	20	14	1,500	7,200	19,000	100
7.5mm Machine Gun	Cr.	9d(2)	14	13	930	4,600	12,100	16
10mm Emag w/APS	Cr.+	8d×4(2)	20	15	2,400	9,600	25,000	20
15mm Heavy Machine Gun w/APS	Cr.+	6d×3(2)	20	14	1,300	5,600	14,700	8
25mm Chaingun w/APDS	Cr.	6d×6(2)	20	14	1,400	5,900	15,500	6
30mm Electromagnetic Grenade Launcher	Exp.	varies	17	11	310	2,400	6,300	8
45mm Emag w/APFSDS	Cr.	6d×63(2)	30	20	14,000	32,000	83,000	1
80mm E-Mortar	Exp.	varies	20	15	1,800	6,900	18,000	2

Beam Weapons

Name	*Type*	*Damage*	*SS*	*Acc*	*1/2D*	*Max*	*RoF*
2.5kJ Laser	Imp.	3d	20	19	1,390	2,000	8
25kJ Laser	Imp.	10d	25	24	7,800	11,000	8
250kJ Laser	Imp.	4d×8	30	29	43,800	94,000	8
2.5kJ Rapid Laser	Imp.	3d	25	22	4,400	6,300	80
25kJ Rapid Laser	Imp.	10d	30	27	24,600	35,000	80

Laser ranges assume an atmosphere of "very thin" or thicker; space ranges are ×20.

The weapon tables use the same format as p. TS156, save that "mMax" is maximum range on Mars. Damage of 30mm grenades depends on the type of smart warhead used; see p. TS158. For 80mm mortars, see below.

"APS" (Armor Piercing Saboted) damage is halved after it penetrates DR. "APDS" and "APFSDS" stands for Armor-Piercing (fin stabilized) Discarding Sabot: an armor piercing dart: damage that penetrates armor is unmodified (doubled for very large caliber round, but halved for being armor piercing).

80mm Warheads

80mm warheads (used in electromag mortars) are similar to other smart warheads (p. TS158) but more destructive:

HEMP: 6d × 15 concussion and 6d cutting fragmentation; 8d × 10(10) shaped charge.

SEFOP: 6d × 24 concussion and either 8d × 20 (5) crushing, or 6d cutting fragmentation.

MBC: Covers a 24-hex radius (184 doses) or carries a 2-hex cyberswarm.

Lifting Gases

The usefulness of "lighter-than-air" gases varies dramatically depending on the local air, as well as ambient temperature and pressure. The *Lifting Gas Table* on p. VE40 assumes the environment is Earth, with a pressure of one atmosphere and a temperature of about 85°F.

To find the local volume of lifting gas necessary to lift 1 lb., start by looking up the density of the local air, and the lifting gas, in the following table:

Gas Densities Table

Gas	*lbs./cf*
Hydrogen	0.006
Helium	0.012
Methane	0.030
Nitrogen	0.080
Earth Air	0.086
Oxygen	0.095
Mars Air	0.121
Carbon Dioxide	0.132

This table gives the correct densities for a pressure of 1 atmosphere and a temperature of 0°F. For Venus air (or Mars air, preterraforming), use the entry for carbon dioxide. For Titan air, use nitrogen.

The choice of lifting gas is also affected by molecular size. At high temperatures and pressures, hydrogen and helium are difficult to contain, as they rapidly slip between the molecules of the container! As a rule of thumb, above 200° and 1 atmosphere, one must use lifting gases heavier than helium.

The volume necessary to lift one pound is equal to 1/(A-L). A is the density of local air, and L is the lifting gas. If A-L is negative or zero, that gas won't lift.

Next, adjust this volume for pressure and temperature. To correct for pressure, simply divide by the local air pressure in atmospheres. To adjust for temperature, multiply by 1 + (T/460), where T is the temperature in Fahrenheit. Round the answer to the nearest 0.1cf.

Example 1: Ruyu Shih wishes to build an airship for Mars; she intends to fill it with helium. Taking the values for Mars air and helium, she gets 1/(0.121-0.012) = 9.17. The Martian atmosphere has a pressure of 0.4, and she intends to fly the airship in regions where the temperature is close to freezing (32°F). Correcting for pressure first, she gets 9.17 / 0.4 = 22.9. For temperature, the calculation is 22.9 × (1 + (32/460)) = 22.9 × 1.0696 = 24.5 cf required per pound of lift.

Example 2: Jirl Steinbach is designing a floating science probe for Venus. Since methane won't burn in a nearly pure carbon dioxide atmosphere, he decides to use that for lift. The first part of the calculation is thus 1/(0.132-0.030) = 9.80. Correcting for pressure, 9.80 / 90 = 0.109. Correcting for temperature, 0.109 × (1 + (900/460)) = 0.109 × 2.96 = 0.323, rounded to 0.3 cf required per pound of lift.

The *cost* of lifting gases in this setting is $0.01 per pound of lift, and may be ignored if desired. (The extensive mining of helium-3 has dropped the price of normal helium dramatically, and most other gases are plentiful.)

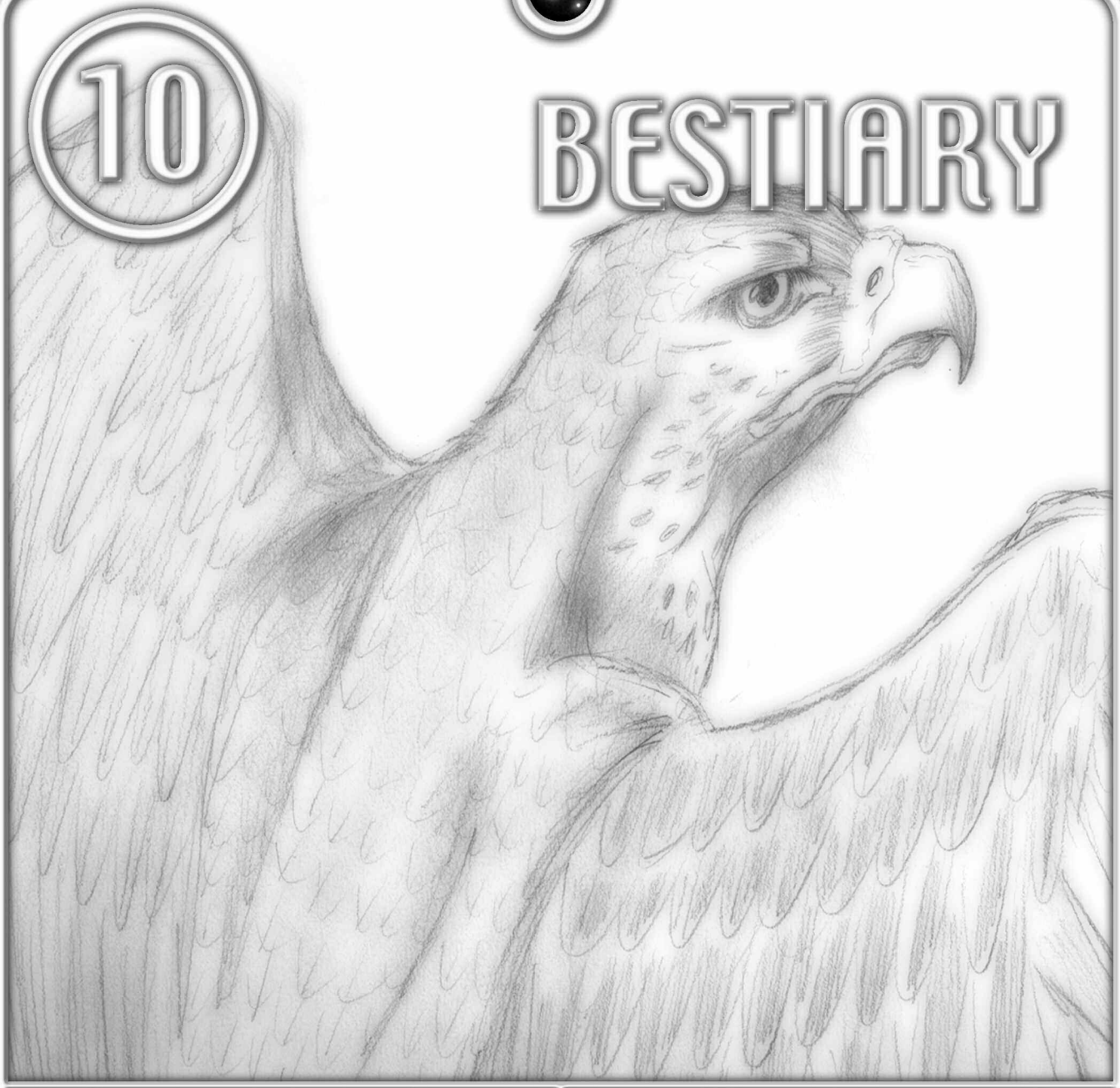
Two further notes: These rules do not adjust for gravity, nor do they need to. If a given volume of lifting gas lifts one pound of material in one G, it will lift that same amount of material equally well in any gravity. The change in weight is matched by the change in buoyancy. So long as static lift calculations are done using Earth weight, no correction for gravity is required.

Second, these rules assume the pressure and temperature of the lifting gas is the same as the atmosphere. Exceptions are possible, but are mostly beyond the scope of these rules. One special case should be noted: On Venus, any space in a vehicle which is largely Earth-normal air (e.g., cabins) will lift about 3.9 lbs. per cf. Since this space must be heavily armored, the extra lift is typically ignored, but vehicle-builders may wish to include it for the sake of accuracy.

Other Statistics

Lower gravity does *not* affect flotation rating, top speed, acceleration, or deceleration, all of which depend on mass, not weight (see p. VE166).

10 BESTIARY



"Eliz'beth! Do come in."

"Thank you, A'ron. I was in the area, and thought I'd drop by for a chat."

"You're always welcome in my home. What's that on your shoulder, dear?"

"My new pet! I visited the local pet boutique, and just had to have him. He's a Martian Tiger breed smartcat. Say hello, Neka."

"Hrr. Hello, ma'am."

"What a beautiful voice! He's darling. And what a coincidence; I just got a new pet, too!"

"A smartcat?"

"No dear, something a bit . . . wilder. He's in the next room."

"'Wilder'? That doesn't sound like you."

"Ah, here he is! He's one of those new Mars hawks. Come here, Avia!"

"Mrrr? Hisss!"

"Skreee!"

"Neka! Stop that!"

"Avia, don't you dare!"

"Neka, what have I told you about birds!"

"Brrt. Birds good."

"Right."

"Birds good . . . food."

"No! That's not right. Bad cat."

"Don't worry about it, dear. I'm sure Avia could take Neka in a fair fight."

"Hmmph!"

Humanity has brought large portions of Earth's ecosystem to Mars. Thousands of species of plants and animals live there. Some are thriving, some are dying out, and almost all have felt the hand of gengineers on their DNA. This chapter covers the more interesting flora and fauna of Mars. (Note: The weights listed are Earth weight. Be sure to make adjustments when necessary.)

Pets

Conventional wisdom says that, in controlled habitats, pets are nothing but consumers of resources and producers of waste. Despite this, animal companions are common on Mars. Some are kept for the company. Others serve roles that *could* be handled by technology . . . but the overall societal bias for wetware over hardware means that people prefer to have these niches filled by something organic. If it's soft and furry, so much the better.

Smartcat

ST: 3	**Move/Dodge:** 10/7	**Size:** <1
DX: 14	**PD/DR:** 0/0	**Weight:** 5-15 lbs.
IQ: 7	**Damage:** 1d-4 cut	**Origin:** SF
HT: 14/3	**Reach:** C	**Habitat:** Dom.

The first experiments into felines with enhanced intelligence were not complete successes. The prototype smartcats were too calculating and manipulative – and were forever wheedling treats and food out of people, terrorizing anything smaller than a Doberman, and driving their owners to distraction. The current breed of smartcats have been engineered for increased sociability and slightly lower intelligence. They are ideal companions, furry, friendly, somewhat trainable (as for an animal with IQ 6), and with a vocabulary of several dozen words. They differ from normal cats chiefly in their intelligence, voicebox, and doubled lifespan. They are Presentient (p. CI103). (Note that ***GURPS Bio-Tech*** allows Presentient gengineered animals to have language skills, as an exception to the description of the disadvantage in ***GURPS Compendium I.***)

Smartcats are available in most breeds (including fanciful ones) and with a wide array of pelts. On Mars, shorthaired breeds are preferred, and tiger stripes are fashionable. A standard smartcat costs $1,000; a 'cat with the feline equivalent of the Andraste biomod (p. 97) would be $1,500.

A very small number of smartcats – particularly second generation 'cats produced by breeding outside the gene factory – have an IQ of 8 and lack the Presentient disadvantage. They *usually* behave the same as their siblings, just smarter. Some are as cunning as the prototype smartcats, and may have *plans* . . .

Guardian Bear

ST: 22	**Move/Dodge:** 10/7	**Size:** 2
DX: 13	**PD/DR:** 2/2	**Weight:** 500-1,000 lbs.
IQ: 7	**Damage:** 1d+2 cr#	**Origin:** SF
HT: 15/24	**Reach:** C	**Habitat:** Dom.

The guardian bear was bred for traditional "guard dog" duties, and also serves as a ordinary, if large, pet. Guardian bears are very affectionate with people they know, and are usually trained to restrain, rather than maul, intruders. "Phone" implants are common, allowing the bear to receive commands remotely, or to call for backup. Guardian bears differ from normal bears in intelligence, voicebox, and extended lifespan. They are Presentient, and typically know between 50 and 100 words.

As pets, guardian bears are devoted, cuddly, and expensive to feed. (They *are* omnivorous.) They are very protective of their adopted family, and often fall into a "nanny" role for small children by default.

A guardian bear on all fours is a two-hex creature; standing upright, it occupies one hex. They strike with their front claws for listed damage, or may bite for the same amount of cutting damage. When trying to restrain a foe, a bear will enter close combat, then try to grapple, takedown, and pin (pp. B111-112).

A standard, lightly trained guardian bear costs $12,000. (The manufacturer, Colonial Genetics (p. 53), makes sure all bears receive enough training so they do not attack people.) The equivalent of an Andraste biomod costs an additional $1,000, and a phone implant (and a day of training for bear and owner on how to work it) adds $500.

Mars Hawk

ST: 4-5	**Move/Dodge:** 18/9#	**Size:** <1
DX: 12	**PD/DR:** 0/1	**Weight:** 6-12 lbs.
IQ: 6	**Damage:** 1d cut	**Origin:** SF
HT: 15/4-5	**Reach:** C	**Habitat:** Dom.

The Mars hawk is an animal companion occasionally used for scouting duties. Between their improved wing configuration and the great depth of Mars' atmosphere, they can achieve an altitude of several miles, given time. They are more intelligent than their unenhanced ancestors and have a parrot's voicebox, though they rarely understand more than a dozen words. Owners who use their hawks as scouts often attach a tiny camera and radio, but a Mars hawk is capable of seeing and reporting the general location of people, structures, etc., by itself. Their effective Vision roll is a 15. The Move above is standard flying Move, but hawks may swoop at speeds up to 70 mph (Move 35). On the ground, Move is 1 and Dodge is 6.

As pets, they are even-tempered but not particularly affectionate. Some are sold with dust-pink camouflage plumage, while others are quite gaudy. A Mars hawk costs $3,000, and a camera/radio implant is $500. All Mars hawks are made to withstand the Martian atmosphere.

New Shanghai/Mars/Teralogos

"I love you, Chi-Chi," said Yuan Liang, age 8, cuddling her over-sized "nanny."

She has good reason. Just last night, Chi-Chi, a Colonial Genetics guardian bear, defeated a home invasion that might have ended in kidnapping or worse.

The intruder has been identified as Wei Zhao, a member of a local Triad gang that has been shaking down Dome 3 merchant like Shina's father. Zhao, despite his martial arts training and Whirling Claws of Death biomod, proved no match for the 500-lb. Chi-Chi. Now he's being treated for multiple abrasions and contusions at Shanghai General.

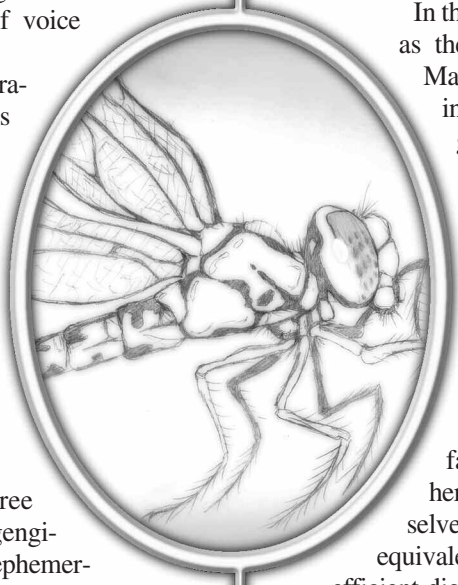
"Chi-Chi stop bad man," the guardian bear told us. We think that sums it up.

Dracofly

ST: 0 **Move/Dodge:** 15/10# **Size:** <1
DX: 13 **PD/DR:** 0/0 **Weight:** <1 lb.
IQ: 1/5 **Damage:** none **Origin:** SF
HT: 14/1 **Reach:** C **Habitat:** Dom.

Dracoflies are one of the current fads in fashion accessories. They are enlarged dragonflies, with wingspans of 6 inches to 3 feet. Engineering has greatly enhanced their iridescent coloring; popular color schemes include oil-on-water, red-gold, and electric blue. Dracoflies are usually worn on the hair or shoulder.

Dracoflies are controlled using an insect director (p. BIO96), which converts spoken commands into infrared signals the insect understands. It will have an effective IQ of 5 in a *very* narrow field. (E.g., "hold still," "fly around for a minute, then come back to my shoulder," "do a loop-the-loop.") Outside that field, a dracofly's IQ is 1. The director is typically small enough to be disguised as jewelry, so the illusion of voice command can be maintained.



Individually, the worst thing a dracofly can do to a human is fly in his face and distract him (roll vs. IQ to ignore a bug in your face). A *swarm* of dracoflies uses the rules on p. B143. They have a Move of 10, and can be dispersed by 10 hits (more if they were *ordered* to swarm). They do no damage, but will be very distracting, especially in brightly lit areas, when they may well dazzle the victim. Roll vs. IQ-3 to do anything but swat them.

Dracoflies live for about three months (longer lifespans *could* be gengineered, but fashion is meant to be an ephemeral thing). They cannot breed. A consumer-grade dracofly, available at the corner pet shop, would be $100. Exotic variants are available (e.g., more than four wings, custom color schemes, tiny cybernetic parts) with increasing costs into the tens of thousands of dollars. Dracoflies have no problem with the Martian atmosphere.

Spybug Variant

A dracofly can be enhanced into a spybug; this is currently a secret to anyone outside the espionage or gengineering communities, and to most people inside them. The IQ of a spybug in its area of expertise is 6. They are typically enhanced with a biochip "clock," and a reusable stinger which can be loaded with a variety of drugs. Things a spybug can do include: carry a tiny payload, such as a microphone; travel to a target the bug has had contact with before; seek out the source of a given odor; sting a target; or retrieve a tiny payload.

A spybug will only be available to spies or people who know spies. On the black market, they go for $8,000. For more detail on insect agents, consult pp. BIO95-97.

Livestock

Mars (odd as it may seem) is the breadbasket of the outer solar system. Herds of food animals inhabit the grasslands near the Marineris Sea.

Pharm Cow

ST: 50-90 **Move/Dodge:** 7/4 **Size:** 3-4
DX: 8 **PD/DR:** 0/0 **Weight:** 0.75-1.5 tons
IQ: 5 **Damage:** 1d+1 cr **Origin:** SF
HT: 16/15-18 **Reach:** C **Habitat:** Equatorial Mars

In the past decade, cows have replaced goats as the most plentiful kind of livestock on Mars. They are modified to produce drugs in their milk or bloodstream, or simply to give "enhanced" milk, full of vitamins and safe for all ages. Both pharm cows and "normal" cows have been gengineered for greater size, increased docility, and a tendency to stay put. Neither gender has horns, and in most breeds births are strongly weighted toward females.

The cattle industry on Mars tends toward large ranches rather than small farms; 90% of the cows on Mars are in herds of 100 or more. The ranches themselves are far smaller than their historical equivalents, per cow. Modern cows have *very* efficient digestive systems, and don't require much grazing lands (especially considering that the grass is gengineered, too . . .).

Genemod Goat

ST: 10-12 **Move/Dodge:** 10/7 **Size:** 1
DX: 14 **PD/DR:** 1/2 **Weight:** 75-400 lbs.
IQ: 5 **Damage:** * **Origin:** SF
HT: 16/8-12 **Reach:** C **Habitat:** Equatorial Mars

Early American settlers brought goats to Mars. They are easy to feed, fast-breeding, milkable, and edible. Once the atmosphere was marginally breathable, gengineers modified the goats to survive outside the habitats. The genemods included Filter Lungs, Cast Iron Stomach, and a thick silky coat providing Temperature Tolerance 6.

Part of the enhancements to their lungs came from mixing domestic goat genes with mountain goat genes. An unforeseen side effect was increased jumping ability – and in 0.38 G, a mountain goat can jump over a *very* tall fence. Needless to say, some escaped into the wild. The food supply is scarce enough to prevent them from breeding unchecked, but it also puts evolutionary pressure on them. Wild goats are noticeably bigger and meaner than their domesticated cousins. Animal Handling rolls are at -5. Wild goats will only flee if outnumbered or injured. Otherwise, they butt. Treat as a slam attack doing 1d crushing damage for each 100 lbs. of weight. Give the goat +2 ST for determining knockdown. They will also eat, or attempt to eat, anything they can chew (DR 2 or less). A goat won't persist in eating something inedible after the first few mouthfuls – but a "few mouthfuls" out of an air hose are a serious problem.

I'd been on the desert for two or three weeks by this time, and all my food and water had run out days before. I knew I couldn't survive more than another day or two without eating. Fortunately I had been able to stave off dehydration for a couple of days by drinking my urine, but without an external source of water, that wasn't going to last.

Then I saw a sand wolf sleeping behind a dune. It was old and feeble, or I never could have killed it. Its meat was nearly inedible, but I choked down what I could, and I filled my canteens from its water sacs. It wasn't the classiest meal I've ever had, but it was one of the best.

As soon as I got back to civilization, I shelled out the money for a high-efficiency kidney. One brush with death in the desert was enough.

– Copernicus Jones, ***Roughing It on Mars***

Variant Goats

There are several variants on the generic goats above. Some have coats with different textures or colors. Many produce pharmaceuticals and other substances in their milk; e.g., the spider goat gives milk that contains spider thread, which is used in clothing and construction. In some cases goats with modified milk can't nurse their young directly. The kids are fed either by a "wet nurse" goat or by artificial means.

Wild Animals

Mars has a simplified but comprehensive ecosystem, encompassing everything from bacteria, worms, and mites to aggressive carnivores at the top of the food chain. This section concentrates on animals likely to have an effect (usually adverse) on Martian adventures. Note that all wild animals have been modified to withstand the high levels of CO_2 in Martian air.

Mini Bears

ST: 10-12	**Move/Dodge:** 7/6	**Size:** 1
DX: 13	**PD/DR:** 1/1	**Weight:** 120-180 lbs.
IQ: 5	**Damage:** 1d-2 cr	**Origin:** SF
HT: 11-13	**Reach:** C	**Habitat:** Mars

Mini bears are omnivorous, and the bulk of their diet is plant life. They also hunt prey and scavenge from other animals' kills. They have the Cast Iron Stomach advantage, and sometimes are found rooting through trash-heaps like oversize raccoons.

An individual mini bear is a match for a human, and they usually travel in families of four to five, consisting of two mated adults and their cubs. The cubs leave the family after a few years, when they reach maturity. Mini bears are nomadic, and do not hibernate.

When encountered, mini bears will generally ignore people (particularly when the bears are feeding), so long as they are not disturbed. If the adults are threatened, the bears will retreat peacefully, but if the cubs are endangered, the entire family will attack ferociously, biting and clawing.

Sand Wolf

ST: 13-16	**Move/Dodge:** 7/6	**Size:** 1
DX: 12	**PD/DR:** 1/2	**Weight:** 150-250 lbs.
IQ: 6	**Damage:** 1d cut	**Origin:** SF
HT: 13-17	**Reach:** C	**Habitat:** Martian Deserts

Sand wolves are the dominant predators on Mars (barring humanity itself). Nominally, they go after the injured or old, but they have been known to attack fully healthy oxen and other dangerous prey, even if food is plentiful. Folk wisdom says that they *enjoy* a good fight. They hunt in packs of 4 to 12, and will not retreat until half their number are dead. They will attack humans, but only if the humans are lightly equipped. While they can't distinguish weapons from nonweapons, they seem to understand that parties carrying lots of equipment are likely to be more dangerous.

Sand wolves live in individual shallow burrows they dig in the downwind side of sand dunes, or in natural caves if they are available. If the area has loose rocks, they will push them in front of the burrow, hiding it from casual inspection (-4 to Vision rolls). To survive in the exceptionally dry Martian deserts, they store water in internal organs holding up to a gallon. Their system conserves water by concentrating their urine, and they do not urinate near their burrows, to prevent giving the location away by smell.

Ice Weasel

ST: 10	**Move/Dodge:** 8/6	**Size:** 1
DX: 12	**PD/DR:** 1/2	**Weight:** 30-70 lbs.
IQ: 5	**Damage:** 1d-2 cut	**Origin:** SF
HT: 12	**Reach:** C	**Habitat:** North Polar Mars

Ice weasels live on and around the northern ice cap, preying on everything from small rodents to large herbivores. In an effort to prevent attacks on humans, ice weasels were gengineered to become docile and affectionate when exposed to human scent. The modification was a qualified success. Around humans, there is a 1-in-3 chance per day that ice weasels will enter heat. While in heat, both male and female ice weasels are extremely vocal, and humans camping too near ice weasel territory may find themselves kept awake by nearby weasel mating activity. (This side effect is why this particular modification hasn't been inserted into other animals as yet.)

There are no cases on record of ice weasels attacking entities that smell human. When attacking transhumans with unusual scents, or other animals, they typically swarm in groups of 3 to 10, doing the listed biting damage.

Tika Bird

ST: 1-2	**Move/Dodge:** 12/6	**Size:** <1
DX: 14	**PD/DR:** 0/0	**Weight:** <1 lb.
IQ: 4	**Damage:** 1d-4 cr	**Origin:** SF
HT: 13/1-2	**Reach:** C	**Habitat:** Mars

The tika is a small bird that lives on insects and seeds. It is noted for its durable nests, which it constructs out of wood shavings glued together by its saliva. It creates the shavings by pecking trees with its unusually hard beak. Unfortunately, it will also attempt to peck apart anything that catches its attention.

In areas with tika populations, anything with no DR may gradually be pecked and shredded by the birds. They particularly go after things that smell interesting or are shiny. Items with DR 1 or 2 can resist a tika's attentions for much longer, but will acquire beak-shaped dents fairly quickly. Anything with DR 3 or above is immune. Tikas are preyed upon by a few species of falcon, and "tika repellent" devices can be purchased that watch their surroundings and produce a falcon-cry if a tika is detected. A tika-repeller is a box the size of a matchbox that runs for a month of continuous use on an A cell, $50, weight negligible.

11 CAMPAIGNS

I drift over the coffee-colored waters of Marineris. My helium-filled gas cells maintain my lift; my fans sustain my speed. To the eyes below, I am just another cargo zep bound for New Shanghai. I tune my ears to the frequencies used by my microbot surveillance dust, devote a notable percentage of my computing capacity to audio enhancement, and see what I can hear . . .

"Government, like disease, is confounded by a vacuum. Only by moving people can illnesses be carried from Earth to Mars; the same is true of government. By removing the Elevator, we can stop this green plague, and achieve our true destiny: On Mars, Of Mars, For Mars."

"Nah, nah, right now I got myself tuned purely het; it was too much trouble being attracted to guys ***and*** *gals. But Car'l, he dumps me, gets his works inverted, so now he's a she, and then figures we should get back together. I say, 'Your application does not meet our present needs.' She didn't take it well."*

"It is ***gold,*** *you philistine. The basis for most currencies since the dawn of time. You cannot back money with nitrogen; would you make Earth rich at our expense? Their atmosphere is filthy with the stuff."*

"Today on Olympus, Representative Khalid ibn-Omar fractured three vertebrae and broke both legs in a skiing incident at the Zeus Resort. He is expected to be up and about tomorrow. From the hospital tank, he claimed that this accident will not slow his law-and-order campaign against the so-called Martian Triads."

"Hello, dear! It's so odd to have to ***record*** *a call. I guess even Interplanetary Communications Systems can't do a thing about lightspeed. Your father and I are having a wonderful time here in Robinson City. He had a little trouble with his mask the first time out, and they had to re-line his lungs, but he's feeling fine now."*

". . . Precis follows: Assemble at 73 Burrel St. site. Rep from TSA will give briefing, hand over viral agent. Infiltration of Colonial Directive offices begins at 2300. No insignia, no ID, all participants must be rigged with incineration devices in case of capture. Virus was made in American labs, so should look like a U.S. provocation."

A-ha, *I think.* ***Bingo.***

Campaign Frameworks

Mars is an entire world, with landscapes unlike anywhere else in the system, vibrant cultures exploding into the possibilities of transhumanism, and adventures both gritty and epic. The other worlds of the inner System have smaller populations, but are hot spots of political maneuvering and intrigue in their own right. The possible campaign frameworks are boundless; here are a few.

Miners

Mining itself is not glamorous or exciting, but the events that surround it can be. Entirely apart from the threats imposed by the environment, land claims under the ROST (p. 49) are tricky things, and the wilderness is close to lawless. Claimjackers and simple thieves keep independent miners cautious; the big corporations have rivals their own size, necessitating security forces and crack legal teams. Plus, thanks to satellite surveillance, any secrets Mars and Mercury have left are buried. It's miners who will dig them up.

Aerospace Forces

See the world . . . from 1,000 miles up! Both China and the U.S. have placed some of their best pilots and equipment on and above Mars, to protect their colonies below. The rival organizations don't think much of each other, especially since the Chinese are *naval* pilots. Until the day comes when they fight for dominance of the Martian skies, they test their mettle against spies, pirates, and the smuggling spacecraft of the Triads.

Intelligence Ops

Bureau 12 and the SIA quietly plot against each other in the dark corners of Mars. Secrets that could determine the fate of a whole world are stolen. Terrorists planning mega-destructive acts like dropping the Elevator or breaking the Capri Chasma Dam are foiled. In a more cinematic game, evil transhuman masterminds plotting System-wide conquest may choose not to begin with Earth, but rather with a slightly smaller morsel – Mars.

Meanwhile, on Mercury, the System's densest concentration of energy and metallic wealth attracts spies like a black hole. Working under the giant Sun requires a different kind of spy than Mars; less social, better at sneaking over rocky crags in a stealthy vacc suit. It involves more sabotage and less theft, but it's still a job for the most secretive profession.

Even Venus is not completely free of intelligence agents and their foes. With its entire future ahead of it, the planet Venus is seen by many as a ripe fruit, which must be claimed before others beat them to it. Research Station Aphrodite is a difficult place to keep secrets, so you'd better be good at your job.

Keeping the Peace

There are troublemakers in every city, and Mars isn't *that* different from the homeworld. In this framework, the PCs are the civil authorities – police, in Earth terms. Only large habitats have formal police forces, of course, and even then they are more likely to be a corporate security agency the city has hired. In smaller habitats, the peace is kept by "neighborhood watches" made up of part-time policemen. In this kind of setting, the PCs could be an areologist, a miner, and a trucker, who only joined the Watch to make a little extra money and then find themselves responsible for solving a particularly heinous crime.

Mercenaries

Little wars are constantly brewing in the Belt and beyond. Mars itself is currently peaceful, but tensions are rising, and a good team of guns for hire can usually find a ticket. Adventures can range from covert anti-industrial operations, to security staff, to counter-terrorist missions. Or, the mercenaries can regard Mars as a peaceful home port, between missions to Europa for the War Under the Ice (p. TS19) and assaults on Trojan Mafia-held asteroids (p. TS85).

The Idle Rich

Mars is a playground like none on Earth. The rules are lax, the deserts are wide and unpopulated, and the rich can do as they please. The coterie known as the Millionaires of Mars (p. 47) are small in number, but most of them live with their families, retainers, servants, and other hangers-on. The range of character possibilities is broad.

Campaigns for the idle rich may center on maneuvering for status in Martian society, spiced with occasional supertank battles. *Real* threats are also a possibility, though most of the wealthy have bodyguards to handle that sort of thing. Still, kidnapping and worse happen to the rich all the time. The threat may come from preservationists opposed to the duels that tear up pristine Martian terrain, or Free Mars terrorists simply looking for funds.

Free Mars!

Vive le resistance! The independence movement on Mars is home to all types, from dignified statesmen to violent anarchists. Of the listed movements (pp. 55-56), the Areohumanists are ideally suited for PCs, but there are enough different Free Mars organizations out there that players should feel free to invent their own. This campaign can require walking a thin moral line; destroying property can be justified, but killing innocents cannot . . . and there's a gray space in between. If using lethal force in self-defense is ethical, does a perceived threat to the whole planet constitute justification for killing the perpetrators?

Scientists

The eternal quest for knowledge drives people into the clouds of Venus, the noonday Sun of Mercury, and the deserts of Mars. It sends physicists probing the horizons of black holes and geneticists browsing through DNA like a lending library. Some say science is the only true adventure.

Scientist PCs can either all be of the same discipline or have varied fields of study. In the first case it's obvious why they're together; a team of areologists can have any number of reasons for existing. The players will have to individualize the characters in the areas outside areology.

A diverse team has strengths, but is less common. An example might be a U. Mars research team, traveling together to share expenses, comprising a field biologist (examining the new Martian fauna in its "natural" habitat), his geneticist partner, an areologist, and a sociologist interested in the societies of the habitats they encounter on the way. Some scientists get together in mixed groups for *fun,* to see what new insights synergy can turn up.

Tourists

A typical tourist-based campaign starts with skiing on Olympus, zeppelin tours of Marineris, and exploring the winding streets of Haiyuan. Then comes the adventure. Perhaps a PC is mistaken for a spy, or the party is present during a Negative Growth (p. 56) attack. Even without hostile people as a complication, what if the zep crashes in the wilderness? Help will be there in hours, but a few hours can be a very long time . . .

Diplomats

Mars is where the edges of many nations meet, a shared frontier where superpowers subtly vie for dominance. Over the next century, Mars may become a second Earth, verdant and with its potential virtually untapped. In that sense, it is the most valuable object in the solar system.

The diplomats assigned to Martian duty are of many types. Some are the best available, assigned with the hopes that they will bring prestige and power to their nation. Others are sent to Mars because they offended someone powerful back home. Still others *volunteer* for a Mars post, looking for excitement on the new world. And in a setting where corporations have as much power as nations, powerful companies field their own diplomats.

Exploring the Wilderness

All of Mars has been surveyed from orbit, but most of it has never been visited on the ground. People explore the wilds of Mars for many reasons – wealth, science, curiosity, thrills – and exploration is a possible basis for a campaign. Simple areography can provide a dozen kinds of dangers, such as sinkholes, mudslumps, crumbling cliffs, and hidden crevasses. The new lifeforms (pp. 110-115) bring threats of their own. However, anyone in possession of a radio can get help within hours or even minutes – if their radios work.

All that said, the problem with "man vs. nature" adventures is that there's nobody to outwit. It can be exciting as a change of pace, but after the third dangerous mountain climb it begins to boil down to die-rolling. Wilderness excels as setting, and can provide seasoning as a source of conflict, but it's a thin diet for a main course.

Players as PCs

Where will *you* be in a century? Tens of thousands of people alive in 2000 are still alive in 2100. The PCs in this campaign concept are the players themselves, with 100 additional years of experience and medical advances. People who can remember the 20th century tend to stick together. Imagine what you might do with your life if you realized that you're going to live to see the 22nd. The oldest *known* person on Mars is 131, but there may be others who are keeping a low profile. After an additional century, the PCs certainly have skills the players haven't pursued yet. The "Recurver" character type works well for this framework. One choice should be made: Have the PCs been hanging around together for the past hundred years, or did they just bump into each other again by accident?

One of the best parts of this concept is that it *might* happen. Life expectancies are steadily going up, and even with no radical breakthroughs, the average ***GURPS*** player will live to see 2050. Dramatically increased lifespans are one of the pillars of transhuman thought. It could happen to you.

Secrets

The lure – or threat – of the unknown is a basic force in many adventures. Below are a few secrets of the inner System for GMs to use as surprises for their players. What follows is not necessarily ***Transhuman Space*** canon, and GMs are encouraged to twist or reverse the plot seeds below to better surprise their players.

Peru on Mars

Many suspect the Peruvian colony on Mars of being the TSA's toehold on the red plane, despite their protestations of innocence, cheerful ubiquity in Martian culture, and constant attempts to promote peace. In truth, the Peruvian cultural hegemony is caused by a breakthrough in meme theory, made by TSA researchers. The secrets of this form of applied memetics are closely guarded; a few outside agencies (including the SIA, p. 45) have figured out that the Peruvians have *something* on their side, but no non-TSA citizen knows the truth. The other TSA operatives mentioned on p. 49 are, in a certain sense, a giant decoy. Their work is considered important and furthers TSA goals, but is not strictly the point. If current trends continue, the Peruvians should end up *de facto* rulers of the planet by 2115 at the latest. Fortunately, it's unlikely their secrets will stay that way. Any good technique for creating powerful memes is *itself* a powerful meme, and tends to spread regardless of attempts to sequester it.

Average Peruvian Martians is unaware of all this; their loyalties are to the colony first, Peru on Earth second, and the TSA third. Only certain members of the government, and the "Meme Warriors" themselves, are in the know. The Memetic Warfare Special Operations Group, as it is known, is made up of just over a hundred agents. They include commandos, spies, and philosophers. Many of them are famous or work closely with public figures. (Whether Margarita Rio (p. 49) is a member of the Group is up to the GM.) Meme warfare is about manipulating the public, and usually this is done through public channels such as MarsWeb. However, the Group also uses such tactics as infiltrating foreign governments, so as to issue memetic disinformation from within the enemy, and "nonlingual triggers" like carefully chosen acts of sabotage.

While the Meme Warriors make an an excellent antagonist force for a campaign, it is possible for the heroes to be *members* of the Warriors. Manipulation of a planet's infoscape involves experts in many fields, and offers a range of missions from the straightforward (kidnap politician X and hold her incommunicado until after the conference), to the bizarre (paint the statue of Wen-Xuan Liang in New Shanghai bright green).

The Natives

The party is camping near Elysium when they are set upon in the dark by beings unlike any they've ever seen and knocked unconscious. When they wake up, they are far underground, being studied by these thick-skinned monsters. With the help of the party's infomorphs, they establish rudimentary communication fairly quickly. The characters seem to have been captured by the last remnants of an ancient Martian civilization – but that's impossible, surely?

The thrill of making First Contact may blind the characters – and the players! – to the implausibilities surrounding the Natives. Any thorough scientific examination will reveal the truth. The first step, of course, is getting uncaptured by the very angry pseudoaliens who are about to declare war on humanity.

The Natives themselves are an extremely expensive and involved practical joke that has yet to hit its punchline. Physically, they are designed to look as alien as possible, and to be ideally adapted to conditions on Mars as it was billions of years ago. Deep under Elysium, there is a complex of chambers filled with records and relics of an ancient Martian civilization – all faked. One vault holds 50 cryosleep capsules, artificially aged. Early in 2097, the vaults opened, and the Natives woke up. They had no memories but a rudimentary language. Everything they know, they learned from the records their ancestors supposedly left behind. These records state that they are the last survivors of ancient Mars, put into deep sleep until the conditions on the surface became livable again.

The Natives have not yet come in contact with humanity; the tunnels leading to the surface are rubble-choked, and as of the beginning of 2100 they have just managed to get their tunneling machines started again. Once they do encounter the residents of the surface, they will probably be very angry.

Even a casual investigation of the Natives' story and chambers will reveal inconsistencies. There's no way the cryocapsules could have survived millions of years, let alone billions. The Native language bears a slight resemblance to Basque. Their story is straight out of 20th-century pulp science fiction. Most importantly, the Natives have features, from their humanoid shape down to their DNA, that are clearly Terran in origin. Nevertheless, the first people to encounter them will probably believe they've made the discovery of the millennium.

The Natives and all their artifacts were created by Mohammed ibn-Khalid, a billionaire with a twisted sense of humor and majority ownership in Khalid Genetics, a small biotech concern. A few dozen people were involved in the creation of the Native hoax over the course of the early 2090s. They have all been bribed into secrecy, and ibn-Khalid keeps a close eye on them.

Physically, the Natives are approximately humanoid. Their arms are longer than a human's, and very flexible. They have only three fingers per hand, arranged to be mutually opposable. Their legs are short, stumpy, and bend backwards. Their ears, mouth, and nostrils are all just thin slits in the head. Their "face" is dominated by large, pitch-black eyes set far apart. Their skeleton, musculature, and internal arrangement are very different from those of humans, with the spine running through the center of a circular, cross-braced ribcage. Most of the redesign was done simply to make them look less human! A Native's skin is thick and ruddy, with deep wrinkles. The psychology of the Natives has been shaped entirely by the "records" created for them by ibn-Khalid. They are utterly dedicated to restoring their civilization.

Native — *13 points*

Attribute Modifiers: ST +2 [20]; IQ -1 [-10]; HT +2 [20].

Advantages: Decreased Life Support (Reduced water requirements) [10]; Double-Jointed [5]; Peripheral Vision [15]; Thick Hide [28].

Disadvantages: Delusion ("We are native Martians") [-15]; Fanaticism (to Native race) [-15]; Monstrous Appearance [-25]; Overconfidence [-10]; Thalassophobia [-10].

Features: Natives are adapted to the Martian atmosphere as of 2100; Earth gravity would feel monstrously strong, and they require high levels of CO_2 to maintain their breathing reflex. They would also get mild skin rashes in areas with high humidity. These are all 0-point features; they are well-suited for their environment, and shouldn't have serious difficulty interacting with other races.

The Mr. Qian Conspiracy

Suwen Qian was a genius software engineer and roboticist with a terminal and untreatable brain disease. In his last few years, he engineered a bid for immortality. He began by creating a shadow of himself and editing it to be obedient. He then customized a half-dozen cyberdolls to resemble himself, and installed the shadow in them.

Now that he had a private goon squad, he sent them out to find, and kidnap, a man who looked as much like him as possible. When he had mere weeks left to live, they succeeded. He had them drug his victim into a stupor, and then installed a puppet implant and a computer to control it. He made a ghost of the subject's brain, destroying it in the process. As with his shadows, he brutally edited the ghost into obedience.

Mr. Qian
-10 (or fewer) points

Before his death in 2093, Mr. Qian had the following stats:

ST 9 [-10]; **DX** 11 [10]; **IQ** 14 [45]; **HT** 7 [-20].
Speed 4.5; Move 4.
Dodge 4.

Advantages: High Pain Threshold [10]; Lightning Calculator [5]; Status 1* [0]; Wealthy [20].
* Free from Wealthy.

Disadvantages: Cowardice [-10]; Intolerance (Bioroids, clones, cybershells) [-5]; Obsession (Cheating death) [-15]; Overconfidence [-10]; Terminally Ill [-50 or more, depending on date].

Quirk: Likes robots better than people. [-1]

Skills: Brain Hacking-13 [4]; Computer Operation-14 [1]; Computer Programming-13 [2]; Electronics Operation (Medical)-14 [2]; Engineer (Robotics)-15 [6]: Mechanic (Robotics)-14 [2]; Physiology (Neurology)-11/17 [2]; Psychology-12 [1].

Languages: English-13 [1]; Mandarin (native)-14 [0].

His new incarnations have naturally diverged from this. Physical attributes may be quite different, and most have picked up new skills.

Finally, he was ready. He had his shadows make a ghost *of himself,* destroying his organic brain. His ghost awoke in the new body he'd stolen. He set the original inhabitant's ghost to run "in the background" of his computer brain, so he could interrogate it for details of its previous life, as needed.

This was only the first stage of his plan, however. If he had merely wanted to live past his physical body's death, he could have legally purchased a bioshell and installed his ghost in it. Mr. Qian wanted to remove *any* risk of ever dying. Over the past several years, he and his shadows have kidnapped a dozen other people, and performed the same procedure. They all have physical appearances very similar to his original body, though four are female. Each, after "conversion," returns to his original life. If their occupation or place in society would be useful to the conspiracy, they keep it, but otherwise they quickly begin severing ties to the host body's previous life, and move away to perpetuate the life of Mr. Qian. The different Mr. Qians prefer to socialize with each other, though they make an odd spectacle in public. In addition to their physical similarities, they have many of the same mannerisms. They all have access to the ghosts of their bodies' previous occupants, and thus their memories. The personality shift is harder to hide, but acting distant, preoccupied, and cold usually gets an "old friend" to go away and stop asking annoying questions. Theoretically, a Mr. Qian could allow the previous occupant's ghost to take control of the body (it's supposedly obedient to him, after all), but none have taken the risk so far. It's always possible that one of those ghosts retained some free will. Note that Mr. Qian's cyberdoll shadows are still around, typically acting as bodyguards or servants to one of the Mr. Qians. Since they look and act similar, they can be mistaken for just another organic host, but they are much stronger and tougher, and have no fear of dying to save a Mr. Qian.

To date, Mr. Qian has not been caught. He has had some close calls – not everyone can drop out of their previous lives without arousing suspicion, and the implants show up on X-rays – but he has always managed to cover his tracks. How many more people he will kidnap before he is stopped is unknown.

Gabriel

Daedalus, an S-type Apollo asteroid two miles in diameter, will be coming very near the Earth in late May, 2100. An apocalyptic cult has decided to make sure it doesn't miss. The cult calls themselves the New Church of the Resurrected Son. An offshoot of Christianity, their beliefs include a strange mix of Jesus-as-alien, physical ascension to Heaven, and a variant of the popular alien contact meme (pp. TS87-88). They theorize that killing a massive number of people will attract God's attention to the solar system, and He will send his Son to take the worthy away to Paradise. Those who died were, by definition, unworthy, since otherwise they wouldn't have died.

The New Church has several hundred members, mostly humans and parahumans. They have spent all their funds modifying Daedalus, which they now call Gabriel. It now has sufficient maneuvering engines to redirect it toward Earth, and some weapons to attack those who try to stop them. (The weapons are *completely* inadequate to the job, given that 99%+ of humanity would be trying to stop them. The New Church is in denial about this.)

Gabriel would not – quite – be a civilization-ender. It would devastate the area it hit, and the dust kicked up would cool weather worldwide, but Earth civilization would only be hammered, not killed.

The New Church is planning the hit for May 25, 2100. Maneuvering will begin early in the month with small, hard-to-notice burns, and ramp up in the weeks before "impact." Gabriel's new orbit will probably be detected more than a week before it would hit, and a combined fleet will meet it, destroy the weapons, and either take over the controls and redirect it, or use nuclear weapons to redirect or vaporize it.

Adventure & Campaign Seeds

The Flood

Aquifer bursts (p. 37) are a known hazard, but most are not seriously dangerous. A city may be flooded, but there's usually plenty of time to get to safety.

Not this time. A small marsquake fractures a slab of bedrock, which suddenly puts its full weight on a deep aquifer the size of Lake Superior. As the water blows to the surface, it turns nearly a square mile of regolith to airborne mud. The PCs are woken by a deafening roar, and look out their windows to see a mammoth geyser uphill from them. They have 15 minutes to get out of the water's path before their habitat is turned into floating shards of metal.

The GM can place more pressure on the PCs by making them responsible for the other residents of the habitat, or for important scientific specimens. Once they're clear, it's time to warn the other people downslope from the burst and start picking up the pieces. For an even harder challenge, the approaching water can be *literally* deafening, forcing the PCs (and players!) to communicate through gestures, writing, and clever use of computers.

A Better Tomorrow

An old friend of the PCs shows up looking for help. He's a member of the Martian Triads (p. 56), and he's had enough. He originally joined to help keep his home habitat safe from violent crime, and he had no problem charging protection money when he really *did* protect people . . . but lately he's been called in to deal with people who just won't pay, and the work sickens him. He's breaking his oaths to the Triads just by discussing this with the PCs, but he truly feels he can't take it any more.

The GM can tailor what the old friend actually wants to the PCs' strengths. He may just need some psychological counseling . . . or to be smuggled off-planet . . . or maybe something more proactive, like sneaking into a Triad headquarters and stealing evidence to use against them . . . or even a straight-up battle with enhanced Triad goons!

Elevator to Purgatory

This is an adventure to start a campaign with. The PCs are bioroids created by the Martian Triads (p. 56) in their Belt birth-labs. They're being taken to their new "employers" (read "slave-owners") on Mars, and have already passed through Deimos. Now they're on the Elevator car, two days away from a life of servitude. They're being escorted by several gangsters, who aren't expecting trouble; the Triads make their bioroids obedient.

The problem is, the PCs are a touch unusual. Maybe one is from a "bad batch," and doesn't feel any loyalty. Maybe another is a "used" model, psychologically reconditioned, but with memories of being more free-willed. The PCs who *are* obedient may need to be talked around to desiring freedom – or maybe they'll follow any authority figure. The PCs can be any of a variety of models; see p. 87 and pp. TS116-118.

The PCs want to be their own people. But they're trapped in a hotel strapped to the side of a 10,000-mile cable, and they're not going anywhere until the bottom floor is reached. There are just enough Triad members to be a challenge, and the hotel staff (a half-dozen people or so) will support their high-paying customers, not some rogue bioroids.

The Year of Dust

Historically, Martian dust storms can blanket the whole planet for months to years. By 2100, they are rare, and smaller when they do happen. In this campaign seed, however, a very warm summer causes the southern ice cap to melt unusually rapidly, driving air pressure up and causing strong winds. The winds kick up dust, and within months the sky is obscured across the whole world. Insolation drops, and the plants start to die . . . then the animals . . . then the people . . .

By the end of the first year, the Martian economy is in ruins, and people are evacuating by the thousands. Many diehards have chosen to wait out the storm, but the desolate countryside and abandoned cities are preying on everybody's minds. Some go mad, some merely enjoy the lack of social order.

This framework is a way to radically alter your ***In The Well*** campaign, by destroying the underlying assumptions and exposing the PCs to the end of a world as they know it. The characters will have to choose between abandoning Mars or changing their lives to adapt to the dark new world. ("The Year of Dust" is not a part of official ***Transhuman Space*** history, but don't let that stop you.)

Crossovers

GURPS Greece

High Arcadia Adventure Theme Park (p. 28) is built around a Heroic Greece theme, with gengineered monsters and prepackaged quests. They've been experimenting lately with performers who *don't know it's just a theme park.* These "method actors" actually believe they're living in Mythic Greece, and are programmed with mental blind spots to cover the inconsistencies – such as guests who won't play along. If the players will tolerate a setting where everything they know is wrong, have them build PCs for ***GURPS Greece,*** then set them in High Arcadia and let the knowledge that All Is Not Right With The Universe slowly creep in . . .

GURPS Horror

Millions of years ago, Mars *did* hold intelligent life. The Martians were driven beneath the surface of their world, not by drought and thinning atmosphere, but by *things* . . . things which obliterated every trace of them from the surface. The Martians all died, but not before sealing the gateway to the dark dimensions. This portal is buried, but it won't stay that way . . .

GURPS Illuminati University

The University of Mars, home to the finest terraforming curriculum in the system, populated by students of varying degrees of humanity and strange gene-altered beasts, located on the side of a titanic volcano named for the home of the gods . . . Hmm, sounds like an ideal location for a slightly skewed IOU campaign! (And aren't they all?)

GURPS Magic

There used to be magic on Earth . . . but in this crossover, mana feeds both magic and *sentient life.* After millions of years of human occupancy, Earth's mana level has dwindled to "none" almost everywhere. On Mars, however, the mana level is normal to high – to very high. Unfortunately, only a few obscure cults have preserved the secrets of magic, and the "wiz gene" is a recessive trait that no geneticist considers important . . . until some researchers in the Genetic Engineering Department at U. Mars start getting some *very* odd results . . .

GURPS Martial Arts

Martial arts are a popular pasttme on Mars, and an encompassing lifestyle for many. Placing the emphasis on martial arts can be as simple as creating characters who are all regulars in the Unlimited Fights (p. 61).

Alternately, increase the legal and societal restrictions on weapons, and *everyone* may know a little kung fu. This can be combined with any campaign framework; when prospectors settle land claims with high-flying kicks, a whole new level of martial arts fun has arrived.

GURPS Mecha

The millionaires of Mars fight for *fun,* and their weapons sometimes defy common sense, so long as they look intimidating. Quasi-gladiatorial mecha combat in Syrtis desert? Why not?

GURPS New Sun

Begin on the partly terraformed Mars of 2100. The party has been captured by the villain. He mockingly injects them all with a mystery drug. The lights slowly go out . . .

They wake up on a world, lush and ancient. The locals call it "Verthandi," the gift-world. The marks of the terraforming of their home time are still visible. The PCs are in new bodies, filled with memories from millennia-old braintapes. In the eons they were dead, humanity became transhumanity, then posthumanity, and is now something both very human and very alien. Welcome to the world of the New Sun.

GURPS Old West

A frontier is a frontier in any century. The wilderness of Mars is under no one's jurisdiction, and it has all the trapping of a good Western: wide deserts, magnificent sunsets, valuable mines, robbable trains, and herds of (pharm) cattle. This works best as a cinematic game (or possibly even an explicitly *silly* one), but there's still a role for a fast gun and a steely gaze on Mars.

GURPS Technomancer

The future of the ***Technomancer*** setting is probably one of slow but steady advances in hard science, and exuberant leaps in the magical fields. Thanks to astromancers, space travel is already ahead of the real world, and weird quasihuman races already exist. It's quite possible that the largest difference between the colonized Mars of ***Technomancer*** and the colonized Mars of ***Transhuman Space*** is that in ***Technomancer,*** it comes about decades *earlier* . . .

GURPS Traveller

Traveller is traditionally a low-biotech setting, but the Imperium is vast. Change the name ("Ares" is an obvious enough choice), and Mars can be a lost Human colony which went down a different technological path from most. Advanced biotech is probably worth a fortune in the right sectors.

Appendix: Wheeled Vehicle Modular Design System

This appendix provides rules for the modular design of wheeled vehicles, using a system similar to that of the spacecraft design rules in ***Transhuman Space.*** It is not intended to replace the far more detailed rules found in ***GURPS Vehicles.*** Instead, the design rules presented here represent a simplification of ***GURPS Vehicles*** optimized for the ***Transhuman Space*** setting. Vehicles created with the Wheeled Vehicle Modular Design System (WVMDS) are suitable for many environments, including Mars, Luna, and the Earth.

To design a vehicle, follow the steps below and the instructions in each step, noting down design choices and keeping track of the cumulative weight (in lbs.), cost (in dollars, $), power requirements (in kilowatts, kW), and fuel requirements (in gallons per hour, gph).

The WVMDS and GURPS Vehicles

This system simplifies a lot of the choices offered in ***GURPS Vehicles,*** *Second Edition.* It's optimized for utility vehicles, such as heavy cargo haulers and off-road vehicles. To build a high-performance sports car, use ***GURPS Vehicles.*** Volumes and weights have sometimes been rounded to give simpler numbers.

Structures

This system uses a rule from p. VXi5, which states that structural weight and cost are based on the larger of volume and structural area. Relative weights and costs of materials are the same as those on p. TS175. All vehicles have robotic frames and computerized controls. Arms are made with carbon composite, extra-heavy frames.

Robotic or Not?

All vehicles built using this system are "robotic" to a certain degree. They all have computers and the necessary control wiring to allow the computer to drive the vehicle, operate any weapons, etc. It is assumed that for many vehicles, human-usable controls exist, and that a person may be driving the vehicle from time to time.

A vehicle may also be designed to only carry human *passengers,* while always being piloted by the computer. In this case, there will be internal space for people to occupy, but no controls (p. 127).

The third option is for an unmanned, fully robotic vehicle. In general, this type is meant when the word "robotic" is used in these rules.

Human or Not?

The words "human" and "person" throughout these rules include any being of more or less human shape and capabilities, including most transhumans, bioroids, etc. If a given sapient being is of exceptionally unusual size or shape, details like seats (p. 127) will require modification. Given the infinite variety of 2100 humanity, this is left up to the GM's discretion.

Step 1: Concept

Decide what the purpose of the vehicle will be, and whether the vehicle will be fully robotic, or (if it *does* have space for people) whether it is designed for short-term or long-term occupancy. A short-term-occupancy vehicle is only comfortable for a few hours before the occupants will want to exit to stretch, rest, eat, etc. (e.g., a typical family car). A long-term-occupancy vehicle is comfortable for days or weeks (e.g., a mobile habitat).

Step 2: Vehicle Body

First, decide if the vehicle has front sloping. This decreases internal space, but improves front armor. This is typical of heavy combat vehicles.

Then, select the body type from the table below (e.g., Small or Midsize). Size is given in vehicle spaces (VSP).

Bodies

Type	*VSP*	*Area*	*Weight*	*Cost*	*HP*	*Dimensions*	*Size*
Tiny	5/4	60	240	$3,000	90	2×3×5	+1
Very Small	10/8	100	400	$5,000	150	3×3×6	+2
Small	20/16	150	600	$7,500	225	3×4×8	+2
Midsize	30/24	175	700	$8,750	263	4×5×9	+3
Large	50/40	250	1,000	$12,500	375	4×6×11	+3
Extra Large	100/80	400	2,000	$25,000	600	5×7×13	+4
Very Large	200/160	600	4,000	$50,000	900	7×9×16	+4
Huge	500/400	1,200	10,000	$125,000	1,800	9×12×22	+5
Immense	1,000/800	2,000	20,000	$250,000	3,000	12×16×28	+6

Type is a descriptive term used for each size of body.

VSP is the number of "vehicle spaces" of components that can be installed. The number after the slash applies to sloped vehicles. One VSP equals 5 cubic feet, exactly 1% of a "space" on a spacecraft (p. TS173).

Area is the body surface area in square feet.

Weight is the weight of the body's frame in pounds.

Cost is the cost of the body in dollars.

HP is the body's hit points, assuming a frame of medium strength.

Dimensions: Height × width × length, in feet. These numbers are only guidelines, and have no effect on play.

Size is the Size Modifier (p. B116) of the body.

Body Options

Different Strengths: The table assumes a frame of medium strength, typical of many vehicles. This may be changed to a "light," "heavy," or "extra-heavy" frame if desired. For a light frame, divide weight, cost, and hit points by 2. For a heavy frame, *multiply* weight by 1.5, cost by 2, and hit points by 2. For an extra-heavy frame, multiply weight by 2, cost by 5, and hit points by 4.

Different Materials: The table assumes the frame is made of aluminum. Other materials may be used; cheaper metals are heavier, while more expensive alloys and exotic materials are lighter. For a given material, multiply weight and cost by the numbers from the Materials table. Nanocomposite and diamondoid will be unavailable for older vehicles.

Materials

Material	*Weight*	*Cost*
Cheap Steel	1.5	0.25
Steel	1.25	0.5
Aluminum	1	1
Titanium	0.75	1.5
Foamed Alloy	0.625	2
Carbon Composite	0.375	10
Metal Matrix Composite	0.25	30
Nanocomposite	0.15	100
Diamondoid	0.1	500

Smart: A diamondoid, carbon composite, metal-matrix composite, or nanocomposite frame may also be "smart." It includes microrobotic sensors and processors, allowing for quick diagnosis of structural damage and stress. The cost is doubled.

Compartmentalization: For extra weight and cost, vehicles can have "heavy" compartmentalization (adds 10% to body weight, figured after any adjustment for strength or materials) or "total" compartmentalization (20% of body weight). Either costs $5 per pound of weight added. A compartmentalized vehicle is harder to depressurize and less vulnerable to fires.

Step 3: Wheels

First, decide how many wheels the vehicle has. This number may be three, four, or any even number greater than four. Generally, more wheels make the vehicle more stable but less maneuverable. Extra wheels are also useful in case a few get destroyed by enemy action.

Second, decide if the vehicle has standard or off-road wheels. Off-road wheels are heavier and more expensive, but improve performance on unpaved surfaces.

Now, find the vehicle's body type (e.g., small or large) in the first column of the table below. The row indicated contains the statistics for the vehicle's wheels. Choose the correct set of values for the type of wheels.

Wheel Options

There are several wheel options available. They add cost but not weight.

Improved Suspension: An improved suspension increases top ground speed and overall ground maneuverability and stability. It is expensive, but very useful. The cost is $100 times the wheel area.

Improved Brakes: This option improves safe deceleration, and costs $5 times the wheel area.

All-Wheel Steering: A vehicle may be equipped with all-wheel steering, which significantly improves maneuverability. The cost is $25 times wheel area, minimum cost $1,250.

Wheels

	Standard Wheels					Off-Road Wheels				
Body	*Wheel Area*	*Weight*	*Cost*	*Total HP*	*Size*	*Wheel Area*	*Weight*	*Cost*	*Total HP*	*Size*
Tiny	11	44	$550	33	-1	18	72	$900	54	+0
Very Small	18	72	$900	54	+0	30	120	$1,500	90	+0
Small	30	120	$1,500	90	+0	50	200	$2,500	150	+1
Midsize	40	160	$2,000	120	+1	60	240	$3,000	180	+1
Large	60	240	$3,000	180	+1	100	400	$5,000	300	+2
Extra Large	100	400	$5,000	300	+2	150	600	$7,500	450	+2
Very Large	150	600	$7,500	450	+2	250	1,000	$12,500	750	+3
Huge	250	1,000	$12,500	750	+3	400	2,000	$25,000	1,200	+4
Immense	400	2,000	$25,000	1,200	+4	600	4,000	$50,000	1,800	+4

Body is used for reference to the size of body chosen in Step 2.

Wheel Area is the total surface area for all the wheels, in square feet.

Total HP is the *total* hit points of all the wheels. Divide HP by the number of wheels, rounding to the nearest whole number. Record this number as hit points per wheel.

Weight, Cost, and *Size* work the same as in the *Bodies Table.*

Smartwheels: This option equips wheels with sensors that detect road conditions, and wheels that change their shape in response, increasing maneuverability. This option is extremely common. The cost is $40 times wheel area, minimum $2,000.

Snow Tires: These add +2 to Driver skill, but only to cancel penalties for driving in snow. They normally cost $100 per wheel.

Puncture-Resistant Tires: These give tires a DR 5 instead of DR 2, and they regenerate damage at 1 hit per second. They cost $250 per wheel.

Note: If the vehicle has standard wheels with body types of Huge or Immense, or off-road wheels with body types Very Large, Huge, or Immense, the cost of snow tires or puncture-resistant tires is doubled.

Vehicle Turrets

VSP	*Area*	*Weight*	*Cost*	*HP*	*Size*
0.05	2.5	10	$125	4	-3
0.1	4	16	$200	6	-2
0.2	6	24	$300	9	-2
0.5/0.4(-0.1)	11	44	$550	17	-1
1/0.8(-0.2)	18	72	$900	27	+0
2/1.6(-0.4)	30	120	$1,500	45	+0
5/4(-1)	60	240	$3,000	90	+1
10/8(-2)	100	400	$5,000	150	+2
20/16(-4)	150	600	$7,500	225	+2
50/40(-10)	250	1,000	$12,500	375	+3
100/80(-20)	400	2,000	$25,000	600	+4
200/160(-40)	600	4,000	$50,000	900	+4
500/400(-100)	1,200	10,000	$125,000	1,800	+5

VSP refers to the spaces available in the turret. The number after the slash is the spaces available if the turret is sloped. The number in parentheses is the spaces *removed* from the body for the turret rotation mechanism. (In the case of a cupola, subtract the turret rotation space from the turret on which the cupola is mounted, not the body.)

Area, Weight, Cost, HP, and *Size* are as in the *Bodies Table.*

Step 4: Turrets

A turret is optional, but is useful for mounting weapons or sensors. Several turret sizes are available. Select one or more turrets, but all turret volumes combined must be smaller than the body volume. A small turret may be placed on *top* of a larger one, in which case it is known as a cupola. (All references to turrets after this point include cupolas, unless stated otherwise.) All but the smallest turrets may be sloped for better defense.

Turret Options

Different Strengths: As with the body, the turret is assumed to have a medium frame, but can be given a light, heavy, or extra-heavy frame in the same way.

Different Materials: Likewise, turret frame materials may be changed. If the turret frame is made of the appropriate materials, it may also be smart.

Step 5: Vehicle Component Modules

Wheeled vehicles are built out of "vehicle component modules," or "modules" for short. All modules are rated for the internal space they take up (in vehicle spaces; one VSP is 5 cubic feet), along with their weight (in pounds), cost (in dollars), and possibly power needed (in kW), and fuel requirements (in gph). Select precisely a number of modules with a total space that fills the vehicle's internal space.

Internal Space

A vehicle's internal space is equal to the vehicle body's VSP, minus any reduction for turret rotation space. In addition, components may be placed in turrets, which have their own VSP. If the vehicle has one or more turrets, be sure to note which components are there, rather than in the body.

Required Modules

Certain kinds of modules are required for all vehicles. Specifically, every vehicle must take a drivetrain core (either rear-wheel drive or all-wheel drive), at least one drivetrain slice (of the same type as the core), a power source sufficient for the drivetrain, and a computer module. Nonrobot vehicles must have seats.

Drivetrains

All vehicles require a drivetrain, made up of a drivetrain core and one or more drivetrain slices.

Rear-Wheel Drive Core: This is the basic components of a rear-wheel drivetrain, including the driveshaft, differentials, etc. Only one is needed. By itself, it will not move a vehicle.

Rear-Wheel Drive Slice: Each slice adds 25 kW of driving power to the core.

All-Wheel Drive Core: Similar to a rear-wheel drive core, an all-wheel drive core consists of the basic parts necessary for all-wheel drive. This drivetrain is heavier and more expensive, but allows for better off-road speed.

All-Wheel Drive Slice: Each of these slices adds 16 kW of driving power to an all-wheel drive core.

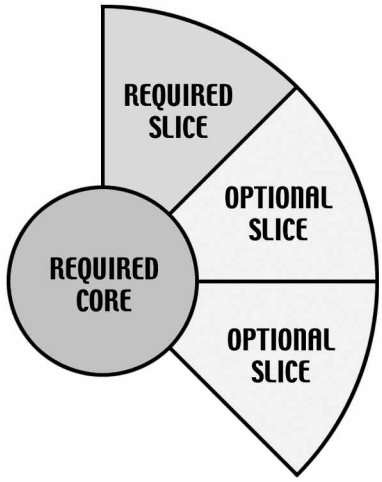
Drivetrain Modules

Type	*VSP*	*Wt.*	*Cost*	*Power*
Rear-Wheel Drive Core	0.2	20	$200	–
Rear-Wheel Drive Slice	0.2	25	$250	25
All-Wheel Drive Core	0.24	30	$600	–
All-Wheel Drive Slice	0.2	24	$480	16

Access Space: Most vehicles require access space for maintenance. This is accounted for above, with two exceptions: If the vehicle is fully robotic, access space is optional. *Halve* the VSP if it is not used. On long-term occupancy vehicles, *multiply* listed VSP by 1.5. Drivetrains and power plants (p. 132) require access space; other modules do not.

Cores and Slices

Many of the modules in this system are designed to work together in a core-and-slice relationship (e.g., the ceramic engine core and slice modules, p. 131). For a given type of component, one core and one slice are necessary, but many additional slices may be added with no need for additional cores. The core itself represents unique, necessary components, but does not itself provide any functionality. One or more slices are required to have a useful component. In all cases, *fractional* slices are also possible, for those wanting finer control. A fractional slice has all its statistics divided by the same number – e.g., half an all-wheel drive slice occupies 0.1 VSP, weighs 12 lbs., costs $240, and provides 8 kW of driving power.



Crew and Passengers

These modules cover the requirements of people occupying the vehicle.

Controls

Unless the vehicle is completely robot-operated, it will require controls. The first set of controls costs $1,000, with no weight, volume, or power requirements. Extra sets of controls cost $500, weigh 25 lbs., and occupy 0.1 VSP each.

Seats

Each crew member or passenger may require a seat. Seats may be cramped, normal, or roomy. All seats come with a crashweb (an advanced type of seatbelt).

Folding Seats: A seat can be designed to fold up and its area used for cargo. The cargo space produced is half the volume of the seat. Multiply the seats cost by 5.

Seat Modules

Type	*VSP*	*Wt.*	*Cost*
Cramped	4.1	25	$200
Normal	6.1	35	$200
Roomy	8.1	45	$200

These figures assume the seat is inside the vehicle. If it is exposed to the elements (or to vacuum, as the case may be), halve the VSP requirement. In vehicle descriptions,

seats are indicated with an abbreviation; CS for a cramped passenger seat, NS for a normal passenger seat, and RS for a roomy passenger seat. If the seat is a crew station, the abbreviations are CCS, NCS, and RCS. If the seat is exposed, there is an X at the beginning (e.g., XCCS).

Quarters

These are bunks and cabins for vehicles that will be occupied for several days, such as exploration rovers.

Hammock: A hanging bed, constituting minimal sleeping accommodations for one person.

Bunk: A fixed bed, usually in a cramped alcove or room with other bunks. The hammock and bunk both include a small (1 to 5 cubic feet) locker for personal possessions.

Cabin/Luxury Cabin: A furnished room for one or two people; a luxury variant with more opulent fittings is also available. Any vehicle with one or more cabins is assumed to have "common facilities" like cooking facilities, bathrooms, passageways, etc., at no extra cost. To create a more spacious vehicle, empty VSPs may be made into living-space freely.

Quarters Modules

Type	*VSP*	*Wt.*	*Cost*
Hammock	20	100	$20
Bunk	20	200	$100
Cabin	100	2,000	$3,000
Luxury Cabin	200	4,000	$10,000

Environmental Systems

These modules control the internal environment.

Environmental Control: This provides standard heating, air conditioning, etc. It can't deal with truly extreme conditions, but adjusts temperatures by up to 40° toward the occupants' comfort zone.

NBC Kit: This system includes the functions of an environmental control, and also filters radioactives, germs, chemicals, and poisonous gases out of the outside air. The air must still contain enough oxygen for the occupants' needs. The vehicle will require the *sealed* surface option (p. 133).

Limited Life System: As for environmental controls, but provides bottled oxygen and water for a limited time. The vehicle must be sealed. Limited life systems are rated in *man-days*; 100 man-days will keep one person alive for 100 days, or two people alive for 50 days, or four for 25 days, etc.

Full Life System: Like a limited life system, but self-regenerating and capable of working indefinitely, if its heavy power requirements are met.

Cooling System: Fully robotic vehicles, that need to survive in the heat of Mercury or Venus, require a cooling system. (For manned vehicles, it's part of the life support system.) A dual-environment cooling system will function both in the vacuum of Mercury and in the thick Venusian atmosphere.

Provisions: Food and drink, plus storage facilities. The space occupied by provisions will usually be part of the cargo bay. Two sets of statistics are listed; the "Provisions w/FLS" line should be used if the vehicle has a full life system.

Environmental Modules

Type	*VSP*	*Wt.*	*Cost*	*Power*
Environmental Control	0.02	5	$50	0.25
NBC Kit	0.02	5	$1,000	0.25
Limited Life System	0.4	100	$500	*
Full Life System Core	2	800	$5,000	–
Full Life System Slice	2	200	$500	10
Cooling System	0.04	10	$100	0.5
Dual-Environment Cooling System	0.04	11	$110	0.55
Provisions	0.05	12	$6	–
Provisions w/FLS	0.01	2	$6	–

Each environmental control module, NBC kit module, or full life system slice will support *one* occupant. Buy one for each person the vehicle is expected to hold. Each limited life system module or provisions module provides one man-day of life support or provisions; multiply the weight, VSP, and cost by the number of occupants and desired duration.

* The *power* requirement of a limited life system is 0.5 kW × the number of occupants (*not* the number of man-days).

Electronics

A wide variety of electronics are available for vehicles.

Computers

All the computers listed on p. 141 of ***Transhuman Space*** are available. Volume in VSP is equal to weight divided by 250; power consumption is negligible. (A typical choice would be a small Complexity-6 computer with backup, occupying 0.008 VSP, weighing 2 lbs., and costing $4,000.) Once the vehicle has a computer, install an AI (pp. TS119-120), and give it the desired skill sets (pp. TS144-145), presumably including Driving (P/A). (Again, typical choices would be an NAI-4 for $250 and a Driving-14 skill set for $500.) Computer terminals do not need to be purchased separately; they are ubiquitous and essentially free.

Communication Systems

Radio: A standard radio. On Earth, parts of Mars, and other areas with a local cellular network, radios can be used to connect to the phone system, at which point their listed range becomes moot. Available in medium- and long-range.

Laser Comm: A tight-beam communication system. The recipient must be visible (i.e., above the horizon) and have a laser comm of his own. It is impossible to eavesdrop on a laser communication without blocking the beam.

Communications Modules

Type	*VSP*	*Wt.*	*Cost*	*Power*	*Range*
Medium-Range Radio	0.01	0.5	$100	0.01	1,000
Long-Range Radio	0.02	5	$300	0.04	10,000
Laser Comm	0.2	50	$3,750	0.4	20,000

Range is in miles.

Sensors

These are devices that help the occupants (or the vehicle's robotic brain) scan their surroundings.

Searchlights: An aimable bright light. (Ordinary headlights are free.)

Simple Sensor Package: This is a package of four PESAs (Passive Electromagnetic Sensor Arrays) arranged in a band around the vehicle. It's intended for simple wheeled robots, most urban vehicles, and other vehicles that only need to detect their immediate surroundings.

Light Sensor Suite: A small PESA and low-res imaging radar in one package, suitable for most off-road civilian vehicles. The PESA has a 12-mile range with Scan 17, and the AESA has a 4.5-mile range with Scan 15. A light sensor suite module fits in a 0.05 VSP turret.

Medium Sensor Suite: An upgraded set of sensors, designed for light combat vehicles and some scientific missions. The PESA has a 36-mile range with Scan 20, and the AESA has a 45-mile range with Scan 21. A medium sensor suite module fits in a 0.5 VSP turret.

Heavy Sensor Suite: A heavy set of sensors intended for combat vehicles. The PESA has a 100-mile range with Scan 23, and the AESA has a 225-mile range with Scan 25. A heavy suite fits in a 5 VSP turret.

Individual Sensors

Sensors can also be bought individually, with the listed statistics. Ladars and low-res imaging radars (LRIRs) have the same statistics.

Sensor Modules

Type	*VSP*	*Wt.*	*Cost*	*Power*	*Range*	*Scan*
Searchlight	0.4	80	$4,000	8	8	
Sensor Suites						
Simple Sensor Package	neg.	0.2	$80	neg.	1.5	12
Light Sensor Suite	0.04	10	$22,770	1.1	*	*
Medium Sensor Suite	0.4	93	$216,180	11.25	*	*
Heavy Sensor Suite	7	706	$1,362,500	126.56	*	*
Individual Sensors						
Small Ladar or LRIR	0.05	12	$15,000	3	6	15
Medium Ladar or LRIR	0.5	120	$150,000	30	60	21
Large Ladar or LRIR	5	1,250	$625,000	312.5	250	25
Small PESA	0.05	12.5	$50,000	neg.	25	19
Medium PESA	0.9	112.5	$450,000	neg.	75	22
Large PESA	5	1,250	$5,000,000	neg.	250	25

Navigation and Combat Systems

These modules help the vehicle find its position. A traditional compass is free, but useless on worlds without a strong magnetic field (e.g., Mars). All computers come with Global Positioning System hardware and software for free; this allows someone to find his location to within a yard or two, so long as the planet they are on has GPS satellites (currently, Earth, Mars, and Luna do).

Inertial Navigation System: A sophisticated gyroscopic system that allows a vehicle to keep track of its location as it travels. It is accurate to within 1 foot per 10 miles traveled, but will correct any drift when it encounters known landmarks.

IFF: "Identify Friend or Foe," a specialized transmitter and receiver used to recognize vehicles that have been detected but not identified. IFFs mostly appear on military vehicles, which will always carry a spare for obvious reasons.

HUDWAC: A Heads-Up Display Weapon Aiming Computer. This devices ties the vehicle's weapons into a targeting display which is projected in front of the user's eyes; it reduces SS by 5. One system is required for each human gunner who uses it.

Jammer: This device projects a signal that interferes with radio and radar, subtracting its jam rating from any rolls to detect with radar or communicate with radio. Jammers have Jam 9 and a radius of 45 miles.

Navigation and Combat Modules

Type	*VSP*	*Wt.*	*Cost*	*Power*
INS	0.04	10	$12,500	neg.
IFF	0.02	5	$1,000	neg.
HUDWAC	0	0	$250	neg.
Jammer	0.6	150	$30,000	750

Weaponry

The following weapons are commonly available. All weapons are fully stabilized, allowing fire while moving. All guns and beam weapons are in casemate mounts if placed in the body, or universal mounts if in a turret. Weapons are assumed to face forward out of the body or turret. If installed to face in a different direction, specify this.

4mm Gatling Emag: A low-damage, high-rate-of-fire weapon used against battlesuits and similar lightly armored targets.

7.5mm Machine Gun: A general-purpose low-end weapon.

10mm Emag: A heavier anti-materiel weapon.

15mm Heavy Machine Gun: A heavier version of its 7.5mm brother.

25mm Chaingun: A rapid-fire weapon used against light armor.

30mm Electromagnetic Grenade Launcher: This weapon fires explosive rounds.

45mm Emag: A powerful railgun used for anti-armor fire.

80mm E-Mortar: An indirect-fire weapon typically loaded with explosive rounds.

Lasers: These are relatively low-rate-of-fire beam weapons.

Rapid Lasers: These are rapid-fire beam weapons.

Weapon and Ammunition Modules

Type	*VSP*	*Weight*	*Cost*	*Power*
4mm Gatling Emag	0.2	47	$18,000	0.0064kW
58,100 rds. APS	0.05	(25)	($1,600)	–
7.5mm Machine Gun	0.09	21	$1,200	–
1,730 rds. APS	0.05	(39)	($1,200)	–
10mm Emag	0.36	87	$33,000	0.02kW
3,730 rds. APS	0.05	(25)	($1,500)	–
15mm Heavy Machine Gun	0.32	80	$4,300	–
240 rds. APS	0.06	(40)	($1,200)	–
25mm Chaingun	0.68	170	$12,600	0.36kW
240 rds. APDS	0.11	(80)	($2,400)	–
30mm Electromagnetic Grenade Launcher	0.13	32	$12,300	50kW
240 rds. HEMP	0.22	(160)	($1,920)	–
240 rds. SEFOP	0.22	(160)	($4,800)	–
240 rds. MBC	0.22	(160)	($960)*	–
45mm Emag	16	3,900	$550,000	3,400kW
55 rds. APFSDS	0.05	(25)	($2,400)	–
80mm E-Mortar	1.6	390	$91,000	0.76kW
10 rds. HEMP	0.05	(25)	($600)	–
10 rds. SEFOP	0.05	(25)	($1,500)	–
10 rds. MBC	0.05	(25)	($300)*	–
2.5kJ Laser	0.29	74	$7,100	40kW
25kJ Laser	2.9	736	$71,000	400kW
250kJ Laser	29	7,360	$711,000	4,000kW
2.5kJ Rapid Laser	13.5	678	$67,100	400kW
25kJ Rapid Laser	135	6,780	$670,000	4,000kW

Ammo Options: * Plus cost of doses of chemical (or microbots, if 80mm). The smart ammo options from p. TS157 may also be applied to vehicular weapons. Simply multiply the ammo module costs by the given multiplier.

Arms

A vehicle may have arms, designed for manipulating external objects. Unlike most modules, arms do not occupy VSP in the vehicle; they are attached to the outside. A vehicle may have as many arms as desired, but the total weight of all arms may not exceed half the vehicle's body weight. Which side (front, back, left, right) each arm is attached to must be specified. All arms have a "smart" structure, as defined under *Body Options.*

Arm Modules

Type	*Area*	*Weight*	*Cost*	*Power*	*HP*	*Size*	*Reach*	*Volume*
ST 10 Arm	1	6	$11,000	0.05	12	-4	1	0.06
ST 100 Arm	5	45	$85,000	0.5	60	-2	2	0.6
ST 1,000 Arm	20	360	$700,000	5	240	+0	4	6

Reach is the arm's reach in yards. Each arm may also contract to half this length.

Volume: is the arm's volume in cubic feet, only used when calculating the Volume statistic in Step 8; arms do not occupy VSP.

Area, HP, and *Size* are as in the *Bodies Table.*

Weight, Cost, and *Power* are as for other modules.

Miscellaneous Equipment

These are other modules that may be installed in or on vehicles.

Safety: A fire-suppression system that senses fires and then floods the burning compartment with inert gas to extinguish them. A compact (and less effective) version is also available.

Minifacturing Workshop: A workshop with a 3D printer, plus appropriate tools and spare parts for using the Armory, Electronics, Engineer, and Mechanic skills. Up to three people can use it at once, and it gives +2 to skill. A compact minifacuring workshop is also available; it can only be used by one person at a time.

Science Lab: An equipment-filled laboratory designed for one Scientific skill (pp. B59-62 and pp. CI155-159). Vehicles are only likely to have labs for Geology, Botany, and other disciplines with a "field" aspect. For tasks where a lab is a prerequisite, it provides no bonus to skill. For those procedures where a lab is a luxury, it gives +2. A lab can only be used for one task at a time. There is a separate entry in the *Miscellaneous Table* for a physics lab; physics experiments require a great deal more power.

Winch: A motorized winch. It can lift one ton (ST 100) at up to 4 yards/second, or tow much greater weights.

Bore: A powerful tunneling system that enables a vehicle to burrow through the ground. Each bore module gives the vehicle the ability to tunnel through 5 cubic feet of hard rock per hour; multiple modules may be combined. The vehicle's subterranean speed in yards per hour may be estimated by dividing the bore's tunneling speed by the vehicle's total volume in cubic feet, as determined in Step 8. It can bore through soft rock at double speed, clay at triple speed, and ordinary soil or sand at quadruple speed.

Cyberdoc: A robotic medic. Cyberdocs are treated as crew, not part of the vehicle. See p. TS122.

Surgery: A well-equipped surgery, including a gyrostabilized operating table, diagnosis table, and EMU. One person may be operated on at a time. A variant surgery module is available for *veterinary* medicine. The differences are minor, and it can be used for work on humans at -2 to skill (and vice-versa).

Small Airlock: A pressurized chamber with hatches big enough for one human-sized being to enter the vehicle without spilling the air.

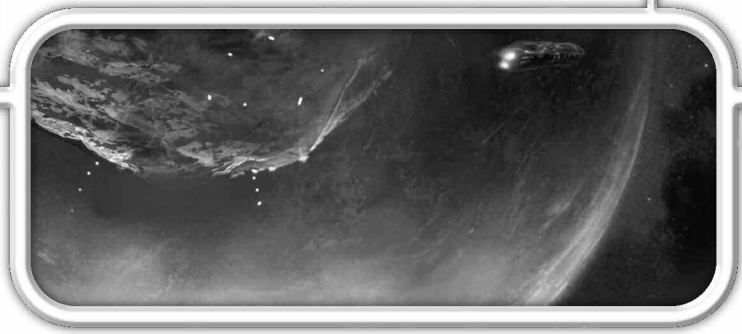
Large Airlock: A three-person airlock. This size is considered the minimum on emergency and search-and-rescue vehicles, as it's large enough for two people carrying a third, or for one horizontal person (e.g., on a stretcher) with another standing over him.

Fuel Electrolysis System: This device converts water into hydrogen and liquid oxygen. It can be very useful for vehicles with turbines or fuel cells (below). Each electrolysis module gives the vehicle the ability to process 40 gallons of water per hour, producing 63 gallons of hydrogen and 30 gallons of oxygen. Multiple modules may be combined.

Cargo: Five cubic feet of cargo space. Multiple cargo modules can be combined to form one large cargo hold. Cargo modules with fractional spaces are also possible.

Open Cargo: Ten cubic feet of cargo space, in an open cargo bed, with partial side protection and no overhead cover. Otherwise identical to a Cargo module.

Empty Space: Any space left over after all modules have been selected is simply "empty space." Calculate this *after* adding a power source.



Miscellaneous Modules

Type	*VSP*	*Wt.*	*Cost*	*Power*
Safety	0.8	200	$5,000	0
Compact Safety	0.2	50	$500	0
Minifacturing Workshop	250	30,000	$170,000	1
Compact Minifacturing Workshop	100	10,500	$55,000	0.5
Science Lab	200	20,000	$1,000,000	3
Physics Lab	200	20,000	$1,000,000	300
Winch	1	25	$1,000	0.5
Bore	2	250	$200	1
Surgery	50	280	$50,000	0.5
Small Airlock	10	500	$1,000	neg.
Large Airlock	30	1,500	$3,000	neg.
Fuel Electrolysis System	1	100	$5,000	560
Cargo	1	0	$0	0
Open Cargo	1	0	$0	0
Empty Space	var.	0	$0	0

Power and Fuel

A vehicle's drivetrain and other systems require power. This can be provided in several ways:

Fuel-Burning Engine: Several types of fuel-burning engines are available. They require fuel, such as synthetic gasoline, alcohol, or hydrogen. A fuel tank module is also required. Note that some engines won't work at all without an oxygen atmosphere, while others will require an additional fuel tank to hold liquid oxygen.

Nuclear Power Plant: A fission, fusion, or radiothermal power plant generates electrical power, and only requires refueling or replacing at intervals of years or centuries. No fuel tank is required.

Batteries: A drivetrain may run off of battery power. If the vehicle has no other engine or power plant, it will need to recharge from building power, another vehicle, or solar cells.

Solar Cells: Theoretically, a vehicle can be powered entirely by solar cells. It will be immobile at night, or even in shadow! Solar cells are more commonly used to recharge batteries. Solar cells are not a module, but a surface feature; see p. 134.

Fuel-Burning Engines

Gasoline Engine: A traditional gas-burning engine, essentially unchanged since the 20th century. Real gasoline is very rare, and synthetic gasoline is expensive, but there are still many gas-burners on the roads of Earth. A gasoline engine requires an oxygen atmosphere (as on Earth or Mars).

Ceramic Engine: An advanced rotary engine made of lightweight materials, and capable of running on most fuels. It is the most common engine found in Martian vehicles. It requires an oxygen atmosphere.

Turbine: A high-performance engine, occasionally found in armored fighting vehicles. Turbines normally require an oxygen atmosphere, but are available in a heavier closed-cycle variant, usable in a vacuum.

MHD Turbine: Magneto-hydrodynamic turbines use magnetic fields and ionized plasma as their working medium. They can be trivially modified to work in a vacuum by adding a liquid oxygen tank and injector.

Fuel Cell: These electric power plants produce power chemically by combining hydrogen and oxygen. Like MHD turbines, they can be easily modified to work in the absence of an oxygen atmosphere by adding a LOX tank. As a by-product, fuel cells produce water, which may be stored for consumption, or turned back into fuel. Every gallon of hydrogen burned produces 0.63 gallons of water.

Fuel-Burning Engine Modules

Type	*VSP*	*Wt.*	*Cost*	*Power*	*Fuel*
Gasoline Engine Core	0.2	25	$125	–	–
Gasoline Engine Slice	0.4	50	$250	10	0.4G
Ceramic Engine Core	0.12	15	$90	–	–
Ceramic Engine Slice	0.4	48	$288	16	0.48M or 0.58A
Compressor	0.1	12	$50	–	–
Turbine Core	0.12	15	$450	–	–
Turbine Slice	0.2	25	$750	25	1.38M or 1.66A
Closed-Cycle Turbine Core	0.2	23	$675	–	–
Closed-Cycle Turbine Slice	0.2	24	$720	16	0.88M + 2.07L or 1.06A + 2.49L
MHD Turbine Core	0.28	35	$700	–	–
MHD Turbine Slice	0.2	25	$500	25	4.5H (+ 2.25L)
Fuel Cell Core	0.2	25	$125	–	–
Fuel Cell Slice	0.4	50	$250	10	1.15H (+ 0.58L)

Power: The power output of the engine slice, in kW.

Fuel: The engine slice's fuel requirements, in gallons per hour (gph). The letter indicates fuel type: G (gasoline, real or synthetic), M (multi-fuel, using gasoline, diesel, aviation gas, or jet fuel), A (alcohol), H (hydrogen), or L (liquid oxygen, LOX). The ceramic engine and turbine may use any of the multi-fuels, or alcohol at the higher gph listed. MHD turbines and fuel cells have the listed hydrogen requirements in an oxygen atmosphere; add the LOX gph listed in parentheses when they are modified to run closed-cycle. The closed-cycle turbine may run on multifuel and LOX or alcohol and LOX.

Access Space: Like drivetrains (p. 127), engines require access space. This is accounted for above, with the same two exceptions: If the vehicle is fully robotic, access space is optional. *Halve* the listed VSP if it is not wanted. On long-term occupancy vehicles, *multiply* listed VSP by 1.5.

Nuclear Power Plants

Radiothermal Generator (RTG): These power plants use a thermoelectric system to convert the heat from a decaying radioisotope to energy. They are heavy and expensive, but useful in situations where the vehicle must operate untended for years.

Fission Reactor: An atom-splitter. Lighter per kW than an RTG, but more expensive.

Fusion Reactor: This plant generates energy through the helium-3 cycle (p. TS66). It is light per kW, but the initial outlay for the core is enormous.

Nuclear Power Plant Modules

Type	*VSP*	*Wt.*	*Cost*	*Power*	*Lifespan*
Radiothermal Generator Core	0.15	75	$3,750	–	14 years
Radiothermal Generator Slice	0.1	50	$2,500	10	14 years
Fission Reactor Core	32	4,000	$250,000	–	2 years
Fission Reactor Slice	0.2	24	$2,400	12	2 years
Fusion Reactor Core	176	22,000	$5,000,000	–	200 years
Fusion Reactor Slice	0.2	25	$5,000	25	200 years

Access Space: The rules for access space for fuel-burning engines also apply to nuclear power plants. See p. 127 and above.

Batteries

Batteries: These rechargeable batteries store a lot of energy, but cannot release it fast enough to power beam weapons. A 0.1 VSP module of rechargeable batteries holds 25 kWh of energy. Multiple battery modules may be added for redundancy, or combined to make one big battery.

Power Packs: These carbon nanotube flywheels can instantly release energy to power beam weapons. A 0.1 VSP module of superloops holds 2.5 kWh of energy. Like batteries, superloops can be combined.

Twin E-Cells: Instead of installing custom batteries "in bulk," many vehicle designers install slots for standard E-cell batteries (p. TS141). Two E-cell batteries hold 40 kWh (or 4 kWh if they are power packs). The batteries may be recharged in place, or swapped out for fresh ones.

Other Batteries: Any of the batteries from pp. TS140-141 may be installed as vehicle components. Volume in VSP equals weight in lbs. divided by 250.

Battery Modules

Batteries or Power Packs	0.1	25	$750
Twin E-Cells	0.16	40	$1,200

Fuel

Fuel Tank: A 10-gallon ultralight self-sealing fuel tank occupies 0.3 VSP, weighs 10 lbs. empty, and costs $100. It modifies a fuel's Fire rating by -3. Fuel tank modules may be combined to produce a big tank, or divided for a smaller tank. Vehicles intended for combat or rough terrain will typically have two or more separate tanks, in case one is ruptured. Tanks may also be used to hold water or other liquids.

Alcohol: Alcohol can be easily produced from many types of plant. It is the standard fuel on Mars, and very common on Earth. One gallon of alcohol weighs 5.8 lbs. and costs $0.50 in most areas. It has a Fire number of 10.

Synthetic Gasoline: Synthetic gasoline is produced to satisfy legacy vehicles and some new luxury vehicles. One gallon weighs 6 lbs. and costs $5, with a Fire number of 11.

Hydrogen: Hydrogen is available in bulk throughout the observed universe. One gallon weighs 0.58 lbs. and costs $0.10. It has a Fire number of 13.

Liquid Oxygen: A gallon of LOX weighs 9.6 lbs. and costs $0.10. Liquid oxygen is not itself flammable, but nearly anything will burn with minimal provocation if exposed to it. It is treated as having a Fire number of 13.

Step 6: Armor

All vehicles have some amount of armor to provide some protection against accident or fire. Decide on the vehicle body's DR and type of armor. Vehicle designers may choose from the same kinds of armor as spacecraft builders (p. TS174): steel, aluminum, titanium, foamed alloy, carbon composite, metal-matrix composite, nanocomposite, and diamondoid. The composite types, and diamondoid, are considered to be laminate armor, with doubled DR against shaped-charge warheads like HEDP and HEAT. Older vehicles will not have nanocomposite or diamondoid armor. Minimum DR is 1 for sealed vehicles. Armor materials need not match frame materials (p. 125).

Some typical DR ranges:

Family Car	DR 5-20
Off-Road Vehicle	DR 5-50
Utility Vehicle	DR 10-50
Light APC	DR 50-500
Heavy APC	DR 250-2,500
Light Tank	DR 500-2,500
Heavy Tank	DR 2,000-10,000

The latest 60mm SEFOP metallic hydrogen warheads penetrate the armor on just about any wheeled AFV. Fortunately, most of the munitions the PLA and PAP have stockpiled on Mars are old Gen-1 munitions dating back to the Pacific War.

– Captain Jose Balderas, 76th Rangers (Mars Battalion), U.S. Army

GM Note: *"old" SEFOP have a (3) instead of (5) armor divisor, but are half cost.*

Armor

Type	*M*	*C*
Cheap Steel	0.6	0.25
Steel	0.5	0.5
Aluminum	0.4	1
Titanium	0.3	1.5
Foamed Alloy	0.25	2
Carbon Composite	0.15	10
Metal-Matrix Composite	0.1	30
Nanocomposite	0.06	100
Diamondoid	0.04	500

M is a weight modifier, representing the weight of one square foot of DR1 armor.

C is a cost modifier, giving the cost per pound of a given armor type.

Figure armor weight (in pounds) as:

armor weight = body area × DR × M

Calculate the armor cost (in dollars) using this formula:

cost = armor weight × C

Slope Effects: If the vehicle has a sloped body, its final front face armor DR is doubled to reflect the slope. This does not affect the armor's final weight or cost.

Passive Defense: This depends on DR (after slope). DR 1 gives PD 1, DR 2-4 gives PD 2, DR 5-15 gives PD 3, and DR 16+ gives PD 4. Add +2 to front body PD if the vehicle is sloped.

Turret Armor: If the vehicle has one or more turrets, use the same procedure to armor each turret and calculate PD, with the exception that the turret's area is used rather than the body area. DR may be the same, more, or less than the body.

Wheel and Arm Armor: Wheels and arms may be armored, using the same method, substituting their area for body area. They typically have less armor than the main body.

Armor Options

Location Armor: The armor on vehicle bodies and turrets may vary by face. For example, the front may be heavily armored, while the underside is lightly protected. If this is desired, multiply DR by 6, and redistribute "DR points" among each of the six sides. For a turret, do the same, but multiply by 5 instead of 6, since the underside is not armored. Wheel and arm armor may not vary by face.

Step 7: Surface Features

These are features added to the surface of a vehicle.

Sealing: Sealing protects the vehicle's interior from hostile environments, vacuum, contamination, and water.

Camouflage Paint: A suitable paint job can make a vehicle harder to spot, giving -2 to Vision rolls. This is the simplest concealment feature.

Chameleon System: This feature combines liquid crystal skin with sensors that scan the surroundings, and change the skin to match. It gives a -6 (-3 if moving) to be visually spotted or hit, or detected by ladar. Optionally, the sensors may be turned off, and the skin may be set to any color scheme the operator desires.

Radical Emission Cloaking: This masks the vehicle's heat, magnetic, and millimetric emissions. It imposes a -10 penalty on rolls to detect the vehicle with non-optical passive sensors.

Solar Cells: These photoelectric collectors convert light (usually sunlight) into electric power. They generally serve as a backup power supply, in conjunction with rechargeable batteries (p. 132). Solar cells cannot be combined with stealth, infrared cloaking, a chameleon system, or liquid crystal skin. The maximum solar cell area equals half the total of the body and all turret areas; any area up to this value is allowed.

Solar cell power output depends (obviously) on the brightness of the sun, and thus varies from planet to planet, and by weather conditions even on a single planet. In any environment dark enough to cause a -1 or worse vision penalty, cells provide negligible power. Under sunny skies (or in vacuum), the formula is solar cell area × P, where P is 0.5 for Mercury, 0.2 for Venus, 0.08 for Earth and Luna, 0.04 for Mars, 0.01 for most major asteroids, 0.003 for the moons of Jupiter, and 0.001 for the moons of Saturn. Further out, solar cells produce negligible power. (The formula for determining P is 0.08 / (distance from Sun in AU, squared).)

Acid-Proofing: For vehicles that must function on Venus, acid-proofing is required. (The vehicle must also be sealed.) If the device has nanocomposite or diamondoid armor, acid-proofing is free.

Surface Features

Feature	*Weight*	*Cost*
Sealing	0	10
Camouflage Paint	0	0.10
Chameleon System	0.5	100
Radical Emissions Cloaking	2	1,500
Solar Cells	0.1	30
Acid-Proofing	0.1	10

Feature: The name of the feature.
Weight: The weight of the feature, per square foot.
Cost: The cost of the feature, per square foot.

To determine the weight of most surface features, multiply the weight value from the table by the sum of body, wheel, arm, and all turret areas. Cost is the cost value from the table multiplied by the same sum.

Exceptions: Wheels and arms do not require radiation shielding; do not include their surface area when figuring weight and cost for radiation shielding. For solar cells, the area can be anything up to *half* the sum of the body and all turret areas. (Solar cells cannot go on the underside of a vehicle.)

Radiation Shielding

This is the rating of the vehicles body to protect its occupants against high-energy radiation. cPF depends on the weight of armor per sf of area. Find the weight of armor in lbs. per sf (the weight number on the armor table); this may vary by vehicle location. A lbs./sf of 1-99 is cPF 1, 100-199 is cPF 2, and 200-399 is cPF 5. Multiply cPF by 100 to get ordinary PF against solar radiation or planetary radiation.

Other External Features

Bulldozer or Plow Blade: These are earth-moving blades attached to the front of the vehicle. They can clear or plow a path as wide as the vehicle. Weight is 2 lbs. times body surface area, cost is $4 times body surface area.

Hitch: This is a hook or other device that enables a vehicle to pull another. A hitch weighs 0.1 lbs. and costs $0.1, both times the body's hit points. A vehicle so equipped may tow another vehicle weighing up to (50 × the towing vehicle's hit points) pounds. A remote-controlled hitch that can be detached by computer command is available at double cost.

Pin: A towed vehicle requires a pin, which weighs 0.1 lbs. and costs $0.05, both times the vehicle's body hit points.

Step 8: Statistics

The vehicle has now been designed. Calculate the following statistics for it:

Endurance: If the vehicle runs on fuel, divide the total capacity of all fuel tanks by the gph fuel requirement of the engine; this gives the vehicle's endurance in hours. If it requires two kinds of fuel (e.g., hydrogen and oxygen), compute the endurance for each separately, and use the lower number. If it runs off of batteries, divide the total battery capacity in kWh by the total power requirements in kW to get endurance in hours. If the vehicle is powered by a fission, fusion, or radiothermal power plant, simply note the plant's lifespan in years.

Dimensions: Use the dimensions given in the *Bodies Table,* or choose similar values to suit.

Empty Weight: Add together the weight of body, wheel, and turret frames, armor, surface features, and chosen modules to get empty weight in pounds.

Payload: This equals the total weight of the following items:

- *Ammunition* – As specified in the *Weapons Modules Table* (p. 130).
- *Occupants* – Add 200 pounds per crew member or passenger (assuming typical human-sized occupants).
- *Cargo* – Add the weight of cargo usually carried. If exact numbers are unknown, add 100 lbs. per VSP of cargo, or 200 lbs. per VSP of open cargo (i.e., about 20 lbs./cf), which can allow for cargo holds that are not fully packed. A weight of up to 5 times that value is appropriate for vehicles which carry densely packed cargo.

• *Other* – And other items which are not part of the vehicle, such as robots, cybershells, or other vehicles.

Loaded Weight: Empty weight plus payload. Some performance calculations ask for loaded mass in tons; divide loaded weight in pounds by 2,000 to get this figure.

Local Loaded Weight: This is loaded weight adjusted for the local gravity. Multiply loaded weight by gravity in gees (e.g., 0.38 for Mars).

Volume: Take the body VSP, using the unsloped value (regardless of whether the vehicle is sloped). Multiply by 5.5 if the vehicle has standard wheels, or 6 if they are off-road wheels. To this figure, add the VSP of each turret, multiplied by 5 (again, use the unsloped value). Add the listed volume of any arms. This gives total volume in cubic feet (cf).

Price: Add together body, wheel, turret, module, armor, and surface-feature costs to get the vehicle's cost in dollars.

Size Modifiers: Record the Size Modifier for the body, wheels, arms, and each turret.

Hit Points: Record hit points for the body, wheels, arms, and each turret.

Health (HT): A measure of structural robustness, distinct from Hit Points. Structural HT = (200 × body Hit Points / loaded weight in lbs.) + 5. Maximum HT is 12.

Step 9: Performance

Calculate the following performance statistics for the vehicle.

Top Speed: Divide total motive power of the drivetrain by loaded mass in tons. Take the square root of the quotient. Multiply by a speed factor (Sf) of 16 to get top speed. (If the vehicle has improved suspension, multiply by an Sf of 18 instead.) Round to the nearest whole number if top speed is less than 20 mph, otherwise to the nearest 5 mph.

gAccel: Divide top speed by the speed factor (16 or 18), then multiply by 0.8 to get gAccel in mph/s. Round to the nearest whole number if less than 5 mph/s, otherwise to the nearest 5 mph/s.

gDecel: The gDecel is 10 mph/s, plus 5 mph/s if the vehicle has improved brakes, plus another 5 mph/s if the vehicle has smartwheels.

gMR and gSR: Find the body type in the first column of the table below. Cross-index by the number of wheels to find gMR and gSR. Add 0.25 *each* to gMR if the vehicle has any of the following options: improved suspension, all-wheel steering, or smartwheels. Add 1 to gSR if the vehicle has improved suspension.

Ground Pressure: Determine the vehicle's ground pressure by dividing loaded weight in pounds by wheel area, and multiplying by 50 for standard wheels, or 33 for off-road wheels. Remember that loaded weight varies by local gravity; use the correct weight for the locale. Look the ground pressure up in the first column of the table below. Off-road speed varies depending on whether the vehicle has all-wheel drive (AWD).

Ground Pressure

Ground Pressure	*Description of GP*	*AWD*	*No AWD*
150 or less	extremely low	4/5	2/3
151-900	very low	2/3	1/2
901-1,800	low	1/2	1/3
1,801-2,700	moderate	1/3	1/4
2,701-7,500	high	1/4	1/6
7,501-15,000	very high	1/6	1/8
15,001 or more	extremely high	1/8	no

The fraction indicates the best fraction of top speed the vehicle can reach when not moving on a road or similar hard surface; "no" means it cannot move off-road.

Wheeled Vehicles in Action

This section provides a summary of vehicle-action rules, optimized for vehicles designed using the WVMDS. For more general rules, see ***GURPS Vehicles.***

Movement

A vehicle moves 1 yard per second for every 2 mph of speed. If using 5-yard hexes as suggested in ***GURPS Vehicles,*** this works out conveniently to one hex for every 10 mph of speed.

A vehicle retains its speed and direction of travel from turn to turn unless it accelerates, decelerates or maneuvers. The driver may add the vehicle's gAccel rating to its speed each turn, up to the vehicle's rated top speed (or its off-road speed, if not on a paved surface). He may also subtract its gDecel rating from its speed each turn without having to make a control roll. In an emergency, he may subtract up to four times the vehicle's gDecel rating from its speed, but this

	gMR			*gSR*		
Body Type	*3 wheels*	*4-6 wheels*	*8+ wheels*	*3 wheels*	*4-6 wheels*	*8+ wheels*
Tiny	1.5	1.25	1	2	3	3
Very Small-Small	1.25	1	0.75	3	4	3
Midsize-Large	1	1	0.5	3	4	4
Extra Large-Huge	0.5	0.75	0.5	4	4	5
Immense	0.25	0.25	0.25	4	4	5

will require a control roll each turn (at -1 for every 5 mph/sec the vehicle decelerates beyond its gDecel rating).

Vehicles moving at high speeds will not be able to turn at will. The vehicle's gMR is the number of gravities it can "pull" safely in a turn. The GM can use the turning radius rules found on p. B139. For more detail, see ***GURPS Vehicles.***

Collisions

In general, a vehicle hitting an immovable object (such as a wall or big building) takes (total body hit points × collision speed in mph)/200 dice in damage. If two vehicles collide, a vehicle *inflicts* damage based on the above formula and the relative velocity. The damage it *receives* is based on the other vehicle's results from the formula.

In a vehicle-to-vehicle collision, if a vehicle inflicts at least twice the damage it took, it will shove the other vehicle aside. In general, if a vehicle collides with anything it can neither smash through nor shove aside, its occupants will suffer whiplash or concussion damage. This amounts to 1d-2 crushing damage per 20 full mph of collision speed. Vehicle or personal armor does not protect, although personal Toughness or a crashweb will. Double damage for anyone not wearing a safety belt or harness.

Attacking Vehicles

Attacks on a vehicle will normally be directed against the side of the body facing the attacker. An attacker may choose to target a turret instead, in which case the Size Modifier of the turret is used instead of that of the body.

Incoming indirect fire usually strikes the top of the vehicle's body or one of its turrets. Roll randomly to determine which subassembly is struck.

A hit vehicle always gets a Passive Defense roll based on armor PD, unless the attack's damage was in the form of an explosion. If a vehicle has gMR of 1 or higher, than the driver may get a Dodge bonus to PD if he was using evasive maneuvering. This Dodge bonus is equal to the operator's Driving skill/4, rounded down.

Damage

A vehicle's DR works just like a character's DR, although it may vary depending on location (body or turret) and facing (front, back, right, left, top, underside) attacked.

Armor divisors are present on some weapons, noted as a number in parentheses. Divide DR by the armor divisor when figuring damage from an attack by such a weapon. This applies only to direct hits, not explosive concussion, or fragmentation effects from near misses. *Sealed* vehicles have their DR *squared* against any explosive concussion damage.

Damage is recorded separately for the body and for each turret or cupola. Each of these locations has its own individual hit points. If a location's hit points are reduced to 0 or less, it is disabled, but can be repaired. If reduced to -5 × original hit points, it is destroyed, and cannot be repaired.

Body: If a vehicle's body is disabled, the entire vehicle is effectively knocked out. All components in it cease to function, and the vehicle will crash (possibly doing damage to occupants, see *Collisions,* above).

Turret: When a vehicle's turret is disabled, those components which are inside it are knocked out, but components elsewhere in the vehicle continue to operate.

Wheels: Whenever a wheel is disabled, the vehicle's top ground speed drops by 10% and the driver must make a control roll at -2. If half or more of the wheels are lost, top ground speed is halved. If the wheels on two corners are lost, the driver must make a control roll at -6 and top ground speed drops to 0.

Unsealing Vehicles: If a sealed location loses 10% of its hit points (20% if it has heavy compartmentalization, 50% if it has total compartmentalization) it is no longer sealed. This exposes the occupants to the outside environment.

Crew and Passenger Injuries: If a location is occupied, and damage penetrated DR in that location, roll 1d per 100 points (or fraction thereof) of penetrating damage. For each 6 rolled, one occupant in that location (determined randomly or by GM choice) takes either 50 points of damage or half the penetrating damage suffered by the location, whichever is less. Toughness and body armor protect normally against this damage. Exception: If the damage was greater than the location's original hit points, damage is inflicted on a 5-6, and the maximum damage is 100 points.

Fire: Many attacks, especially energy weapons and explosive attacks, can start fires. If such an attack penetrates vehicle armor, it may cause a fire in the penetrated location. Roll 3d; if the roll is less than or equal to the amount of penetrating damage, a fire breaks out. A location which is on fire takes 2d damage, plus a further 2d every 10 seconds. DR is ignored, but heavy compartmentalization subtracts 2 points and total compartmentalization subtracts 4 points. Any time a fire does 8 or more points of damage (after modifiers) it spawns another fire, either affecting the same location or setting fire to a person in it (GM's choice). If it does less than 4 points, the fire goes out. A fire will fill its location with smoke (see p. B132).

A safety module puts out fires on a roll of 15 or less (-1 penalty per extra fire raging) on 3d. Check immediately and again every 10 seconds for each fire separately. Occupants can take 10 seconds to put out a fire manually (roll 6 or less) or with handheld extinguishers (11 or less). A critical failure in this case means they take 2d burn damage.

Ammunition Explosion: If a vehicle location is on fire and has explosive ammunition stored in it, roll 1d. On a 5-6 the ammunition "cooks off" and explodes. All ammunition is destroyed. Use the damage of 1d shots (or whatever is left) to determine damage to the vehicle, ignoring its DR.

GLOSSARY

aquifer: An area of porous rock saturated with liquid water.
biosharking: Fronting the money for a biomod in exchange for extended service.
CFC: Chlorofluorocarbons. While notorious on early-21st-century Earth for their negative effect on the ozone layer, the types used for terraforming Mars are not harmful to ozone.
chasma: Latin, "canyon."
claim-jacker: Someone who tries to steal land from another; a "claim jumper."
combatrix: Generic term for a female combat bioroid, usually exotic in some way.
datum: The arbitrary Martian "sea level" set in the 20th century by sky areographers (c.f.). Bears no relation to actual sea levels.
Deep Beyond: The solar system from the Main Belt outward.
fossae: Latin, "trenches."
fines: Extremely fine dust, with particles measuring about a micron across (i.e., approximately 1/100,000 of an inch).
guanxi: Chinese, "a relationship." The connection between two people whereby they exchange favors. **Guanxixue** is the art or science of cultivating and using these relationships. Pronounced *guan-shee* and *guan-shee-shwe,* respectively.
habitat: An individual human habitat, whether it is a space station, a domed city, or a one-family settlement.
iceteroid: An asteroid made largely of ice.
insolation: *In*coming *sol*ar radi*ation.* The amount of sunlight received at a planet's surface.
k-kill: "Kinetic kill," used of a projectile that damages the target through velocity, not explosives.
KBO: Kuiper Belt object, a protocomet found in the outer solar system.
Martian: A sapient being (typically transhuman) who calls Mars home.
mons: Latin, "mountain." Plural, "montes."
nat-born: Naturally born, as contrasted with vat-born such as bioroids.
pantropy: "Grow anywhere." Coined by author James Blish, this term describes the process of adapting people to their environments, instead of the other way around.
planum: Latin, "plains."
postmaterial: A state of being beyond physical matter – or, indeed, any form comprehensible to material life. One of the possible end goals of transhumanism.
recurving: Changing occupations (often with a decrease in income) in pursuit of new skills and experiences. Very common in a society of plenty. Coined by author Douglas Coupland.
regio: Latin, "region."
regolith: Organically inert dirt. The proper term for the original "soil" on the surface of Mars.
sky areography: The study of Martian geography through telescopes, rather than by physically being there. The only kind of areography that existed prior to the late 20th century.
tessera: Latin, "mosaics." Refers to crust fractured into blocks from several to a dozen miles across.
tholus: Latin, "dome."
top-line: "Top of the line," used to describe hard tech and biotech. Not necessarily "cutting edge," but the best currently available to the general public.
transevolution: The evolution of humanity through biotech means, rather than "natural" genetic happenstance.
valles: Latin, "valley."
vat-born: Someone who was not born of woman; typically but not necessarily a bioroid. The counterpart to nat-born.
Well, the: The solar system from Mars orbit inward.
xieh: A type of mercenary, typically Chinese.

Pronouncing Chinese

Chinese is a tonal language, and very difficult to pronounce correctly without more guidance than this book can provide. Chinese words in this book are written using Pinyin romanization. Most letters can be pronounced as they would be in English, but four simple rules will help with the exceptions: "x" = "sh," "q" = "ch," "z" = "dz," and "c" = "ts."

Names and Neologisms

Mercury, Venus, and Mars are all names of Roman gods. Their Greek equivalents are Hermes, Aphrodite, and Ares, respectively. Both sets of names are used for naming things after the planets; e.g., "The Ares Conspiracy."

Two words that tend to get abused a lot off-Earth are "geology" and "geography." The "geo-" prefix in both means "of Earth," and some philologists say they should *only* be used for talking about Earth. The equivalent terms for Mars are "areology" and "areography," and many sources (including this book) actually use them. Just as many people say that the old words work fine. The quirk "Has strong opinion about areo-/geo- debate" is available for vocal nit-pickers. The Mercury and Venus equivalents, ("hermeography," "aphrodisiology," etc.) have not caught on.

On Mercury, most features are named for artists and writers – the Plains of Shakespeare, Renoir Crater. On Venus, women's names are used, mostly mythical – Guinevere Planitia, Aphrodite Terra. Mars has no theme. The land features on all these worlds were largely named in Latin – e.g., "Valles Marineris." Modern usage mixes Latin, English, and other languages freely, to the despair of many pedants.

BIBLIOGRAPHY

The bibliographies found in ***GURPS Bio-Tech*** and ***Transhuman Space*** cover a lot of the territory that inspired this book. Here are some additional useful resources.

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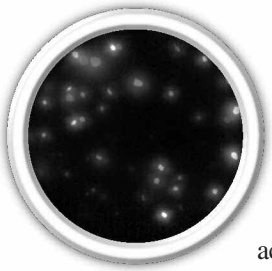
Film



Mission to Mars (Brian De Palma, 2000). The human hardware is believable, and the Martian landscapes are fairly accurate. One of the few mostly realistic Mars movies out there. Regardless, it is definitely a film with problems both cinematic and scientific.

Red Planet (Antony Hoffman, 2000). The other Mars movie of 2000, and equally problematic. However, it does touch upon terraforming, and can be a source of ideas for campaigns set in the era of the first Mars landings.

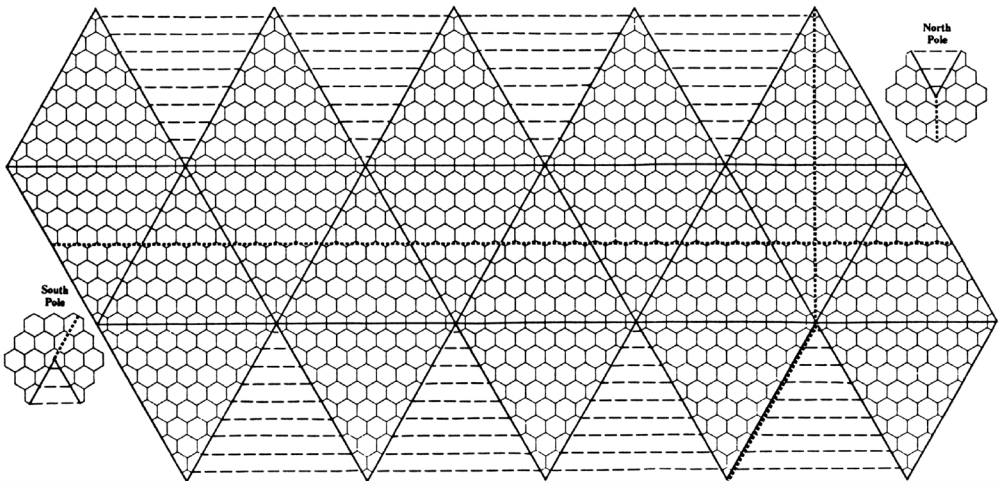
Online Resources

The ***Transhuman Space*** web page located at **www.sjgames.com/transhuman/** maintains updated links to online documents and web pages relating to both transhumanism and space colonization.

SYSTEM OBJECT RECORDS

Below is a blank System Object Record, used to record pertinent data about planets, moons, asteroids, and stations in a brief format. A few guidelines: Rotational Period is "sidereal day"; one rotation relative to the fixed stars. For Earth, this is 23 hours, 56 minutes. The Solar Day is the period from noon to noon, and is 24 hours for Earth. For many bodies, the two are effectively identical. Rotational Period, Solar Day, Period of Revolution, and Orbital Period may be expressed in the most convenient unit: hours, days, or years. Atmospheric Pressure should be given both in atmospheres and with a descriptive term (none, trace, dense, etc.). For moons, list the number, then names. Interesting moons should get their own record sheet.

Population is the population of biological sapient beings, excluding animals, AIs, etc., but including bioroids. The percentages break population down into humans and bioroids. For societies, the recommended format is: Name, percentage of total population, and average CR, followed by a brief description. In the Spaceports section, each port should be qualified as large, medium, or small. If the port is merely a docking facility, "spacedock" is appropriate. Spaceports may be qualified as private or military, or as including spaceyards if they have spacecraft construction facilities.



TRANSHUMAN SPACE SYSTEM OBJECT RECORD

One hex = ___ miles

Mean Distance From Sun _____ A.U. Diameter _____ mi. Mass _____ Earths Density _____ g/cm^3
Gravity _____ G Escape Velocity _____ mps To Orbit _____ mps Rotational Period _____
Solar Day _____ Period of Revolution Around Planet (Moons Only) _____ Orbital Period _____
Orbital Period in Local Days _____ days Axial Tilt _____ Atmospheric Pressure _____ (_____)
Atmospheric Composition _____ Temperatures at 30° Latitude: Low ___ Average ___ High ___
Surface Composition _____
Notable Resources _____
Economic/Production _____

Moons
_____

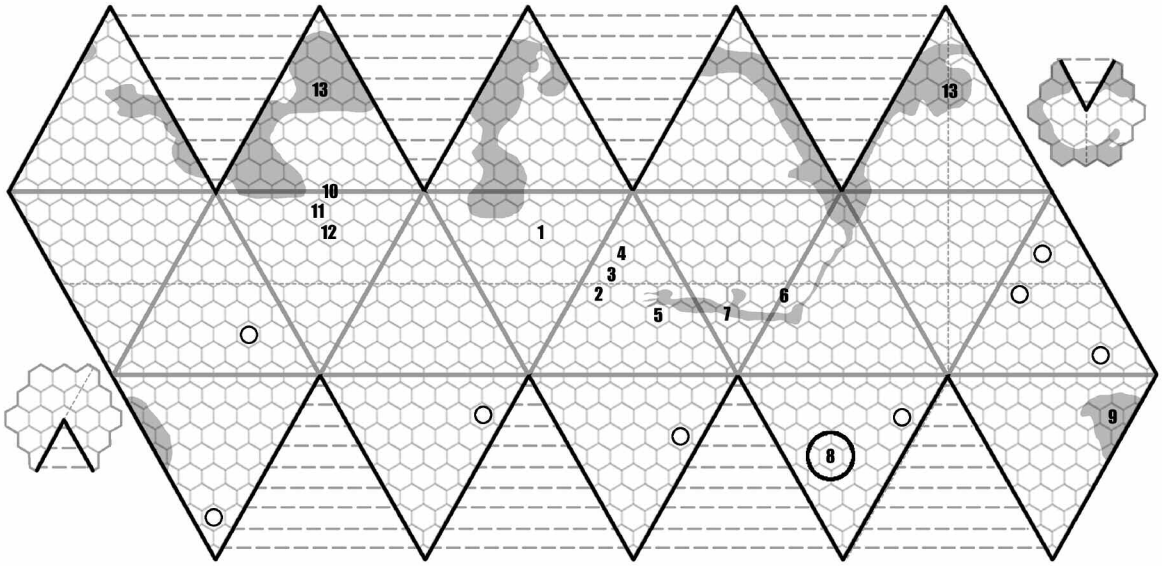
Societies
_____
_____
_____

Population _____ (__% : __%)

Spaceports
_____
_____
_____

Other Notes
_____
_____
_____

Mars



One hex = 295.6 miles

Mean Distance From Sun 1.52 A.U. *Diameter* 4,223 miles
Mass 0.107 Earths *Density* 3.9 g/cm^3 *Gravity* 0.38 G
Escape Velocity 3.1 mps *To Orbit* 2.2 mps
Rotational Period 24.6 hours *Solar Day* 24.7 hours
Period of Revolution Around Planet – Phobos: 7 hours, 39 minutes
Deimos: 30 hours, 18 minutes
Orbital Period 1.88 years *Orbital Period in Local Days* 668.6 days
Axial Tilt 25.2°
Atmospheric Pressure 0.4 atmospheres (very thin)
Atmospheric Composition 75% CO_2, 15% O_2, 5% N_2, 2% Ar, 3% others
Temperatures at 30° Latitude: Low 0°; Average 20°; High 40°

Surface Composition basalt, clays, ice
Notable Resources deuterium, ore
Economic/Production basic research in biotech and terraforming, ore, foodstuffs

KEY

1. Olympus Mons (Nix Olympica)
2. Arisa Mons
3. Pavonis Mons (New Shanghai)
4. Ascraeus
5. Haiyuan City
6. Robinson City
7. Maneris Sea
8. Argyre Planitia
9. Hellas Sea
10. Hecates Tholus
11. Elysium Mons
12. Albor Tholus
13. Borealis Sea

○ Major Crater

Moons
Two asteroidal moons – Deimos and Phobos. Deimos' longest dimension is 18 miles; Phobos' is 9 miles. Both are largely carbonaceous, and have minimal gravity.

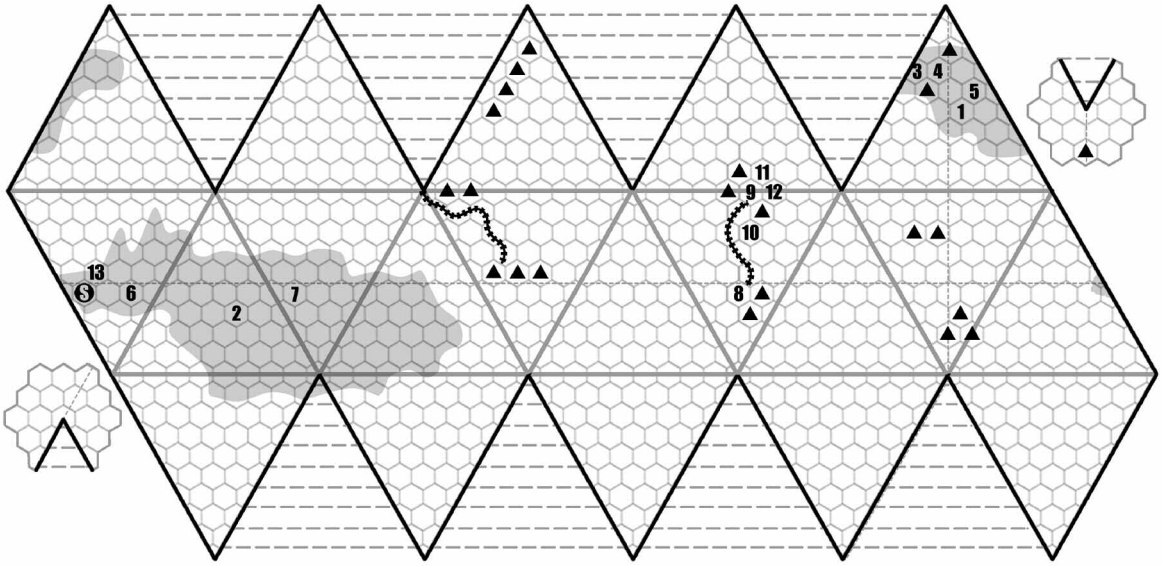
Population 2,500,000 (85% : 15%)

Societies
Mars Autonomous Region of the People's Republic of China, 55%, CR 4
Martian Commonwealth of the United States of America, 18%, CR 3
Other societies, varying widely.

Spaceports
Deimos, New Shangha, and the Space Elevator connecting them constitute a large spaceport. Large spaceport at Phobos, with spaceyard. Various smaller spaceports, some private, some military.

See pp. 18-19 for larger map.

Venus



KEY

1. Ishtar Terra
2. Aphrodite Terra
3. Lakshmi Planum
4. Maxwell Montes
5. Fortuna Tessera
6. Ouda Regio
7. Thetis Regio
8. Phoebe Regio
9. Beta Regio
10. Devana Chasma
11. Rhea Mons
12. Thela Mons
13. Research Station Aphrodite

▲ Major Mountain
Major Canyon
Ⓢ Spaceport

One hex = 526.5 miles

Mean Distance From Sun 0.72 A.U. *Diameter* 7,521 miles
Mass 0.815 Earths *Density* 5.2 g/cm^3 *Gravity* 0.91 G
Escape Velocity 6.5 mps *To Orbit* 4.6 mps
Rotational Period 243 days (retrograde) *Solar Day* 117 days
Orbital Period 225 days *Orbital Period in Local Days* 1.9 days
Axial Tilt 3°
Atmospheric Pressure 90 atmospheres (superdense)
Atmospheric Composition 96% CO_2, 4% N_2
Temperatures at 30° Latitude: Low 880°; Average 900°; High 920°

Surface Composition basalt, granite
Notable Resources ore
Economic/Production planetological research

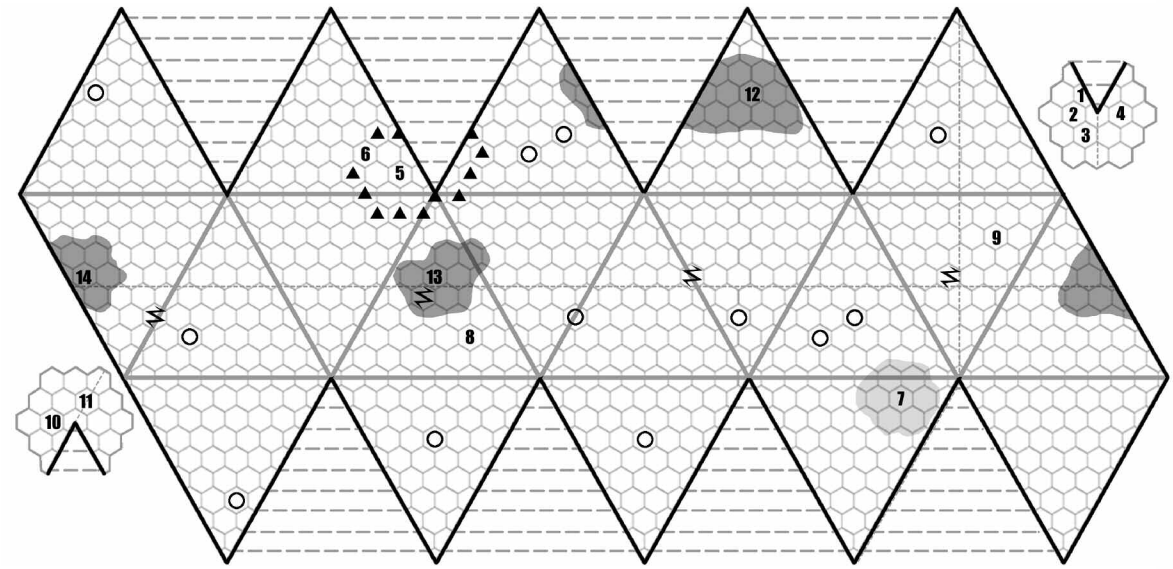
Moons
None

Population 2,000 (95% : 5%)

Societies
All inhabitants are representatives of off-world powers, mostly the European Union. CR 4.

Spaceports
Medium spaceport at Research Station Aphrodite. Small spaceports elsewhere, and in orbit at Anadyomene Orbital.

Mercury



One hex = 212.2 miles

Mean Distance From Sun 0.39 A.U. *Diameter* 3,032 miles
Mass 0.055 Earths *Density* 5.4 g/cm³ *Gravity* 0.37 G
Escape Velocity 2.7 mps *To Orbit* 1.9 mps
Rotational Period 58.6 days *Solar Day* 176 days
Orbital Period 88 days *Orbital Period in Local Days* 0.5 days
Axial Tilt 0°
Atmospheric Pressure none (vacuum)
Atmospheric Composition none
Temperatures at 30° Latitude: Low -280°; Average 260°; High 800°

Surface Composition silicates
Notable Resources ore, energy
Economic/Production ore, antimatter, energy

Moons
None

Population 110,000 (90% : 10%)

Societies
All inhabitants are representatives of off-world powers, mostly the European Union. CR 4.

Spaceports
Large spaceport at Goethe Crater. Several small spaceports.

(As of 2002, much of Mercury has not been charted in detail. Some features on the above map are speculative.)

KEY

1. Purcell Crater
2. Desprez Crater
3. Goethe & Aristoxenus Craters
4. Cook Crater
5. Caloris Planitia
6. Caloris Montes
7. Guido d'Arezzo Crater
8. Tolstoj Crater
9. Ferguson Region
10. Scopas & Chao Meng-Fu Craters
11. Boccaccio Crater
12. Borealis Planitia
13. Tir Planitia
14. Loubet Planitia

Plains
Lineated Terrain
Major Crater
Major Weather Situation
Mountains

INDEX

Hot and Heavy

In the Inner System, the worlds are closer together. Hotter. Full of promise and adventure. ***In The Well*** includes:

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Written by Jonathan Woodward Edited by Andrew Hackard

Cover by Christopher Shy

***Transhuman Space* designed by David Pulver**

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