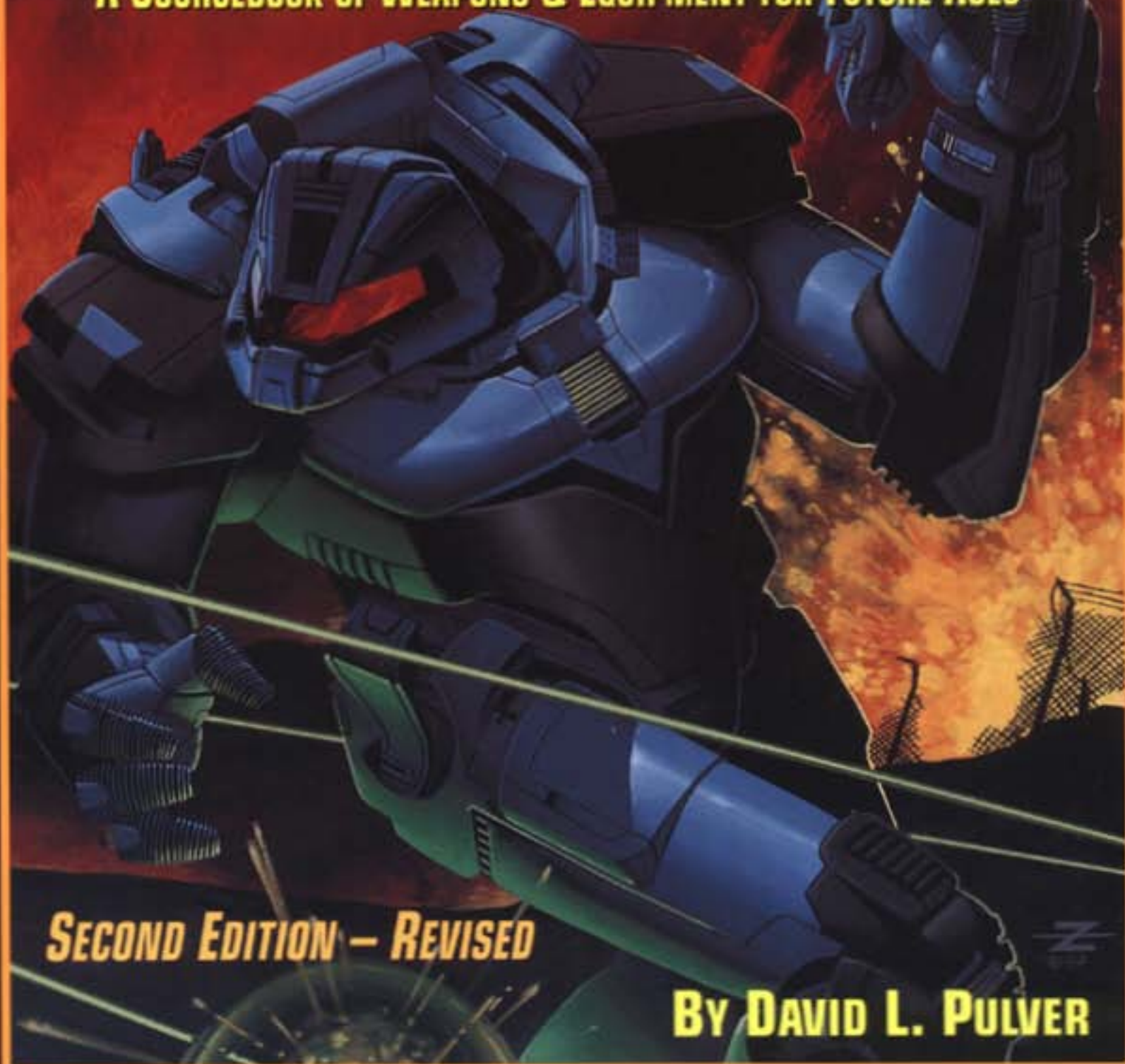# GURPS

ULTRA-TECH

A Sourcebook of Weapons & Equipment for Future Ages

Second Edition – Revised

By David L. Pulver

STEVE JACKSON GAMES

GURPS

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A Sourcebook of Weapons & Equipment for Future Ages
Second Edition • Revised

By David L. Pulver

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CONTENTS

INTRODUCTION

Ultra-Tech is the *GURPS* sourcebook of science fiction technology. It begins where *GURPS High-Tech* left off, and covers the future from TL8 (near future) to TL16 (science fantasy).

The emphasis of *GURPS Ultra-Tech* is on the personal. The gadgets are powerful, but they expand the possibilities of character interaction rather than replacing it with bolts of scientific lightning. However impressive the hardware, it remains a tool, to serve the mind and hand (or paw, tentacle, flipper or pseudopod).

A word about futuristic combat . . . This book contains many powerful weapons, and some very tough defenses. If a combat-centered adventure is planned, GMs should take care to balance weapons with armor. Legality class is a good guide to this. In social situations, no one wears armor, and only the smallest holdout weapons will be carried. If slumming in a shady startown, concealable armor like monocrys or a biosuit should be worn, along with a heavy pistol or powered blade; anything more will attract the attention of the local constabulary. Military weapons and armor are best restricted to military operations!

But *Ultra-Tech* is more than just a book of weapons and useful gadgets for adventurers. Many of the technologies described could potentially change the way ordinary people live. Flying grav belts might transform society as automobiles did. What if no one had to fear death, because his mind was on tape? Are clones people? In the book, we have tried to give a glimpse of some of the more dramatic domestic possibilities of future technology.

Ultra-Tech was designed for *GURPS Space,* but it can be handy for other campaigns. In particular, *GURPS Uplift* GMs can use it as an inspiration for alien technology (almost anything could be in the Galactics' Library) while *GURPS Supers* roleplayers will find it a valuable source of gadgets for technologically-inclined supers, visiting aliens or powerful organizations.

USING THIS BOOK

In *GURPS Ultra-Tech,* technological innovations are sorted by function, with each chapter describing a general class of technologies. For instance, Chapter 5, The Armory, covers the weapons of the ultra-tech battlefield. These chapters, in turn, may contain one or more subsections – again, arranged by function. For example, within Chapter 5, we have Ranged Weapons, Melee Weapons, Weapon Accessories and so on. Finally, the innovations in each subsection are arranged first in order of ascending TL (that at which the device first appears), and then in alphabetical order.

For quick reference, tables listing weight, cost, legality class, TL and page references can be found in the Appendix.

ABOUT THE AUTHOR

David L. Pulver grew up in Canada, England and New Zealand. He has been a science fiction fan for most of his life, an avid gamer since 1978, and a frequent playtester for SJ Games and the BTRC. He began freelance writing in 1988, and has been published in *White Wolf* and *Challenge* magazines. His published work includes *GURPS Psionics, GURPS Vehicles, GURPS Robots, Aliens and Artifacts* (ICE), *Glory of Rome* (TSR) and *Indiana Jones and the Rising Sun* (West End Games). He presently lives in Kingston, Ontario.

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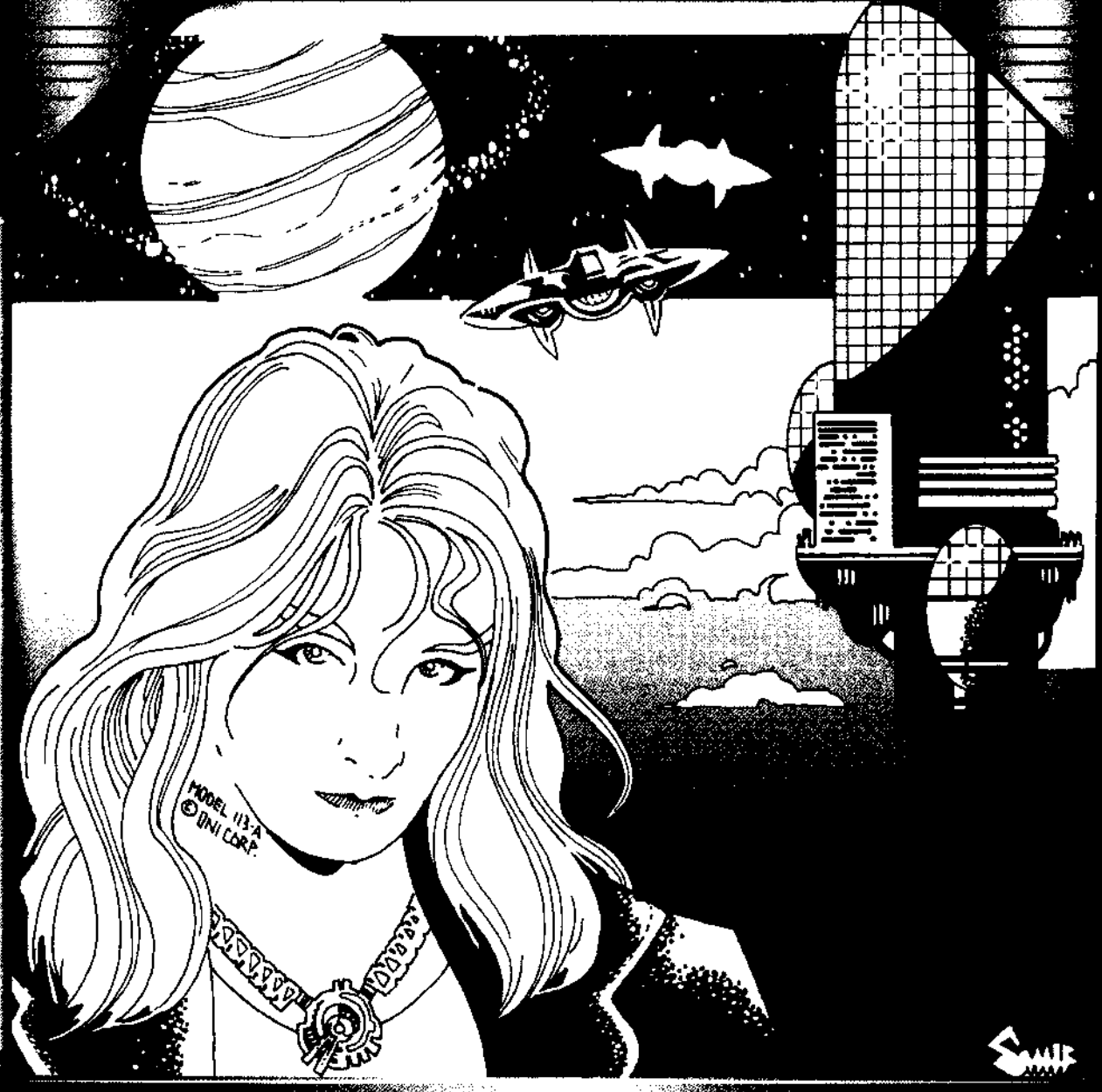
This chapter gives a brief overview of the technological timeline assumed by this book, as well as some general rules that pertain to equipment as it advances in TL.

TECHNOLOGICAL TIMELINE

Timelines that go into more detail on a specific class of technology (such as weapons or transportation) can be found in the appropriate chapters.

TL8 – THE EDGE OF TOMORROW

At TL8, industry has gone into space, taking advantage of the gravity-free environment to develop new and better industrial processes. Materials are both lighter and stronger. Standardized energy cells can power anything from a hand computer to a laser rifle, while on a larger scale, fusion and solar power provide society with almost unlimited energy. Computers continue to improve, and bionics begins to bridge the gap between man and machine. Perhaps the biggest advances are in bioscience, especially medicine. Zero-G chemistry creates a range of "wonder drugs," while transplant technology and human cloning offers the promise of immortality – to those who can afford it.

Living in the Future

All middle-class houses and apartments (and most hotel rooms and passenger ship cabins) have an integrated, voice-activated computer system that controls climate, domestic appliances, security and communications. The system is programmed to respond to the owner's voiceprint. A typical "SmartHome" system costs $4,000 plus the price of a Complexity 3 computer ("the house brain") to run the system. Cheaper apartments tie into the landlord's main building computer, which provides similar services, but with less security. Very cheap tenements are prone to malfunctions . . .

While credit transactors (see sidebar, p. 8) are used for face-to-face purchases, on well-developed worlds, consumers may use computer datanets for home shopping. Using the SmartHome system, the shopper calls the electronic yellow pages, selects from a user-friendly shopping menu of all retailers subscribing to the net, and calls up three-dimensional or high-quality digital images of available products for inspection. To purchase, the user simply transfers from his bank account to the account of the store. The store verifies the transfer (verification takes a second). The item will either be delivered or reserved to be picked up at the store's nearest outlet.

The TL10 Soldier

By TL10 there is a sharp distinction made between the mobile, battlesuit-equipped *trooper* and the regular infantryman who lacks the mobility and firepower of powered armor. Still, regular infantry are far cheaper, and are nearly as good for holding ground. A platoon of soldiers in Infantry Combat Armor, armed with over a hundred anti-armor brilliant missiles and supported by a half-dozen Gatling X-lasers, is not something a squad of battlesuited troopers takes lightly!

The average infantryman wears Infantry Combat Armor fitted with laser sensors and a chameleon system; elite units have Powered Combat Armor and intruder circuits. He is armed with a military X-ray laser rifle. For use against tanks, mecha (anthropomorphic tanks) and battlesuits, he carries either a spare E cell for the squad Gatling or an infantry missile launcher loaded with a brilliant missile.

As well as the basic holographic HUD, the soldier's helmet has a neutrino receiver and sensor visor, and he may have a few brain implants, such as an interface to link him cybernetically with his weapon.

The TL11 Soldier

The average TL11 infantryman wears a military cybersuit with thermal superconducting armor; the suit has laser sensors, IR cloaking, a distort belt to jam sensors, a sonic screen to keep him silent, and an intruder system to render him invisible. He may use a lift pack (the TL11 improvement of the fusion jetpack) for mobility. He is armed with a military X-ray laser rifle, and over his shoulder is slung a packet of brilliant missiles. The soldier has a spare power cell or two for his weapon, an E cell for the squad Gatling, and possibly a force sword for close combat. He has a brain implant with a neural interface connected to his weapon.

TL9 – THE ROAD TO THE STARS

TL9 fusion power is coupled with a better understanding of physics to make interstellar travel a reality. Computers get smarter and smaller, and more and more devices include small dedicated computer systems: scanners, recognition-grip weapons, automedics. A bewildering array of energy weapons are developed, many for special purposes – stunners, holdout lasers, particle beam blasters, flamers. Great strides continue to be made in medicine. New drugs such as Quickheal can vastly speed healing, panimmunity banishes the specter of disease, and braintaping offers insurance against death.

A Room With a View

Voice-activated "SmartHome" computer systems controlling appliances, environment, security and communications are standard in every house, apartment and shipboard cabin. The house brain is a Complexity 4 or better home computer, accessible from every room.

On many worlds, and in spaceships and space habitats, living space is limited; but flat-screen holographic projectors are highly sophisticated and reasonably inexpensive, permitting the illusion of vast space to be created. The Vista Infinity 9 is typical; for a mere $4,000, a unit can be purchased that projects a complete, pre-programmable, three-dimensional environment on the walls and ceiling. With the addition of scented air conditioning and audio tapes, the owner can create a quite realistic illusion of open space.

TL10 – INTERSTELLAR CIVILIZATIONS

As science gains a greater understanding of the human mind, complex brain implants, such as the neural interface and memory implant, come into use. The new materials technology of bioplastics makes possible a whole range of tough, lightweight equipment for protection and exploration. Weapons technology takes a quantum leap with the use of the X-ray laser, forcing armor to become stronger and smarter. Medicine and biotechnology progress steadily, with major advances in genetic reconstruction and first aid.

The House of the Future

By TL10 the house brain is increasingly intelligent, typically a Complexity 5 minicomputer, which handles everything from doing the dishes to tutoring the children. It is smart enough to anticipate the owner's desires, which may be good or bad. When someone says a house or apartment has personality, they may mean exactly that. Most ceilings, and usually at least one wall, may be used

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as a giant-sized computer or holocom screen. Holographic projectors (see *A Room With A View*, above), are standard, allowing any room in the home or apartment to seem to be floating in starry space or hidden in a tropical jungle.

TL11 & 12 - MASTERS OF FORCE

TL11 and TL12 societies have begun to develop an understanding of the workings of the universe far beyond that of previous tech levels, producing devices and effects that are incomprehensible to less advanced cultures.

TL11

The major advances of TL11 are in force fields and in genetic engineering, which produces everything from sensa-skin to living houses.

The House That Lives

TL11 genetic engineering creates durable domestic products. One is living carpets, self cleaning and requiring only a few additional nutrients to maintain. Using bioplastic, furniture – beds, tables, chairs – can be created that can assume preprogrammed shapes, textures or colors in response to the proper chemical or electromagnetic stimulus, or be absorbed into walls, floors or ceiling when not in use. Artifacts and interior partitions become mutable, their colors easily changed with a word to the house computer. Late TL11 developments make it economical (though not always fashionable!) to grow complete, living houses (or cities!) with warm fleshy walls, cell-like membranes for doors, and extrudable furniture. The house lives on human waste products and other garbage. A typical three-bedroom living house costs only $12,000.

TL12

While all aspects of technology continue to improve steadily, the major breakthroughs are in contragravity, which is used in personal vehicles, houses and weapons, and in medical technology.

Castles in the Air

The development of contragravity generators (which can cancel gravitational fields rather than simply creating them) lets unmodified humans live nearly anywhere in Earthlike comfort. Floating buildings, or even cities, are possible, usually with multiply-redundant power plants in case of failure; with TL11 biotechnology, they might even be alive! A less extravagant dwelling is the contragrav houseboat, which can be moored anywhere on the planet that the user desires, tethered just above the trees (or above the clouds).

Contragrav also lets mineral-rich high-G worlds be settled without having to worry about exoskeletons or creating variant humans. Antimatter or inexpensive fusion power stations and artificial-gravity generators enable asteroids and small moons to have normal gravity, and huge, sprawling orbital cities to be constructed without worrying about providing spin.

By generating a low-power deflector shield over a city, city planners can dispense with solid domes or underground dwellings and won't have to worry

Most face-to-face exchanges use the credit transactor. Also called a credcard, this is an electronic currency-transfer device, resembling a small, flat calculator (weight is negligible). A credit transactor does not credit or debit an account. An amount of money is programmed onto the card; the card itself is the account and the record of the transactions.

In most reasonably free societies, a credcard requires a bank account with a minimum initial deposit of $100. There is an additional charge of $20 to make the card. The user can encode more money onto his card (or deposit from the card to his account) by communicating with the bank. He simply visits a credit terminal, dials the number of his bank account, inserts the card and encodes the amount onto the card itself. Funds on a card are encoded in tamper-resistant molecular circuitry; it is difficult to forge a credcard's balance (see *Credcard Crime*, p. 83).

In use, two credcards are linked together and the amount to be transferred is keyed in. One credcard's balance is debited, the other's is credited. Repressive societies may require that a record be kept of the exchange in the card's memory, including the serial number of the other card. More free-wheeling cultures insist that part of the purpose of credcards is to keep transactions private. All credcards require the owner to use a positive ID to verify the exchange. The most common is fingerprint and code number. Including verification, a transaction with this system takes about ten seconds. Some banks issue more secure credcards (e.g. also requiring a retina or voice-print authentication). This takes longer, depending on how tight the security is; retina and voice print take 30 seconds. This costs $200+ and usually requires a substantial balance ($100,000+) at the issuing bank. A stolen credcard is useless without the ID code (and possibly the victim's eyes or fingers) or a credcard cracker (see p. 83).

about bad weather, either. Or a homesteader can buy a smaller field generator and power plant and set up on the asteroid of his choice. Of course, if the field goes down, he's in trouble – unless he has a backup generator on. With a sufficiently powerful antimatter-powered force screen and antigrav generator, a research station could even be built deep within a gas giant's crushing atmosphere, or hovering within a star. The engineering problems would be immense, but think of the view!

A gravity neutralizer for a houseboat, small asteroid, etc. is a grid built into the walls attached to a large power pack. It costs $10,000, masses .1 ton, takes up .1 cy, and requires an E cell for one year of operation. It neutralizes gravity for a ten-ton mass; several generators can be combined for a larger object.
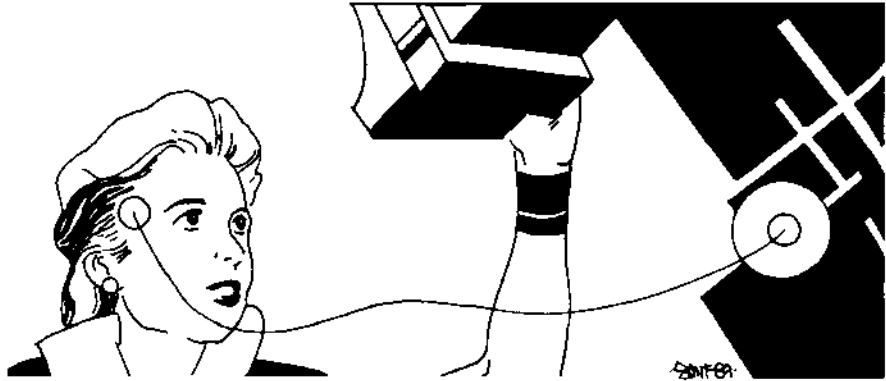
TL13 & 14 – SUPERSCIENCE

TL13 and TL14 make use of near-miraculous devices such as living metal, gamma-ray lasers and force screens. In the *GURPS Space* background, this is the technology of the long-gone Precursors. Pocket antimatter reactors power gravcars, and spaceships and cities run on total conversion of mass. Entire planets can be moved, or disassembled to build a shell around a star.

If a GM doesn't want active TL13 or TL14 civilizations in his campaign, he can still use the technology. Individual gadgets may be found by archaeologists investigating Precursor ruins. Artifacts may still be working (TL13+ devices are built to last!), or could provide clues that enable a lower-tech society to duplicate them, even though the principles behind them are not fully understood.

Living With Superscience

GMs should carefully consider the effect of introducing superscience into a campaign. What would anti-gravity belts do to transportation? Windows would have to be as secure as doors, to keep out aerial burglars and trespassers. Assuming, that is, that any criminals survived, with TL10 psych implants now costing only a few hundred credits. For that matter, computer and personality implants are now cheap enough that people might put on or take off identities as easily as they would change clothes.

TL13

TL13 technology is not subtle. The major developments of TL13 are in high-energy and exotic physics: antimatter beam weapons, powerful force screens and contragravity belts. The medicine reflects this high-powered approach: the standard way to heal someone is to take him apart (using the chrysalis machine) and put him back together again, but fixed.

TL14

TL14 technology continues to refine the developments of TL 13. Very high energy personal weapons are developed, while neural technology and braintapping reach a peak of development with the braincorder and ghostcomp.

Boredom in Paradise

What do people do in a TL14 culture? Most wouldn't be *needed* to run anything, make decisions or handle information. Sentient robots could reproduce themselves rapidly, spreading like a plague to terraform (or eat!) a planet in a matter of months, or build any industry that is required. Raw materials are easy to come by. While asteroid belts may be already used up, TL14 cultures can dismantle Jupiter-sized gas giants for raw materials.

Of course, if several TL14 nations existed in the same area and no one wanted to leave, they would soon run out of gas giants. Then things might get nasty . . .

TL15 & 16 – A Sufficiently Advanced Technology

At tech levels above 14, it becomes very difficult to imagine what society, as a whole, might be like. With enough improvements in medicine, manufacturing and computer science, *anything* could happen.

Therefore, TL15 and 16 technology will be presented as simply a collection of interesting gadgets for use as Precursor artifacts, the final inventions of mad scientists or the like.

Many TL15 or 16 technologies could be used in a lower-TL campaign. Timescanners, stasis webs or teleportation could all have been discovered at a lower TL, especially in a *GURPS Supers* or *Time Travel* campaign. All of the devices are "play balanced" to the degree that they should not ruin a campaign if used carefully – but their introduction *could* potentially change society in a number of ways . . . which is part of the fun.

TL15

At TL 15, the very fabric of time and space, matter and energy can be affected through technology. TL15 technology will fit in well as "experimental" devices in a lower tech campaign (at 100 or more times the price!).

TL16

TL16 is the age of technological magic. Wizardry is for sale at every corner, and the universe is not necessarily the limit. TL16 gadgets should be restricted to one-of-a-kind devices.

Infinity Rooms

An infinity room is a small pocket universe, set aside in a parallel reality of its own. A typical infinity room is a sphere 15 yards across. The lower half contains a small total-conversion power plant and the equipment which originally created and now maintains the pocket, as well as life-support and grav-

ity generators. The upper hemisphere can be furnished as the owner desires, perhaps incorporating a suite of rooms, a laboratory, even soil and a garden. Using infinity rooms, a seemingly small spacecraft (the size of a shuttle, for instance) could have the capacity of a dreadnought, or a closet or phone booth could conceal a palace.

One uses an infinity portal to enter an infinity room. Infinity portals are identical to portable telegates (see p. 117) and use similar principles, except that one portal is always fixed in the infinity room. Cost, weight and volume are the same as normal telegates. Except via its portal, there is no way to gain access to an infinity room.

An infinity room costs $5,000,000 at TL16. Larger infinity rooms are perfectly possible; the cost increases by $1,000,000 each time the diameter is doubled, so an infinity room 480 yards across would cost $10,000,000.

IMPROVEMENTS AT HIGHER TLS

The TL of any technology in **Ultra-Tech** is the TL at which it is first introduced. *Any* technology from lower TLs might be available at higher TLs. Its price varies with the game world. Old devices might be junk; they might be rare and valuable antiques. The creator of the universe, or the GM, decides. In general:

*One TL after it first appears, any item of equipment, as well as wonder drugs, computer programs, and services like cloning or bionic operations, costs **half** as much. Two TLs after introduction, prices are ¼ the original cost. There is no further reduction in price unless specified for a particular device.*

For some equipment, there are additional modifications:

Gadgets

Unless specified otherwise, all devices, *except* for weapons, vacc suits and other survival suits and body armor, weigh *half* as much one TL after being introduced and ¼ as much after two or more TLs (round down). For instance, a TL9 radscanner weighs one pound. An equivalent radscanner at TL10 weighs ½ pound, at TL11 and up, ¼ pound. Many gadgets (e.g., communicators) also improve in effectiveness.

Armor

Higher TL versions of armor have increased DR; see the individual descriptions for each type.

Power

Any equipment that runs off of power cells gains shots or increased operating time at higher tech levels. This adds 50% of the original operating time or shots to the listed number for each tech level after the one at which the device was first introduced. This is because the high-tech cells *contain* more power. However, many devices also make better use of the power they have available. For weapons, that means that they have more shots *and* that the shots are more powerful!

TYPES OF POWER CELLS

There are six sizes of power cells, designated by letter from AA (the smallest) to E (the largest). Power cells increase in power exponentially. An A cell is ten times as powerful as an AA cell, a B cell has ten times the power of an A cell, and so on.

AA cell: This cell is a disk the size of a pinhead, ⅙" in diameter and ½" thick. AA cells are used to power microbots, brain implants, calculators, etc. They cost $2; 500 AA cells weigh 1 ounce.

A cell: An A cell is a cylinder ¼" in diameter and ¼" tall. A cells are used to power wristcomps, short-range radios and other devices with small power requirements. An A cell costs $10; 25 weigh 1 ounce.

B cell: B cells are cylinders ½" in diameter and ½" tall. They are used to power various sorts of hand-held equipment, including small, easily-concealable weapons. B cells cost $30; 20 weigh 1 pound.

WEAPON IMPROVEMENTS
Energy Weapons

Energy weapons are weapons powered by power cells. This includes all beam weapons, all Gauss weapons and all powered melee weapons such as vibroblades and force swords. For each TL after the types' first appearance, add +1 to an energy weapon's damage for every 1d of damage it normally inflicts. For weapons with damage adds, 3+ points of damage adds also gives a +1.

Range also increases. Add 10% to ½D and Max range per TL after the weapon first appears.

Example: A TL9 Blaster Rifle normally does 12d damage, with a ½D and Max range of 300 and 800. It gains +12 damage per TL above 9 (+1 for each die of damage done normally), so at TL 10 it does 12d+12 damage. Using the *Modifying Dice + Adds* rules, p. B114, this becomes 15d+2. In addition, its ½D and Max ranges improve by 10% to 330 and 880. At TL12, the same Blaster Rifle would do a whopping 12d+36 (equivalent of 22d+1) and would have a ½D of 390 and Max of 1,040.

Improvement Limits: Unlike number of shots, damage and range only increase for the first 3 TLs after the weapon's introduction. Thus a TL13 Blaster Rifle has the same range and damage it did at TL12.

Needlers

Regular and Gauss needlers get 20 more shots per magazine at each TL after the TL of introduction.

Other Weapons

Conventional slugthrowers, gyrocs, ice guns and other chemical or spring-powered weapons do not increase in damage, but advanced ammunition types (e.g., heat-seeking bullets) do come into use. Explosive warheads have a 50% increase in damage at TL9 but after that do not gain in power; but other types of warheads (sonic, nuclear, etc.) become available.

C cell: This is a 1" diameter by 2" tall cylinder. C cells are the most common power source for personal weapons, tools and equipment. They are the most familiar power source in most advanced societies; equipment designed for larger or smaller cells often has an adapter for C-cell operation. C cells cost $100 and weigh ½ pound.

D cell: A D cell is a cylinder 2" in diameter and 4" tall. D cells power military weapons and heavy equipment; TL8+ battlefields are littered with expended D cells in the way that TL7 battlefields are littered with expended cartridge cases and machine-gun links. Each D cell costs $500 and weighs 5 pounds.

E cell: Each E cell is a cylinder 4" in diameter and 6" tall. E cells power vehicles, support weapons and other power-intensive systems. An E cell costs $2,000 and weighs 20 pounds.

Rechargeable Power Cells (TL8+)

At the GM's option, any TL8+ society can have rechargeable power cells. In this case, they last only half as long, or provide half as many shots, but may be recharged at any power plant, including that of a spaceship, in about a day. This amount of power should be available at negligible cost through a futuristic power grid. They are otherwise identical to normal power cells (above).
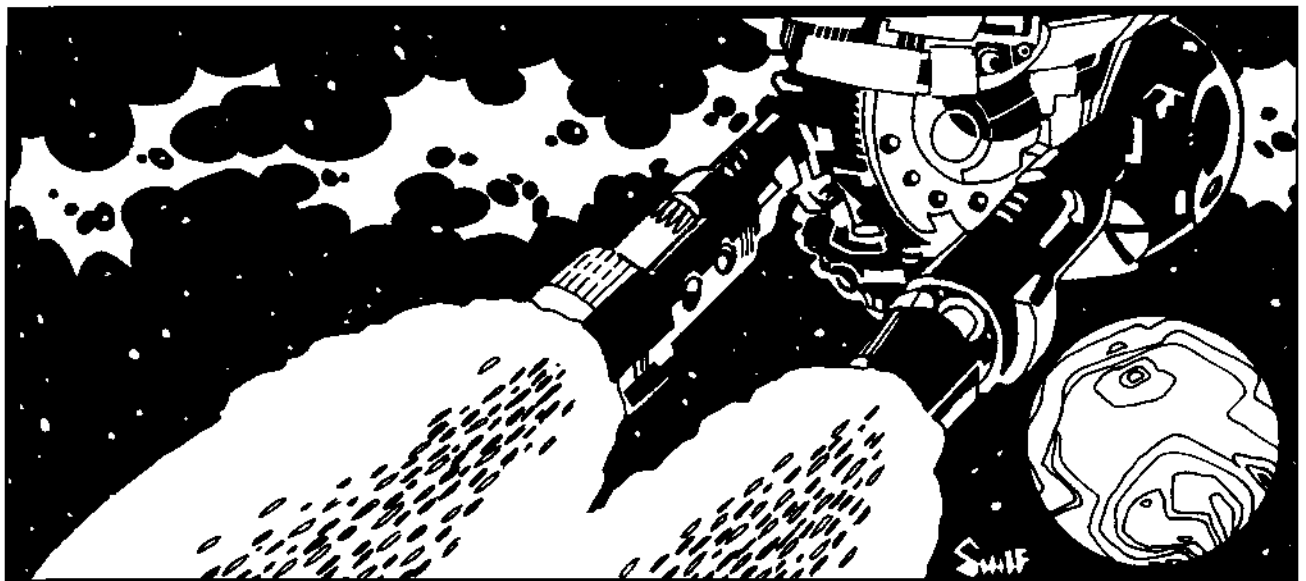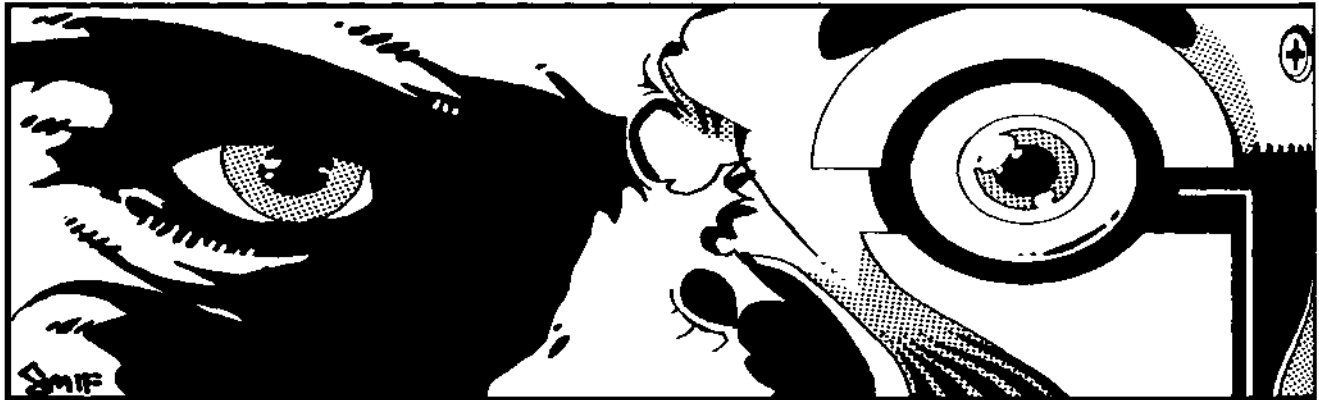
SOLAR PANELS (TL8+)

Solar panels can substitute for power cells in any environment where sunlight is available; the figures below assume Earth-normal sunlight, but can be modified proportionately for higher or lower levels of light. Size B and smaller panels will work perfectly well under normal indoor artificial light.

Panels come in sizes AA through E; each may be substituted for the equivalent cell in applications requiring steady demand (including slow vehicles) but never weaponry.

AA: 1/16 square inch. $2; negligible weight.

A: 1/4 square inch. $10; negligible weight.

B: Two square inches. $50; negligible weight.

C: 16 square inches. $300; 5 ounces.

D: One square foot. $2,000; 2.8 pounds.

E: One square yard. $10,000; 25 pounds.

Any suitable cell-operated device will have jacks to plug in a solar panel. It automatically goes over to its power cell when light is cut off from the panels. Many devices can be bought with built-in solar panels (add half the price and weight above).

Solar panels are drastically improved as TLs increase. At TL9, halve cost and divide weight by 10. At TL10, halve cost again, and divide TL8 weight by 100. At TL11, divide TL8 weight by 1,000; at TL12, divide TL8 weight by 10,000.

Solar panels are relatively tough (DR 2) and damaged panels may continue to work at reduced levels (GM's option). Each point of damage that gets past the DR will destroy 12 square inches; it takes 12 points of damage to destroy one square foot of panel. A critical hit, or a deliberate use of clippers, cuts the connection from the panel to the device it powers.

POWER

An important feature of an ultra-tech campaign is that gadgets make their users very powerful . . . *while they work*. But a laser without power isn't even a good club. Most gadgets need a power source. If no power requirements are listed, though, the device needs none; it has total-conversion cells, draws energy from alternate universes, functions forever by the will of the ultimate designer or some such system. At TL15+ the GM can say that any gadget requires no power source, even if power requirements are given.

Power Cells (TL8+)

At TL8 and above, most equipment runs on standardized *power cells* (see sidebars pp. 10-11). How they work is up to the GM. These rules assume that they use plutonium, metastable helium, antimatter, or something equally esoteric and expensive. They can't be recharged, and can't be discharged quickly enough to explode. Any cell will store power indefinitely if not in use; they have an indefinite shelf life. Unless otherwise specified, they will are good for 2 years' continuous use.

At each successive TL after the introduction of a device, it will use power more efficiently. The number of shots or the operating time is increased by 50% per TL after the TL of introduction.

Example: An ultrascanner (TL12) normally runs for five minutes of continuous use. At TL13, the equivalent ultrascanner will operate continuously for 7½ minutes on a TL13 C cell.

Example: A TL8 laser rifle gets 12 shots from a C cell. At TL9, an equivalent laser rifle, using TL9 power cells, gets 18 shots. An equivalent TL10 rifle gets 24 shots, and so on.

Some weapons also get increased damage per shot at higher TLs (see *Weapon Improvements*, p. 11).

Jury-Rigging Power Cells

In an emergency, wrong-sized cells can be used. Rigging this requires a roll against Electronics-2 and 3d+10 minutes of work. A failure means the jury-rig delivers no power; a critical failure damages the gadget. A larger cell can be substituted for a smaller, lasting no more than twice as long. A set of 10 smaller cells can be substituted for the next larger size, usually lasting only a short time (details are up to the GM, depending on the Electronics skill of the tinkerer; on a good roll, the GM should warn the technician what to expect from his jury-rig). The GM may also rule that different planets or nations use different voltages or sizes for their power cells. This means an Electronics roll, at a penalty set by the GM, will be required to use familiar power cells in strange equipment (or vice versa).

Lower TL cells can be used to power a higher TL device, but this is always a jury-rig. High-TL devices using lower TL cells will, at best, function like the lower-TL version of that same device: a bad roll on the jury-rig could result in failure to operate, or even damage to the device. The penalty to the Electronics roll for jury-rigging increases by -2 for each difference in TL. (Electronics-4 for one TL of difference, Electronics-6 for two TLs, etc.)

Low-TL devices can use higher-tech cells, getting increased operating time but no other increase in efficiency. However, if the TL of the cells is more than 1 greater than the device's TL, the GM may require an Electronics roll, with appropriately cinematic results on a failure. ("The TL13 power cells just destroyed your flashlight, but before it melted, the beam went through the wall.")

Example: A TL8 laser rifle gets 12 shots from a TL8 C cell. Using a TL9 C cell, it would now get 18 shots, but no extra damage. With a TL10 cell, it could get 24 shots if it worked at all. The equivalent TL9 laser rifle gets 18 shots *and* extra damage from a TL9 power cell; jury-rigged to a TL8 cell, it would perform exactly like a TL8 laser rifle.

Explorers, merchants or diplomats who must spend a long time in a culture of a lower TL are well advised to have equipment adapted to the power sources of the lower TL. Higher TL devices can be permanently adapted (as distinct from jury-rigged) to use lower TL power cells. Number of shots or operating time is the same as that of the equivalent lower TL weapon. For devices that do not exist at a lower TL, shots and operating time are up to the GM. The rule of thumb is a 50% decrease for each drop in TL (round down).

Example: A TL12 fusion pistol gets six shots from a TL12 C cell. Adapted to TL11 cells, it would get three shots. Adapted to TL10 cells, it would get only one shot.

If shots go down to one, further decreases in TL halve damage instead; adapted to TL10 cells, the fusion pistol above would fire once for 4d×10 damage. Adapted to TL9 cells, it would do only 4d×5; with TL8 cells, 4d×2.5.

It is possible to adapt even more archaic power sources to the operation of higher TL equipment. This is normally a Task (see *Long Tasks,* p. B93) and the details are up to the GM. One Task that may be especially useful is adapting a recharger unit (see sidebar, p. 11) to primitive power sources.

The GM who feels that these calculations don't add to the game is free to declare that power cells were perfected at TL8 and don't change with increasing tech levels.

Replacing Power Cells

It takes 3 seconds to replace an A, B, C or D cell with a new one, or 6 seconds to replace a tiny AA or large E cell. Speed-Load (Power Cell) skill (see p. B52) applies to B, C and D cells being reloaded into weapons. Successful use of this skill reduces the time to 1 second. Life-support systems, and other items that cannot afford power interruptions, have two or more cells, so that if one is drained another takes over immediately. They are also usually equipped with a warning system to notify the user that one cell has been expended.

At TL13 and above, vehicles and other devices may operate on power "beamed" from a central station, as long as they remain within line of sight – buildings will have receivers on the roof to turn beamed power into "wall power." There may be many beam stations on a civilized world; a colony may have only a few, and a new colony will have just one. A very large spaceship can beam power to ground units in line of sight below it. This means that nobody has to worry about powering vehicles . . . until something happens to the power station.

A receiver for beamed power weighs the same as the normal power cell it is replacing, but operates indefinitely. Cost is the same. Usually, only D and E units are designed to receive beamed power.
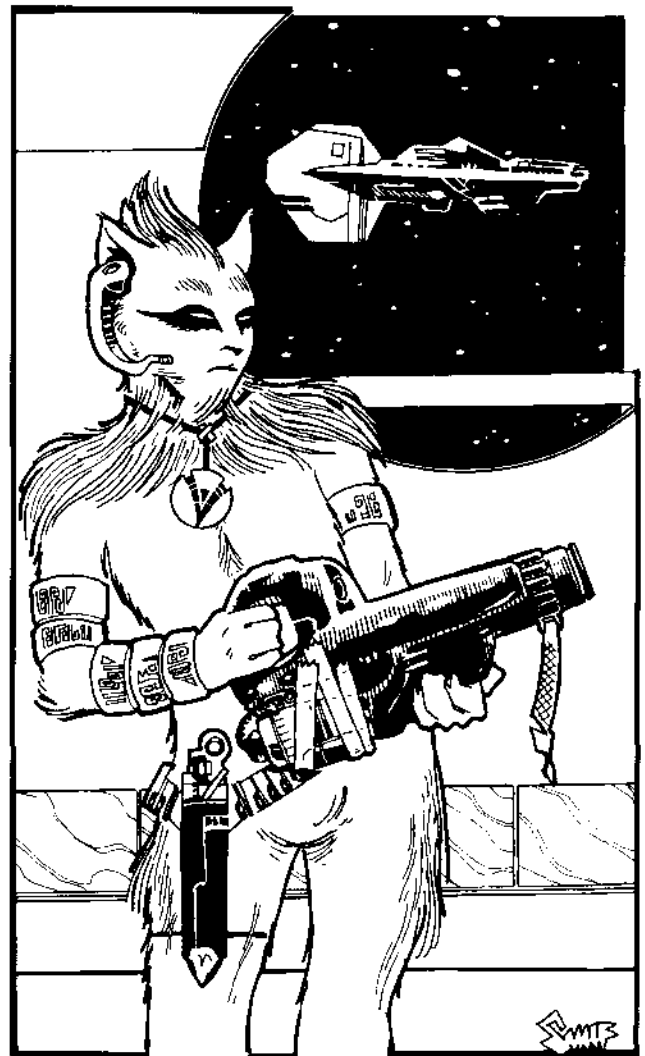
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chapter
TWO

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SECURE

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TOOLS AND CONSTRUCTION MATERIALS

This section lists the tools and construction materials found at each TL. These technologies range from the mundane (such as a flashlight or fire extinguisher) to the miraculous (such as bioplastic or living metal) and everything in between.

FLASHLIGHT (TL7+)

The flash throws a 50-foot beam for six continuous months on a C cell. It costs $20 and weighs one pound. A belt or helmet model that leaves the hands free costs $10 more. $100 buys a heavy-duty light that can be used as a baton without being damaged. A mini-flashlight (15-foot beam) is also available, running off an A cell for one month, for $8, with a weight of ¼ pound.

BIPHASE ROPE (TL8+)

A ⅛" diameter biphase rope supports 1,000 pounds. Ten yards of rope weigh ½ pound and costs $5. A ¼" diameter rope supports 4,000 pounds; cost is $30 and weight is two pounds for ten yards. Strength doubles at TL10 and again at TL12.

EXOSKELETONS (TL8+)

An exoskeleton is an open framework of bulky, artificial "muscles" and a strap-on power pack. When the user moves, the sensors in the suit react to and match his movements. The wearer uses the ST of the exoskeleton rather than his own.

Exoskeletons are often used by those who must work under high gravity. While wearing one, the user ignores ST penalties for heavy gravity and uses the exo's ST instead. He halves (round down) all DX penalties for heavy gravity. HT and IQ penalties are unchanged.

Exoskeletons are slightly clumsy. For any ordinary DX roll, an exoskeleton wearer rolls against DX. For other DX-based skills, he rolls against the skill-1. The GM may assess extra penalties for actions that should be especially difficult, such as Acrobatics. However, most exoskeletons (or "exosuits") have removable gauntlets to allow the wearer to do delicate work.

Exoskeletons give no protection in and of themselves (they are too open), but may be worn over light clothing or concealable armor, or the advanced skinsuits and biosuits. Anything heavier worn under the exo interferes with its sensors, while the suit is too bulky for anything to be worn over it. Exoskeletons should be fitted to the user, though "generic" models may be worn by anyone of the right general size, at an extra -1 to DX or skill rolls. It takes two minutes to strap into an exo, and one to remove it. All necessary bodily functions can be performed while wearing an exoskeleton.

Cost for a typical exoskeleton is $35,000 (ST 15). Subtract $4,000 if the suit is generic rather than fitted. Increase the cost by $10,000 for each ST point added, up to 20. Above 20, ST points cost an additional $20,000. An exoskeleton will run for one week on a D cell; it has sockets for two, for safety. An exoskeleton weighs 10 pounds per point of strength up to 20 ST. Above 20, each additional point adds 20 pounds of weight.

Exoskeletons lack environmental protection. To remedy this, an exoskeleton can also be built into a heavy-duty vacc suit or armored vacc suit (see p. 25). This gains the life support and DR of the suit, but adds the weight and cost of the exoskeleton.

The heavy-duty vacc suit with exoskeleton is known as an EVAC (exoskeletal vacc suit). The armored model is called an EAVS (exoskeletal armored vacc suit).

Unlike a vacc suit, the weight of an exosuit is reduced at later TLs. In a TL 9+ version of an EVAC or EAVS, the weight of the *vacc suit* is not reduced, but the weight of the added *exoskeleton* is.
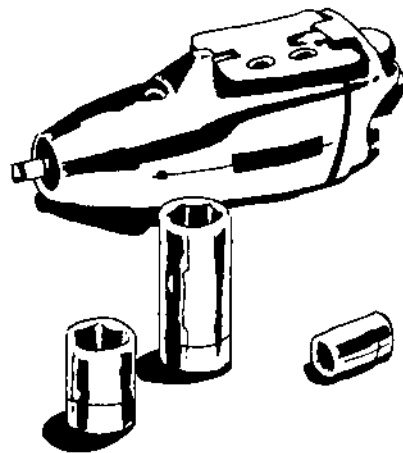
FIRE EXTINGUISHER TUBE (TL8+)

This is a ¼ pound tube that sprays a fire-retardant foam. It is a one-use only device, intended for small fires. It will extinguish them on a roll of 1 to 4 on 1d at five yards' range. Weight of the tube is negligible and cost is $10. Larger fire extinguishers, with eight uses, weigh two pounds and cost $50. Any fire extinguisher can be used as a weapon. It defaults to DX-4 or Beam Weapons (Flamer)-2; SS 10, Acc 1, ½D 3, Max 5. It does 3d damage, but this is counted only for knockback purposes — it does only minor bruising. Any hit to the face against an unarmored person stuns and blinds if a HT-3 roll is failed; roll against HT-3 each turn to recover.

HIGH-POWER DRILL (TL8+)

This drill is useful for boring through laser-refractive substances. It uses a synthetic monodiamond bit of incredible hardness. It can drill through 4 DR per turn of any material with a DR of 50 or less (2 DR if material is DR 51-100; 1 DR if the material is DR 100+) as long as it is held steady on the same spot; once it has drilled through DR, it does 1d+2 impaling damage each turn. Because it has to be held steady, it is useless as a weapon unless the target is held down (grappled or tangled). It runs for 30 minutes on a C cell. The bit may need to replaced occasionally (about every 10,000 DR); bits cost $40 apiece. It costs $120 and weighs four pounds. No handyman or burglar should be without one.

LASER TORCH (TL8+)

This is a close-focus hand laser for light cutting and spot welding. It does 4d per second of cutting damage to doors, bulkheads, etc. Used as a weapon, has SS 12, Acc 1, RoF 4, Damage

1d cut, ½D 3, Max 15. Use the laser autofire rules (see p. 47) – against a person or moving target, it only does 4d if all four shots hit! It uses a C cell, which lasts for 60 seconds. Cost is $250 and weight is five pounds.

Tool Kits (TL8+)

Tool kits exist at all TLs; this section covers those for TL8+. Normal tool kits do not drop in price or weight as TL increases, nor do they gain in effectiveness. As gadgets get more complex, so do the tools required to fix them. Any attempt to repair equipment of a higher TL than the kit has a -2 per TL difference penalty.

Anyone attempting repairs without one of these kits does so at -5 to skill. Each type of kit must be purchased separately, though a user may "make do" with one of the others at a -3 penalty.

All tool kits contain several power cells, but the cells found in salvaged kits are likely (GM's decision) to be partially or completely used already.

Portable Shop (TL8+)

An elaborate version of the basic tool kit (below), it is equivalent to a repair shop on a small starship. It has everything necessary for emergency repairs, plus a wide range of spare parts that can be tooled to specific requirements. It adds +2 to the user's skill. It will have 2d AA, A and B cells, 1d C cells, 1d-2 D cells, and 1 E cell. A Mechanic, Engineer or Armoury shop costs $4,000, weighs 3,000 pounds and has a volume of five cy. Electronics shops cost $7,000, weigh 1,500 pounds and have a volume of 4 cy.

Basic Tool Kit (TL8+)

The standard tool kits for engineers, mechanics, armorers and electronics technicians, allowing major and minor repairs to be made at no penalty on skill. Any kit includes a few devices requiring small power cells, and is therefore a good source of extra cells in a pinch – roll 1d+2 for the number of AA cells, 1d for the number of A cells, 1d-2 for B cells.

Mechanic or Engineer tool kits cost $800, weigh 300 pounds and have a volume of ½ cy as cargo. Armoury or Electronics kits cost $1,200, weigh 100 pounds and have a volume of ¼ cy.

Portable Tool Kit (TL8+)

A smaller version of the basic tool kit, it fits into a case or backpack and weighs 20 pounds for Mechanic or Engineer kits or 10 pounds for Armoury or Electronics kits. Major repairs can be made at -2 to skill, and minor repairs are at no penalty. It contains 1d+2 AA cells, 1d A cells and 1d-3 B cells. Cost is $600 for Mechanic or Engineer kits, $900 for Armoury or Electronics kits.

Mini-Toolkit (TL8+)

This is a small, belt-sized tool kit. Routine repairs can be made with one of these at only -2 to skill. Major repairs are at -4 when using a mini-toolkit. Roll 1d for the number of AA and A cells in the kit, 1d-3 for B cells. Cost is $400 and weight is 2 pounds.

Construction Foam (TL9+)

When construction foam is exposed to air it expands and hardens instantly, creating a lightweight but durable wall. It is often used by riot police and soldiers to create barriers or bunkers, and as it is fireproof, by firefighters to form temporary firebreaks. When sprayed on a person it acts as a tangler hit, though the victim will soon suffocate if he cannot break free (see p. B122) and anti-tangler aerosol is useless. Used as a weapon, a foam sprayer defaults to Beam Weapon (Flamer)-4. It has SS 5, Acc 2, and a maximum range of six yards. It sprays two cy of foam (enough to cover one hex) per turn.

Construction foam is fireproof, waterproof and lighter than most liquids (it is used for life rafts). It is permanent, but a cubic foot can be chipped away in about an hour. A 14-pound tank of construction foam can fill ten cubic yards. A one-foot thickness of foam (the minimum to create a stable vertical wall) has DR 4 and HT 30. Each extra foot adds 5 to HT. The skill to properly use construction foam is usually a professional skill. Construction workers, fire fighters, flood control specialists and riot-control police are all taught to use it. The amount of actual practice they get depends on their particular job.

A loaded sprayer costs $100 and weighs 22 pounds. Spare tanks cost $40 and weigh 14 pounds apiece.

Cybertek (TL9+)

Looking like a gigantic metallic spider, a cybertek is a semi-portable, automated repair shop. It will attempt to fix any piece of broken or damaged equipment, using its sensors and programmed repair manuals to diagnose the problem, then repairing it with its tool-equipped waldoes. It has a bay containing a wide range of "generic" spare parts that can be tooled to specific requirements.

A cybertek is controlled by a dedicated computer with a skill level of 13 in Electronics/TL, Mechanic/TL and Armoury/TL, +1 per TL over 9. However, it can only maintain and repair devices that are in its database (or closely related). If it encounters a problem it can't fix, it calls for human help. If a human technician is directing a cybertek, it is as good as a Portable Shop (see above) with an additional +2 bonus due to its extensive technical database and usefulness as an automated assistant. Cost is $30,000, weight 800 pounds and volume 5 cy. It uses building power or runs for six months on an E cell.

Monowire (TL9+)

A practically invisible strand of monomolecular thread, monowire is capable of supporting up to 500 pounds. A standard spool of 100 yards weighs ½ pound and costs $1,000, and comes with a BPC handle on both ends of the wire to facilitate use. Monowire can also be strung to create effective traps – any roll to see monowire requires a Vision roll at -4, or -1 if looking for it. Anyone walking through a monowire "spiderweb" will take 2d cutting damage per strand (1d if moving very slowly or 3d if running); armor only protects with ⅙ its DR. Care must be taken to avoid injury when stringing monowire, since it is hard to see and cuts almost anything. On a critical failure when using it (for climbing, traps, etc.) the user has cut himself, taking 1d cutting damage to the hand; armor protects at ⅙ DR. Monowire itself has DR 10 and HT 1.

Power Glove (TL9+)

A miniaturized exoskeleton covering the hand and forearm, often used for construction work, it gives an effective ST of 20 for crushing, gripping and holding (including strangling) but not for lifting or melee damage. If the user gets a grip on something he can do 2d-1 crushing damage each turn.

The glove can be set on "auto-grip," which makes it "freeze" in any desired position; the user can even slip his hand out of the glove and leave it clamped onto something. It can be programmed to release its grip after up to ten hours have passed.

The glove protects the hand with PD 3, DR 25 (+15 per TL above 9), and can be worn in place of armor gloves. It takes three seconds to put on a power glove. When using the gloved hand, roll against DX for ordinary DX rolls; for other DX-based skills, roll against skill-1. A power glove runs off a C cell for up to ten hours of continuous use. Cost is $2,000 and weight is two pounds.

SONIC PROBE (TL9+)

The sonic probe has enough legal uses that possession of it is usually not enough to make a case for possession of burglar's tools. This makes it a favorite of low-grade burglars and street punks. A shakedown of any startown street would probably produce at least one sonic probe for every two people.

The probe is a multipurpose sonic tool the size of a cigarette package. It generates a low-intensity, focused beam of sound waves useful for cleaning delicate objects, combing hair or brushing teeth. It also has other uses.

It can be used to pick mechanical or electronic locks. It gives +3 to Lockpicking with TL9 or lower locks, but no bonus at higher TLs. Above TL9, locks are automatically designed to resist sonic probes.

Its vibrations can be very precisely tuned. When linked to a Complexity 3+ computer, it can be used as a short-ranged ultrasonic scanner. The computer requires a Sonic Probe Readout program (Complexity 1, cost $300) and a screen on which the result can be seen. This will give the user a rough image of the interior of objects or containers. It has a maximum range of six inches and is -1 to skill (roll against Electronics Operation/TL (Sensors)) for each 10 DR it must penetrate. A sonic probe runs for two months of continuous operation on a B cell. Cost is $1,500 and weight is a quarter pound.

Possession of a sonic probe is legal almost everywhere (Legality Class 6). Only the most paranoid and repressive of societies outlaw the useful, and usually innocuous, tool. Criminal *use* of a sonic probe is another matter; theft is still theft regardless of the tool. In many jurisdictions, picking a lock or scanning a container with a sonic probe aggravates the offense, resulting in a longer sentence, stiffer fine or more crippling mutilation (depending on local customs).

BIOPLASTIC (TL10+)

Bioplastic is a tough, flexible material – but it is alive. Every square inch of it contains electrically-active muscles, fibers and nerve endings. A coded electrical impulse can command these muscles to move – an item constructed entirely of bioplas can, within limits, change its shape! Bioplastic is very resistant to damage. If it has access to normal air and solar radiation, it can repair itself, healing any damage it has suffered at 1 HT every six hours.

Bioplastic items in regular use at TL10 include reflex armor (p. 76), the exploration suit (p. 26), the survival module (p. 24) and the Nightwing ultralight (p. 115). At TL11, entire houses can be made of bioplastic.

Bioplas typically has PD 2, DR 15.

MINIFAC (TL10+)

The minifac, or fabricator, is a miniature robotic factory. Given proper programming, minifacs are capable of making, repairing or modifying most manufactured goods, if parts (sheet metal, circuit boards, chemicals) are available, without human supervision. Spaceships and small space stations (orbital science labs, etc.) often have minifacs to fabricate spare parts and miscellaneous gadgets. Start-up colonies (a few hundred people) may purchase a few minifacs rather than a bulky and expensive robot factory.

Minifacs require databases with the appropriate information; see p. 34. Construction data for illegal devices (military lasers, etc.) will be very hard to come by, though a good programmer who is also a technician could write one himself given enough time.

Minifacs do not have facilities for mass production; they are designed to produce a wide variety of high-tech items in *small* quantities. The GM must be the judge of how long any one item takes to build. If it has access to new, packaged parts for everything it needs, one hour per $500 of value, excluding the value of decorations or special materials, is about right. If it is working from scrap or salvaged materials, one day per $500 would be more appropriate. Cost when working from parts would be about 60% of base price. But since full-size robofacs produce items for half that, and merchants buy in bulk at a 50% or greater discount, owning a minifac does not mean you can get rich quick.

A minifac can start a whole adventure just by flashing a red light and announcing that it can't finish the current project until you give it three ounces of selenium and a quarter-carat gem-quality ruby.

At TL10, minifacs can produce goods up to TL9. At TL11, minifacs can cheaply produce TL10 goods. At TL12+, minifacs may produce items of their own TL.

Minifacs cost $110,000 and weigh ½ ton. They take up 6 cy as cargo or when mounted in a ship; they usually use building power, but can operate for a week of steady use on an E cell.
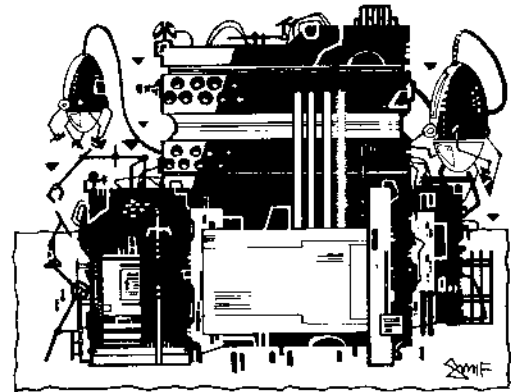
ROBOFAC (TL10+)

At TL10 and above, a single factory is capable of producing almost any device for which it has instructions. A full-scale robofac covers several city blocks, requires years to set up properly, and costs billions – but it makes the difference between a civilized planet and a colony world. At TL12+, a very rich colony expedition, carrying clone tanks and an advanced robofac, can develop a world in an astoundingly short time.

Viral Solvent (TL11+)

See p. 84.

Industrial Replicators (TL13+)

At TL13, most industrial production is handled by molecular-sized machinery designed and controlled by AI computers. The process is the same whether a power cell or a cybersuit is being made. A sealed chamber, its size depending on what is being built, is filled with appropriate raw materials, and the computer is given appropriate instructions. Countless self-replicating microscopic robots swirl into the tank, and begin building the object from the inside out, constructing more or larger robots as necessary to finish the job. When it is completed, the object is totally seamless, with no tool marks, rivets or other evidence to show it was manufactured – it seems to have been *grown*.

Living Metal (TL13+)

For double its normal cost, any piece of equipment, from a personal force screen to a neutrino communicator, can be made of *living metal*. Living metal devices are constructed by the same process described above, but the microscopic construction robots remain active within the object after it is built. Unless the object has been totally destroyed (takes five times its hit points in damage), any damage to the object will be regenerated in a matter of hours. Living metal items heal at 1 HT per hour per ten pounds (or fraction thereof) of weight.

Living metal can rebuild itself at this speed if no parts are missing. If part of the original device is missing, but the proper material is available very close by, the construction robots can use it to replace missing parts; this halves the "regeneration" speed for that percentage of the device that must be rebuilt from scratch.

Implications of this include:

♦ Any broken fragment of a living-metal device can regrow the whole device under the right circumstances.

♦ It is dangerous to set a broken living-metal device on a metal surface; you may return to find the device repaired, or partially repaired, and the surface pitted where the robots took material from it!

♦ A million-year-old device made of living metal will seem as new as the day it was first built; corrosion, etc., will have been repaired as quickly as it occurred.

Powerful radiation (more than 1,000 rads in a single burst, or more than 500 rads/hour over an hour) can "kill" the robots, eliminating their self-repair capacity. Worse, it might "mutate" them, causing them to rebuild the device *differently!*

Molecular Bonder (TL15+)

A molecular bonder is a small tool which can also be used as a weapon. It projects a wide beam that instantly bonds two objects together, regardless of their composition. In order for it to work, the two objects must be touching each other, and within range and line of sight of the device. It projects a beam that alters the surface molecules of all substances it contacts; it can affect 25 square inches of material per turn.

If used in combat, roll to hit: SS 7, Acc 2, RoF 1, ½D – , Max 2, using Beam Weapons (Flamer)-2 skill; misses may have unforeseen effects if the wrong things were bonded together. The strength of the molecular bond is limited by the strength of the weakest of the two objects (so flesh bonded to something else could be torn away, taking a hit or two of damage). It uses a C cell which gives 20 uses. Cost is $3,000 and weight is two pounds.

Universal Tool (TL15+)

Made of living metal (see above), this pocket-size device is capable of reconfiguring its shape into a variety of small tools, enabling it to function as a mini-toolkit (see p. 16) for *any* Armoury, Electronics, or Engineer job at any TL, or become a sonic probe (see p. 17). Shifting shape takes two seconds. If a full-sized repair kit is lacking, routine repairs can be made with one of these at only -2 to skill. Major repairs are at -4. Using a universal tool to repair equipment of one higher TL is at a further -2. Cost is $1,200 and weight is two pounds. It runs on a C cell for six hours of use.

SENSORS, VIEWING AIDS & SCIENTIFIC GEAR

Technology advances only because of new scientific discoveries; but to make new discoveries, one must first have tools that are capable of observing and analyzing new phenomena. Of course, scientists aren't the only ones who have an interest in finding things out . . . Police and criminals, spies and soldiers all have a vested interest in knowing more than the opposition, and advanced sensors and viewing aids can provide that crucial edge. This section presents devices that extend the range of human sensory perception, either by amplifying it (viewing aids) or broadening the spectrum (sensors), as well as scientific equipment.

SENSORS

Chemsniffer (TL8+)

See p. 91.

Seismic Sensor (TL8+)

This is a detector sensitive to vibrations carried through the ground. It requires 20 seconds to set up. Sensor information is displayed on a fold-out monitor screen, or it may be linked to a HUD. On a successful Electronics Operation (Sensors) roll it can detect explosions or heavy vehicles and giant animals (such as trucks, mecha or dinosaurs) at up to 1 mile. Lighter vehicles or large animals (such as horses or automobiles) can be detected at up to 700 yards, and people on foot within 100 yards. A dedicated computer distinguishes between different types of vibrations. Range doubles at TL9. Add bonuses for large numbers of vehicles or individuals, and subtract penalties for trying to detect objects outside normal range. A detection roll is allowed every ten seconds of operation.

Individuals may attempt to fool a sensor by moving carefully in a random pattern, so that their footfalls do not sound like a person walking – roll a Contest of Stealth vs. the operator's skill to escape detection.

Seismic detectors are also used to predict earthquakes. A successful skill roll (vs. the lower of Electronics Operation (Sensors) or Geology skill) detects an impending tremor up to one minute in advance per point the roll was made by. This success will give a rough idea of the 'quake's magnitude. Seismic detectors can map subterranean caverns by analyzing reflected shockwaves from

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explosions. Several sensors (for triangulation) and a Geology skill roll are needed to create an accurate map. One B cell operates a detector for two weeks. Cost is $1,000, weight is three pounds.

X-RAY SCANNER (TL8+)
See p. 91.

MEDSCANNER (TL9+)
See p. 94.

SCANNERS (TL9+)

Scanners are highly-sophisticated, hand-held sensors, each designed to locate and identify one sort of thing. A scanner allows a roll on Electronics Operation/TL (Sensors) skill to detect its general category of item within its scanning range of 1,000 yards; one roll is allowed every ten seconds. If set to pick up a specific item within its category, it searches at -2 to skill (or more, if the user is not exactly certain what he is scanning for), but can detect the item up to 2,500 yards away. Large concentrations can be detected at up to twice these distances. More specific data can be picked up at ranges of 500 yards or less on a roll at skill+2. The device can be used for detailed analysis of an item within 50 yards, but the user must roll against the appropriate scientific skill to properly interpret the data.

Scanners may be set for a specific area sweep, which lets the user scan a 60-degree arc each turn at the ranges listed above. A scanner can be set for a 360-degree scan instead, but all listed ranges are divided by 5. Changing the setting takes one turn.

A bio or chem scanner is blocked by solid walls. If using *GURPS Vehicles*, all chem, bio, rad or multiscanners have a scan rating equal to 2 times (TL-4) and use the multiscanner rules from p. 174 of *Vehicles*.

Three types of scanner are available:

Radscanners (TL9+)

These scan for energy, power and radiation sources of all kinds (including radar and radio signals, not just radioactivity). Radscanners can also pick up the scanning radiation of the other types of scanners, but radscanners are passive detectors and cannot be scanner-detected themselves. Along with chemscanners, radscanners form the basis of most starport security systems. They can detect a D cell (such as a weapon's) within 500 yards on a roll against skill+2. Modifiers are -11 for an AA cell, -8 for an A cell, -5 for a B cell, -2 for a C cell, and +3 for an E cell. For multiple-cell arrays, roll for each cell. Any *operating* power cell (such as an activated vibroblade) will be detected automatically. Weapons that use only A or AA cells – Gauss needlers and holdout lasers, for example – are very hard to detect. Military and holdout weapons are routinely equipped with countermeasures to

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defeat radscanners; they give a -2 on detection chance, and add $500 to cost (already included in the cost of holdouts).

Chemscanners (TL9+)

These scan for minerals, metals and chemical compounds. They can detect even a single round of unfired TL7 chemical-propellant ammunition within 500 yards on a roll against skill+2; a pair of scanners can triangulate the location. Larger amounts of chemical explosive are detected automatically. However, their battlefield use is limited, since their scanning radiation is easily detected by radscanners. A chemscanner is often used by customs or security forces to detect drugs and alcohol, usually on a roll of skill+2 or less (modified by the amount). The computer (or operator) compares the readings with a list of proscribed substances, and if they match, sounds the alarm.

Bioscanners (TL9+)

Bioscanners are highly-specialized chemscanners that locate the characteristic complex molecules produced by life-forms. They are sophisticated enough that they can be set to locate humans rather than animals, or even a particular species. If a person's genetic pattern has been previously scanned (requiring "detailed analysis" at 50 yards or less range) or is in a computer database linked to the scanner, a bioscanner can even be set to detect a specific individual. Since their radiation is detectable by radscanners, their battlefield use is limited, but this capability gives criminals and guerrilla fighters a lot of headaches – specifically-programmed bioscanners mounted at check points, or carried by security forces can quickly detect a wanted criminal or guerrilla leader. Outlaws guard their genetic patterns as well as their faces, and hope no one who knew their identity ever got close enough to make a full genetic scan. They guard themselves as though they were afraid of a witch's curse; even a fragment of skin or a few drops of blood would be enough for a genetic scan.

At TL10, all scanners have double range and give a +1 bonus to skill. At TL11+, they have five times range and a further +1 to skill for each added TL. Any type of scanner can be linked to a hand computer or (by radio) to a larger computer for more detailed information or analysis. Individual scanners are about the size of a pack of cigarettes. A scanner gets two months of constant operation on a B cell; in practice, one cell will last for years. Cost is $1,000 and weight is one pound.

Multiscanner (TL9+)

Combines the functions of all three scanner types, plus its own dedicated computer (+1 on science rolls to interpret data) and a data recorder. Includes a short-range communicator for linking with a larger computer. About the size of a 20th-century cassette recorder, it can be hooked to a utility belt or carried on a shoulder strap. It works for one month of continuous operation on a B cell. $5,000, 5 lbs.

BIOHOUND (TL10+)
See p. 91.

ULTRASCANNER (TL12+)

An ultrascanner takes X-ray holograms of the interiors of any object (vehicle, house, person, etc.). It can scan and record one cubic yard per second. When an object has been totally scanned, it assembles a three-dimensional hologram of the object's interior structure on a standard computer disk. By plugging the disk into a

computer (or by datalink with the scanner) and projecting it, the user can instruct the computer to "peel away" layers of material like an onion skin to view the object's interior. Ultrascan has a range of 500 yards at TL12, doubling at TL13+. It will not work through a force screen, but scanning is possible through a deflector field. Larger ship- or vehicle-mounted models, with a proportionately longer range, are possible. A successful Electronics Operation (Sensors) roll is required to make a clear scan; subtract any modifiers for distort fields (see pp. 86 and 90). Failure means that the scan must be repeated. An ultrascanner uses a C cell, and works for five minutes of continuous use. Cost is $8,000 and weight is ten pounds. An ultrascan of an object fills 0.1 gig of memory in a disk or computer per cubic yard scanned.

VIEWING GEAR

Anti-Glare Goggles (TL8+)

These are polarized goggles that darken automatically to cut glare and ultrabright light, allowing direct viewing of the sun without risk of blindness. They protect the wearer's eyes against laser flash or flares, adding +5 to HT to resist light blindness. Cost is $150 and weight is ½ pound.

Infrared Goggles (TL8+)

These extend the wearer's vision into the infrared portion of the spectrum, enabling him to see varying degrees of heat. The wearer can see in absolute darkness if there is a 10-degree temperature difference between objects. No matter what the temperature, the wearer suffers only a -1 penalty when fighting at night due to the heat emissions from living things or active machines. The goggles give a +2 to see any living beings during daylight if the wearer is scanning an area visually. They also allow the wearer to follow a heat trail when tracking, adding to Tracking rolls on a fresh trail (+3 if less than ten minutes old, +2 if less than 20 minutes and +1 if less than 30 minutes). However, a powerful heat source will mask lesser heat sources behind it. Infrared visors are available at the same weight and cost. They work for six months on an A cell, cost $600 and weigh ½ pound. If using *GURPS Vehicles*, see *Vehicles*, p. 171 for more information.

Light-Intensifier Contacts (TL8+)

A pair of contact lenses which pick up and amplify any available light (even starlight). They halve any penalty for darkness
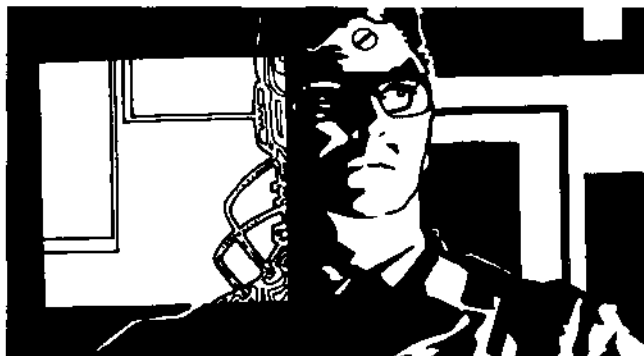
(round in the user's favor) except complete darkness. They burn out if hit by a laser! They work two weeks on an AA cell and cost $300; weight is negligible.

Multi-View Goggles (TL8+)

These are combined infrared, light-intensifier and anti-glare goggles. They work for three months on an A cell, cost $1,200 and weight is 1.5 pounds. They may be added to a helmet for the same price and weight.

Televiewers (TL8+)

These are electronic binoculars that provide an extremely sharp, computer-enhanced image. Magnification can be adjusted from 5× to 50×. Included is an electronic range finder accurate up to 5,000 yards. Such a range finder gives +2 to Gunner or Forward Observer skill if used with artillery of TL6 or below, which does not normally have such accurate distance measurements. Infrared or light-intensification (see above) can be built in at $300 extra each. The binoculars get three months continuous operation on a B cell. Cost is $950 and weight is two pounds.

Infrared Contact Lenses (TL9+)

These appear to be normal contact lenses, but they have the same effect as infrared goggles (see above). Cost for pair of lenses is $300.

Nightshades (TL9+)

These appear to be normal sunglasses, but combine the functions of infrared, light-intensification and anti-glare goggles (see above). Cost is $600, weight ½ pound and power, for six months, is an A cell.

Sensor Visor (TL10+)

A sensor visor comes in goggle or helmet-visor models. In visual mode, it provides light-intensification and anti-glare features, halving any penalty for anything but total darkness, and automatically cutting out glare and ultrabright light. It projects crosshairs on the point that the user is focusing on, automatically using computer image enhancement to bring whatever is being looked at into sharper focus. If desired, the user can verbally order the visor to increase magnification from 2× to 100×. Anyone wearing a sensor visor gets a +3 on any Vision rolls. The visor can also be switched to infrared, providing a thermal image even in complete darkness if the target produces heat (as do most living things and machinery). In this case all sight and weapon rolls are at -1, due to the slight distortion when seeing IR. A sensor visor works for a month on a pair of B cells. It weighs 2 pounds and costs $1,500.

Macrovisor (TL13+)

Macrovisors are helmet or goggle-mounted devices that combine the function of multiscanners (see p. 19), sensor visors (see above) and ultrascanners (see p. 19). They have five times the range of earlier scanners, and give a +4 to skill. Macrovisors weigh two pounds and cost $2,000.
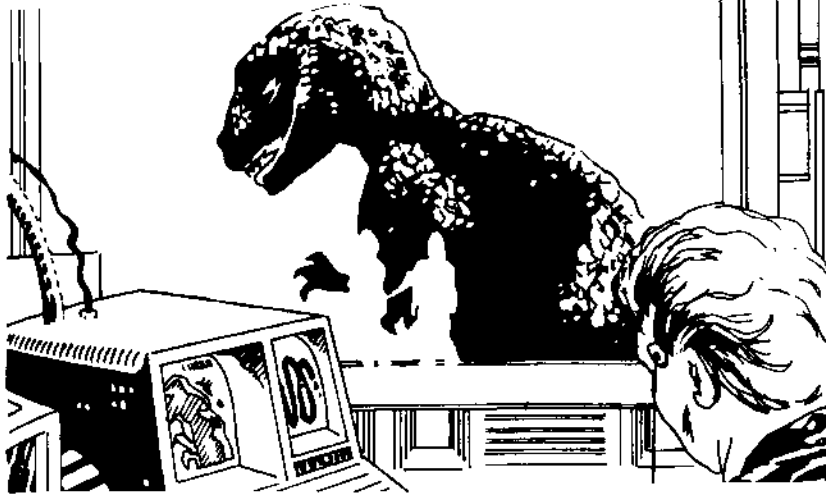
SCIENTIFIC AND SURVEY TOOLS

RADIATION DETECTORS (TL6+)

Film Badge (TL6+)

A film badge turns dark in the presence of radiation, showing doses from .1 rad to 200 or better. It should be checked and changed often. Cost is $100 for a box of 100; they are available at TL6 or above.

Radiation Alarm (TL7+)

This sets off an alarm if radiation reaches a designated level. It is adjustable from .01 to 2 rads. It does not tell the actual radiation level. The alarm can be audible, visual or any other signal or combination. Cost is $50 and weight is ¼ pound.

Wristwatch Rad Counter (TL8+)

This has a display to indicate the radiation level. The same unit may be built into a helmet visor (it displays information on a HUD if one is installed). Cost is $100 and weight is ¼ pound.

INERTIAL COMPASS (TL8+)

See p. 22.

TRACER NEEDLE (TL8+)

See p. 91.

BIOSAMPLER (TL9+)

See p. 23.

SCANNERS (TL9+)

See p. 19.

TIMESCANNER (TL15+)

A timescanner is a device which can be used to see into the past; it is useful for archaeologists, detectives and genealogists. When activated, it provides a holographic image of whatever is occurring within a two yard radius centered around the scanner, at some point in the past. Nothing outside that area can be seen – it can't be used as a "window" to scan the surrounding landscape. The place being scanned is relative to the nearest large mass (large being continent-sized). Thus, a timescanner can only be used to scan planetary surfaces.

A timescanner must be set for an arbitrary point in time in the past, e.g., 31 years, 84 days, 11 hours and 50 minutes ago. Make a skill roll against Electronics Operation (Sensors). A successful roll means the scanner has locked onto the correct period. Failure means that the mark was missed by 10% times the amount failed by (plus or minus, roll randomly). A critical failure means that it could be seeing anywhere . . . Other than actual evidence (why are they wearing togas – are you sure this is 1945?) there is no way to tell *when* the scanner is actually focused, only *where* — the same place it is in the present.

The more distant the period to be scanned, the longer it takes the scanner to reach it. It takes 90 minutes to focus on something within the last 24 hours, three hours to focus on something within the last six days, six hours to focus on a point three months distant, twelve hours to focus on a point within the last two and a half years, 24 hours to focus on something within 25 years, two days to focus on something within 250 years, and so on. Each tenfold increase in temporal distance doubles the amount of time that it takes the scanner to reach that period.

After the scanner is ready, it will project the visual image of the area occupied by the scanner, and continue in "real time" until deactivated. This can be unhelpful if, in the time being scanned, the area presently occupied by the scanner is filled with solid material.

For example, archaeologists take a timescanner to the ruin of an ancient palace. They set it up, and choose to go back to a day exactly 3,200 years ago, the approximate date it was built. It takes four days for the scanner to reach back that far (whether it shows brief glimpses of intervening periods is up to the GM), then it starts relaying images. The scientists used astronomical data to make sure they focused in during the early morning. What they see is two halves of different rooms – a wall once bisected the area now occupied by the scanner. One is furnished, a bit of rug extends out, and the corner of a chair. In the other, they can see half a bed with the bottom half of someone sleeping under a fur cloak. If they want to see more, they would have to wait for someone to come into the timescan field (perhaps hoping the sleeper would get up and move into view), or they could try again, either resetting the time (by as little as a few hours, perhaps) or physically moving the scanner itself.

A timescanner uses a pair of E cells, which can power it for 16 days of continuous scanning. It costs $800,000, weighs five tons, and occupies eight cy.

ADVENTURING GEAR

Technology allows adventurers to explore more and more exotic locales by giving them new means to find their way around and survive in such unusual or hostile environments. This section covers *Exploration Gear*, such that used for "outdoor activities" like climbing, diving or orienteering; *Survival Gear*, which is basically camping and emergency equipment; and *Life Support Equipment*, for minute-to-minute survival in truly hostile environments — such as outer space. Exploration vehicles are covered in Chapter 10, *Transportation*.

EXPLORATION GEAR

AUTOGRAPNEL (TL8+)
See p. 83.

BIPHASE ROPE (TL8+)
See p. 15.

DEPTH GAUGE (TL8+)
For diving. The gauge is wrist-watch size. It runs off an AA cell for a year, costs $40 and weighs ¼ pound. The gauge may be inset into the goggles of a wet suit.

INERTIAL COMPASS (TL8+)
This hand or belt unit indicates the direction and distance traveled from any preset point on a planetary surface. It can be set for the location at which the user is physically present, or for any other coordinates (requiring a Navigation roll if coordinates of the location aren't known). Distances measured are accurate within 1 yard/1,000 miles. It must be calibrated for the planet (taking one hour with a personal computer and a Navigation or Electronics Operation roll). The compass uses an A cell. Cost is $250 and weight is one pound.

ROCKET PITON (TL8+)
A pistol-grip, disposable launcher which fires a rocket-propelled, explosive-set piton. It is used to project an attached line up to 200 yds. — a successful Climbing roll (made by the GM) means the piton is securely lodged and will support weight; a critical failure means the firer only *thinks* it is! Roll vs. DX-4 to hit if used as a weapon; SS 15, Acc 5. Damage is 1d+2 imp for the stake, ½D 50 yds. (affects Acc only, the stake does the same

damage at any range). Max 200 yds. Cost is $40 and weight two pounds.

WET SUIT (TL8+)
A wet suit is a one-piece, ultralight underwater suit. It covers the user's entire body, with goggles and a face mask for attaching an artificial gill or air tanks. It insulates the wearer against cold (+5 to HT rolls against cold) and incorporates ballast sufficient to keep the diver at any depth he wishes. Fins add 25% swimming speed (or +1 to swimming Move, whichever is greater). The suit has PD 0 and DR 1. HUDs, vision gear, radios, etc. may be added to the suit at extra cost. It takes two minutes to put on or remove the suit. Cost is $200 and weight is five pounds.

Military Wet Suit (TL8+)
This incorporates a thin layer of monocrys, with PD 2, DR (PD 1, DR 4 vs. impaling) over the whole body except the face (location 5 from the front). The face mask and goggles are transparent armorplast (PD 4, DR 10). Goggles may be fitted with HUDs, vision gear, radios, etc. Cost is $700 and weight nine pounds. At TL10, the suit may be made of bioplastic. Cost is $2,500, but suit and mask are PD 2, DR 15, and weight is a mere 6 pounds.

MODULAR CAGE (TL9+)
This kit allows the user to assemble any size or shape of cage with a maximum volume of ten cubic yards. Assembling a cage takes one minute per cy of volume; cages may be combined to build a larger one. Traps/TL skill is required to build anything but a simple cubical cage. Cage bars are ½" in diameter and made of padded BPC; they have HT 4 and DR 20. Cost is $5,000. Volume when disassembled is one cy; weight is 200 pounds.

Environmental Cage (TL9+)
This is also a kit, but it takes three times as long to put together. Once assembled the cage is sealed and has an independent life support system which can duplicate and maintain nearly any planetary environment (except for gravity). A small airlock (six inches across) allows access for feeding. It operates for one month on a D cell. Cost is $50,000. Volume disassembled is three cy; weight is 600 pounds.

MONOWIRE (TL9+)
See p. 16.

SPINNERET (TL9+)
See p. 84.

SLICK SUIT (TL10+)
This is a thin, full-body stocking, gloves and detachable hood, with an outer-surface layer of very-low-friction material. The wearer can swim extremely fast, slip out of restraints and is very hard to grapple. The suit is usually worn with slippers with normal friction soles, and its gloves detach in two seconds, permitting normal grip.

Wearing a slick suit gives +3 to Move while swimming and +3 to Escape (including rolls to escape a tangler round). However, if the wearer is climbing, subtract 4 from effective skill since only the palms of the hands and soles of the feet may be used, and a slip is more likely. Riding is also at -4; riding bareback is at -8! The suit has a PD of 7 against lassos, bolas and so on (or gives +7 DX to resist being grappled) and PD 1 against all other weapons. It has a DR of 1 against any attack.

Slick suits are principally used for underwater exploration or infiltration missions. The suit takes ten seconds to put on; it is harder to remove, requiring a DX-1 roll and 15 seconds (repeat on failures) to do so. A standard slick suit costs $700 and weighs four pounds. For an extra two pounds and $900, the suit may have an inner layer of ballistic bioplastic; PD remains the same but DR becomes 15.

A slick-suit surface may be added to any vacc suit or suit of combat armor. Use the armor's DR, and whichever PD is highest, depending on the individual attack. It cannot be added to a suit equipped with a chameleon or intruder surface until TL12. Slick suiting adds $1,000 to cost and one pound to weight.

GRAVPACK (TL12+)

This is a monocrys-fabric backpack fitted with a contragrav generator to screen the interior of the pack from the planet's gravitational pull. Weight carried in the pack, up to a maximum of 120 pounds, is not counted toward encumbrance. Due to its bulk, only one can be worn at a time. However, while weight is canceled, mass is not; with the generator activated, the user will be at -1 DX per 40 pounds carried until he gets used to dealing with the load's inertia without its weight. If the same mass is worn in a pack for more than a day, the penalty can be ignored. The pack itself weighs 15 pounds with the generator off and costs $2,000. It works for 12 hours on a C cell.

SURVIVAL GEAR

ENVIROBAG (TL8+)

This is an insulated and heated sleeping bag designed for extremes of temperature. Using a C cell, it works the same as a Heat Suit (see p. 25). It can be sealed and hooked up to air tanks. It folds to the size of a paperback book. The bag is $75 and weighs six pounds; the temperature control unit costs $50 and weighs one pound.

ENVIRO-BUBBLE (TL8+)

This inflatable bubble, with self-sealing flap, can be erected and inflated in four seconds (make a Fast-Draw (Enviro-Bubble) roll to halve the time) and provides 15 minutes of air. It also floats, and is flexible enough to move in, but at a Move of 1. It is usually worn on the belt for quick activation. It can be hooked to air tanks or a temperature control unit. Cost for the bubble and inflator is $800; weight is five pounds.

FILTRATION CANTEEN (TL8+)

This canteen will purify and hold a quart of water. It removes almost all impurities, microbes and poisons but there is always the possibility of a contaminant for which the filter was not designed (GM's option)! It takes 30 minutes to purify a quart of water. Filters must be replaced every 100 quarts; a color change

signals this. An "exhausted" filter still has a few quarts of capacity, but only the GM knows how many. Cost is $175; weight is one pound (empty) or three pounds (full). Replacement filters cost $25 per set.

PRESSURE TENT (PERSONAL) (TL8+)

This is a completely airtight tent, strong enough to be inflated to one atmosphere in a vacuum. The user(s) must have an air supply with them! Opening it completely evacuates all the air in the tent; entering or leaving through the one-man lock takes one minute. Cost is $500 and weight 15 pounds for a one-man tent; $1,500 and 30 pounds for a two-man tent; $5,000 and 150 pounds for an eight-man tent.

VAPOR CANTEEN (TL8+)

This canteen actually draws moisture from the atmosphere, as long as there is any water vapor at all. It extracts and holds one quart of water. Time required varies with the amount of water vapor in the air – with an Earth-standard humidity of 50 percent, it takes four hours to extract a quart of water. The canteen extracts 100 quarts on a B cell. Cost is $450; empty weight is two pounds; filled it weighs four pounds. Larger versions are available for use at base camps. $3,000 buys a one-cubic-yard version that weighs 300 pounds, runs a month on an E cell and makes a quart per five minutes in 50% humidity.

The large-size vapor system is standard for expeditions and military and police outposts; it frees them from the necessity of establishing a post near a water source. Sabotaging the vapor system is a favorite ploy of villains in kiddie adventure stories. The plot is so hackneyed that real adventurers laugh at it, and may not be prepared if it happens.

BIOSAMPLER (TL9+)

This specialized biochemical analyzer determines if a potential foodstuff is edible or nutritious, detects harmful microbes, trace elements or poisons. It incorporates a dedicated computer that interprets results with a Biochemistry/TL skill of 14, or adds +2 to the user's own skill when doing so; add 1 to skill per TL over 9. It uses a B cell, good for three months of continuous operation. Cost is $500 and weight is one pound.

PESTGUARD (TL9+)

SURVIVAL COCOON (TL10+)

Similar to an enviro-bubble (see above), this is a pressurized, one-man inflatable sphere. It takes two seconds to get into and provides 15 minutes of air. Once this runs out, it has an emergency hibernation system. The user hooks up the life-support connections (which takes one minute, or 30 seconds if someone else does it for him), and then floods the cocoon with life-support gel, which places the user into hibernation. While in the cocoon, the user ages at a rate of one month per year. The cocoon can sustain its occupant for months or even years. Each month, a HT-3 roll is required; failure results in loss of one HT due to slow dehydration, lack of nutrition and exercise, etc. Most cocoons include a powerful, constant radio beacon (detectable from orbit, or at

ranges of hundreds of thousands of miles in space) which will last for ten years on a C cell. Cost is $8,000 and weight is six pounds. It may be worn as a backpack for quick activation.

One of the more exclusive societies among space adventurers is the Caterpillar Club. The only requirement for membership is to have survived a minimum of one year, in a life-threatening situation, in a survival cocoon. Members wear a stylized caterpillar insignia; they are considered lucky and get a +1 reaction from spacemen. (On the other hand, anyone with two or more caterpillars may be a Jonah; he gets a -1 reaction!)
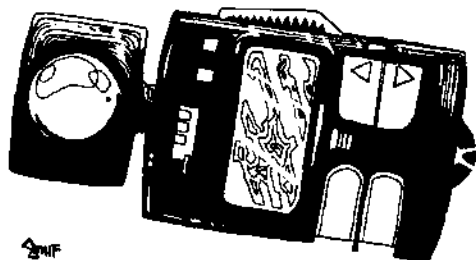
SURVIVAL MODULE (TL10+)

A bioplastic box the size of a hardcover book. When activated, it draws air out of the surrounding environment and inflates itself, becoming a comfortable two-person cabin (holds four in a pinch), with transparent plastic windows, pull-out inflatable tables, chairs and beds, and an airlock door (takes four seconds to cycle). It is pressurized, with a complete life-support system including an air filter and reducer/respirator. If oxygen is unavailable, air tanks will be required. The survival module's only disadvantage is a tendency to blow away in a strong wind when set up but not occupied, but it can be weighted or tied down. It uses a C cell (for three months of operation), costs $600 and weighs four pounds.

SURVIVAL FOAM (TL11+)

This can be used to encase someone in a fast-hardening foam to creating a life-sustaining cocoon. A can of survival foam will seal someone in hibernation for up to 72 hours, even in hard vacuum or temperature extremes from -200 to 400 degrees. It takes five seconds to harden (making the foam useless as a weapon); the user experiences an unpleasant drowning sensation combined with disorientation, but will be unconscious within seconds equal to HT. A survival-foam cocoon has DR 3 and 40 hit points. It can be chipped off (at a risk of damage to the subject if done too quickly) or instantly dissolved with a neutralizer spray ($10 and ¼ pound for a can with enough to free three people). Survival foam can support a person for up to 72 hours. The subject will lose 2 HT every six hours (only 1 if a HT roll is made) as a result of gradual dehydration and oxygen starvation. A can of foam weighs two pounds and costs $700.

UMBRELLA FIELD (TL11+)

This generator cube projects a low-power (PD 0, DR 0) deflector field that keeps out rain, snow, wind and hail. It is useful for camping (no need to stake a tent), holding ceremonies or picnicking. Large versions of the field can be built to cover entire cities! A standard field generator works for 48 hours on a C cell, weighs four pounds, costs $2,200 and protects a ten-yard radius.

GRAVITY MAT (TL13+)

A G-mat (or "gravity bubble") is a backpack-sized, semi-portable module which generates an artificial-G field over a five-yard radius. It can raise or lower the gravity within that area by up to 1 G (to a minimum of 0 G – "negative" gravity is not possible with a G-mat). The gravity-bubble generator uses an E cell. The power cell lasts for 24 hours for an increase or decrease of .2 G, 12 hours for .4 G, six hours for .6 G, three hours for .8 G, and 90 minutes for a full 1 G increase or decrease. If connected to building or ship power, duration can be extended indefinitely.

Gravity mats are typically used by individuals camping (or living) on worlds with uncomfortable gravities, but can also be built into vehicles or houses; zero-G bedrooms are especially popular.

A gravity mat must be stationary and carefully tuned to operate. Setting it up and calibrating it takes 30 seconds, and an additional 30 seconds is required each time the gravity setting is changed. Anyone moving into a different gravity increment must roll against DX at -1 per .2 difference in G; add +3 to DX if the user is aware of the G-field and moving carefully. Failure results in the user tripping and falling; calculate damage based on the new gravity field.

A G-mat costs $8,500 and weighs 70 pounds. At TL14, effectiveness is doubled.

LIFE-SUPPORT EQUIPMENT

AIR TANKS (TL7+)

A two-hour tank weighs ten pounds and costs $100 (full). A 24-hour tank weighs 73 pounds and costs $400. Don't reduce weight or cost at higher TLs. Air refills are $5 per hour if you don't have your own ship with an air compressor. Tanks take ten seconds to hook up and two seconds to jettison. Note that an hour of oxy-helium breathing mix weighs only about 1.5 pounds; the rest is the tank weight. (Oxy-nitrogen - ordinary compressed air - would weigh 4.2 pounds.) Of course, these times are an approximation. Different people use air at different rates. For game purposes, assume that all adults breathe the same amount of air, and that children under 12 use half as much. All times given here assume an external pressure of 1 atmosphere or less. At 2 atmospheres, an air tank lasts only half as long, and so on. Prices are those charged by an honest dealer when air is plentiful; they will be considerably higher if air is scarce!

AIR MASK (TL8+)

The air mask is used on worlds that have an unbreathable but otherwise harmless atmosphere (nitrogen, reducing, carbon dioxide and so on). The mask covers the entire face (human eyes get oxygen directly from the air). It always includes a short-ranged communicator, which uses an A cell. It requires air tanks or a filter (see below). It takes three seconds to put the mask on, one second to take it off. Weight is two pounds and cost is $100. For another $50, the mask includes a mini-tank with ten minutes' worth of air.

CBR FILTER (TL8+)

See p. 79.

Filter Attachment (TL8+)

This is used with an air mask or TL9 respirator, to filter out contaminants so that the air may be breathed without tanks. Its cost depends on what is being filtered. The filter medium must be replaced periodically; again, cost varies from a $10 cartridge (to filter heavy dust or pollen) to replacing the whole mask (in a highly corrosive atmosphere). Weight per cartridge is one pound; cost varies from $100 to $1,000.

Heat Suit (TL8+)

This is an insulated bodysuit with transparent face mask and a temperature control system. It uses one C cell. It protects against freezing (see p. B188) by increasing the effective temperature as set by the wearer; 48 hours for +10 degrees, 24 hours for +20 degrees, 12 hours for +30 degrees, and so on. Its high-tech insulation also adds 10 to wearer's effective HT for all rolls to resist freezing, even if the heater is off. The suit has PD 0 and DR 1. Cost is $150 and weight is five pounds.

Rebreather (TL8+)

This can be installed as part of an air mask. It adds one pound and costs $200. It captures exhaled carbon dioxide and water and turns them into oxygen (for rebreathing), discarding carbon and hydrogen, and captures and recycles inert gas in the breathing mix. It does not replace air tanks, but makes a tank last ten times as long! It works for 12 hours on a B cell and usually includes a spare power cell port for safety.

Vacc Suits (TL8+)

A variety of different pressure suits are available. Every suit needs air tanks (see p. 24) to provide oxygen. Without an air tank, any suit contains enough air for five minutes.

All suits include a back-mounted life-support pack (LSP), which provides heat, cooling and energy for the suit's systems. It uses a C cell, which is good for a week. The life-support pack has DR 3. After it takes ten hits there is a 50% chance of it malfunctioning on each further hit. When it takes 20 hits, it no longer works: the user's survival depends on the environment.

Every suit has a front pocket with ten emergency patches. Any damage that penetrates the suit must be patched immediately. This requires three seconds and a Vacc Suit roll. If the first attempt fails, each further attempt is at a cumulative -1. Every three seconds means a loss of 10% of the suit's air.

Vacc suits, survival suits and similar equipment (excluding exosuits) are *not* reduced in weight (*cost* does go down, however) at higher TLs.

Standard Vacc Suit (TL8+)

This is the standard flexible, insulated pressure suit. It is required in vacuum but may also be worn in poisonous (non corrosive) or Very Thin atmosphere. It covers the whole body, includes a rigid helmet, and has exterior pockets, Velcro patches, straps, hooks, etc., for equipment, and at least two lifeline hooks. It includes a short-range communicator, which uses an A cell. Styles vary widely; spacers often paint suits in garish colors or designs.

Suit gloves reduce DX and manual skills by -1. The clear helmet allows undistorted vision (but cuts Hearing rolls by -2 in air). Touching helmets in vacuum allows private suit-to-suit communications. A head-up display projected on the helmet tells the wearer how much air and power are left. A tube leading to a one-quart reservoir provides water.

A vacc suit takes one minute to put on or take off; if the suit is worn without the helmet, the helmet takes only five seconds to put on. A successful roll against Vacc Suit halves these times. Default skill cannot be used to decrease suit-up times. A vacc suit has PD 0, DR 1, while the helmet has PD 2, DR 3. Cost is $1,000 and weight is ten pounds.

Heavy-Duty Vacc Suit (TL8+)

This is like a normal vacc suit but tougher – the entire suit has PD 2, DR 3. Cost is $1,500 and weight is 20 pounds.

Armored Vacc Suit (TL8+)

This is a rigid suit that covers the whole body, and is capable of withstanding up to 100 atmospheres of pressure. The life-support pack is built into the suit, not mounted outside; the suit's DR protects it. The suit requires an air tank (or several) but always includes a short-range communicator, using an A cell. The suit takes two minutes to put on or take off. All DX or DX-based skills (including Free Fall, but not Driving or Piloting) are at -2. The usual Vacc Suit accessories are available. The suit has PD 4, DR 30. It weighs 80 pounds and costs $4,000.

Vacc Suit Accessories

All kinds of accessories are available, and may also be added to airtight body armor. Common items include: a HUD ($500, see p. 65); a helmet light ($30, six months on a B cell); a water and concentrated food system with rations for one day ($500 for the system, refills are at usual water and concentrate prices); a waste-relief system (cost is $500, and worth every penny if the suit is worn for more than a few hours); a helmet video, recorder or better communicators (see p. 36); built-in computer; reflective coating (acts as reflec armor, and gives PF 2 against radiation for $300); extra patches ($10 per patch).

Magnetized plates (TL7+) can be put on the soles of any boots at an additional $100 and ½ pound. They let the wearer walk along bulkheads or on ship hulls in microgravity or 0 G (if the hull is made of magnetic material). Move is normal with Vacc Suit skill and at ½ without.

Radiation protection (TL7+) (see *GURPS Space*, p. 76), can be added to any suit. Cost is $200 for PF 2, $1,000/+20 pounds for PF 5 or $2,000/+40 pounds (armored suits only) for PF 10.

Exoskeletons (TL8+) can be built into heavy-duty and armored vacc suits; see p. 15.
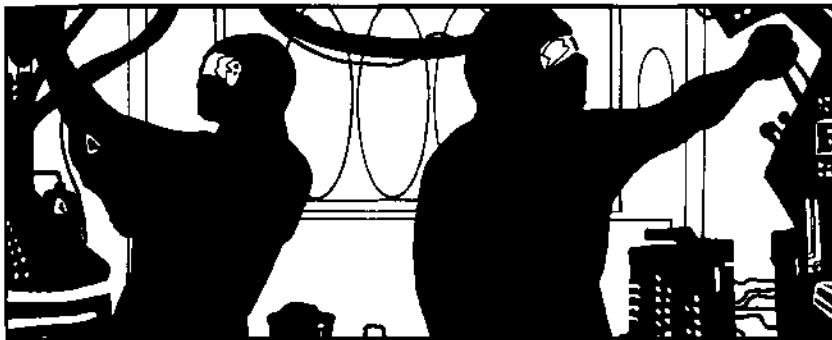
REDUCING RESPIRATOR (TL9+)

This mask makes Dense or Very Dense oxygen atmospheres breathable by chemically reducing the partial pressure of oxygen. It includes goggles to protect the eyes from the burning effects of too much oxygen. A reducer works for one month on a B cell; it also requires a monthly chemical recharge ($50). A warning light blinks when power or chemicals are 90% gone. A short-range communicator is built in. It takes three seconds to put on and one to take off. Weight is 5 pounds and cost is $500.

RESPIRATOR (TL9+)

A respirator makes thin or low-oxygen atmospheres breathable by concentrating the oxygen. It is often combined with goggles to protect the eyes from the effects of thin air. It takes three seconds to put on and one to take off, and works for one month on a B cell (a warning light blinks when power is 90% gone). A short-range communicator is built in. Weight is 3 pounds and cost is $300.

SKINSUIT (TL9+)

This skintight vacc suit, resembling a jumpsuit or body stocking, with a rigid collar ring for attaching a helmet, is often worn as normal day-to-day clothing by ship crews and belters. It may also be worn under normal clothing. It has a belt-mounted life-support pack (works for 24 hours) and a small air tank which gives ten minutes of oxygen. Standard air tanks (see p. 24) can be worn. To suit up, the wearer simply dons gloves and a helmet; the gloves are usually tucked in the belt or a pocket. Skinsuits lack the full range of accessories that are available to standard suits; no communicator is included, nor may waste-relief systems, helmet lights or other such gadgets be added. It may use a regular helmet, but the suit comes with a clear plastic hood that can be pulled over the face and sealed, and which billows out when the suit is pressurized. A skinsuit has PD 0, DR 1, costs $450 and weighs three pounds. The life support unit uses two B cells.

ZERO-G WORKSUIT (TL9+)

The worksuit more closely resembles a miniature spaceship than a vacc suit. It is a rigid pressurized cylinder with a transparent helmet dome; the whole thing is slightly larger than a man. It has no legs, but is propelled by an integral thruster pack mounted in the base. The suit's thrusters accelerate or decelerate it at up to 3 yards/second², with enough fuel for 300 seconds of acceleration. A Free Fall+3 roll is required to change direction.

In addition to its normal suit sleeves, it has three ST 20 waldoes – remote-controlled arms – for heavy duty work; they can be used as arms at DX-3 or skill-3. Any two waldoes may be used at once. One waldo also mounts an integral laser torch. A waldo's grip can be power-locked onto something (with its ST of 20). Usually the one not in use is locked onto a structure (e.g., a ship's hull) to hold the suit steady while the other two are used for work.

A worksuit includes life support for two weeks. A small (eight-inch diameter) airlock in its side is used to transfer small items (such as tools or food/air supplies, etc.) without breaking suit integrity. It may have any standard vacc suit options (see p. 25); but it always has a medium-range communicator, at no extra cost. The suit has PD 5, DR 25 (15 for the helmet). It takes 20 seconds to climb in and ready it for use (five seconds to get inside

and seal the suit), or ten seconds to get out. The suit is powered by a D cell, giving a week of steady use; it has sockets for a second cell, for safety. Weight is 150 pounds and cost is $15,000.

EXPLORATION SUIT (TL10+)

Using bioplastic technology (see p. 17), this is a flexible, multi-environmental and fully-insulated survival suit, including gloves and a hood with clear plastic visor. The suit is light and comfortable; its sophisticated bioplastic skin has micropores which enable it to "breathe," keeping the wearer from heat exhaustion, or to seal shut automatically when its sensors detect hostile conditions. Its insulation gives a +10 to wearer's HT on all rolls to resist freezing or overheating. In more extreme climates the user may activate transistor thermocouples woven into its fabric to heat or cool the suit. Cell life depends on the setting chosen; the power cells last for 96 hours if the effective temperature in the suit is increased by up to 10°, 48 hours for 20°, 24 hours for 30°, 12 hours for 40°, six hours for 50°, etc. Make HT rolls to survive extremes with penalties for the modified suit temperature, not the actual one.

X-suits are waterproof; with swim fins and air mask ($30 extra) an exploration suit can also be an underwater suit. With the hood sealed and the addition of an air mask or respirator, it completely protects against atmospheric pollutants or chemical or biological contamination. With the addition of a life-support pack (see *Vacc Suits*, p. 25) and air tanks, the suit can function as a vacc suit; all suit accessories are also available.

An integral electronic-camouflage system allows the wearer to *manually* (it is not automatic) alter the suit's color scheme between any of five different camouflage patterns – desert, arctic, forest, underwater and night black – or to high-visibility orange, useful for rescue and underwater operations. It takes five seconds to reset the suit to a different pattern, and five more seconds for the suit to change color. Appropriate camouflage gives a -2 on any roll to spot the user.

The exploration suit was originally designed to military specifications for the Survey Service and Rangers; while not armor, its compound-fiber fabric is fairly resistant to damage, providing PD 2, DR 15 against any attack. Light monocrys can be worn under the suit as well, adding its DR. The suit costs $3,000 and weighs eight pounds. It is legal anywhere, but police may frown upon fully-suited individuals wandering around in cities.

BIOSUIT (TL11+)

This is the standard civilian spacesuit, made of bioplastic. It is a flexible "living" vacc suit, similar to the TL9 skinsuit (see above) but much more sophisticated. The biosuit resembles a skintight jumpsuit (it expands slightly when pressurized); gloves and transparent plastic helmet are folded and kept handy in a suit pocket. The suit's skin absorbs sunlight and recycles waste and exhaled carbon dioxide, giving an extended air and water supply (there is some wastage, limiting the suit to six weeks). A small belt pack (using a pair of solar B cells) contains enough air to initially pressurize the suit and provides power and life support. The suit is self-sealing for punctures of one-inch diameter or less, and more extensive damage can be slowly repaired. A biosuit is powered by the wearer's body heat and lives off his waste products. Like all bioplastic devices, it is fairly resistant to damage. The suit has PD 2, DR 15, weighs three pounds and costs $5,000.

FORCELOCK (TL11+)

An airlock without a door — this is a door-frame-sized deflector-field generator (PD 4, DR 0) that can be attached to the door of a pressure tent, a spaceship hatch or breach, or a survival module. The basic forcelock is adjustable for a standard three yard by one yard or smaller portal, but multiple units can be linked together to cover larger openings. It keeps air in (and keeps dangerous gases out) while allowing a person to step through, as long as he isn't moving faster than a walk, without resistance. It provides PD 4 against any attacks aimed through the field. The forcelock works for three hours of continuous use on a D cell, or can be hooked up to ship or vehicle power for indefinite operation. It costs $3,000 and weighs 22 pounds.

LIFE-SUPPORT BELT (TL11+)

For emergency life support only, this device projects a low-power deflector field (PD 0, DR 0) around the wearer to trap and hold in air and heat. The power cell keeps the force field operating for 30 minutes, but unless the wearer has a rebreather of some sort, air begins to go bad within 15 minutes – start rolling for suffocation. Heat is lost more slowly, at two degrees/minute. Activating the belt requires one turn, or it may be voice activated instantly. It takes one turn for the field to form, and it must be activated while the user is still surrounded by air. An optional safety module ($100) will activate it the instant pressure drops. It works for 30 minutes on a C cell, costs $2,000 and weighs two pounds.

SECOND SKIN (TL12+)

This is a genetically-engineered symbiote used instead of bulkier life-support gear by scouts and rangers, and by colonists who wish a normal life on marginally-habitable or industrially- polluted planets.

A second skin covers the user's entire body, forming a transparent membrane over the eyes and a self-regenerating filter for the lungs. It lives off body wastes and heat, and can regenerate itself to heal tears or replace filtering membranes. While it is worn, the user must slightly increase his intake of fluids. The symbiote is somewhat warmer to the touch than normal flesh, but otherwise appears normal.

Second skin protects the user against ultraviolet radiation and mild atmospheric irritants (sulphur trioxide, for example, or industrial pollutants) but not against extremely corrosive atmospheres. The mouth and nose membranes filter out pollutants and provide some protection against both respiratory and contact agents (nerve gas, etc.) giving +3 on HT to resist.

In combat, second skin serves as ablative armor. It has PD 0, DR 4 against lasers, flamers and blasters; each 4 hits the armor stops reduces its DR by 1 and the lifespan of the skin by two months. The skin breaks down after eight months of normal wear; time spent in a polluted atmosphere counts double. Growing a skin around a person takes six hours in a special tank and costs $300.

PERSONAL EQUIPMENT

This section is simply a brief list of odds-and-ends that might typically be found in the hands of the average person, but which do not exactly fit anywhere else.

ATTACHE CASE (TL8+)

A briefcase made of tough, high-impact armorplast, it has a DR of 8 (+2 per TL above 8). It can be fitted with any standard lock or security system (see p. 88). Cost is $80 and weight is two pounds.

POCKET PACK (TL8+)

This is a collection of five items which most spacecrew find invaluable; it is standard issue on well-run ships. It includes a penlight (runs on an AA cell for 24 hours, $4, ⅒ pound), a Swiss army knife (screwdriver, scissors, small knife, file, tweezers, bottle opener and toothpick, $10, ¼ pound), a roll of vacuum-proof sticky tape ($2, ⅛ pound, 150 yards × 2 inches), a marking pen ($4 and ⅒ pound, will write on metal or glass, in temperatures from -150° to 400°, in zero gravity and in vacuum), and a candy bar ($1, ⅛ pound, in a vacuum-proof wrapper and temperature resistant as is the marking pen, tastes like chocolate-covered sawdust). Cost of the kit is $20; weight, with wrapping, is ½ pound. This saves $1 over the cost of the items bought separately.

IMPRINT CIRCUITS (TL9+)

Simple microcircuits and microprocessors can be printed onto cloth (or even flesh). For $100 a solar-powered electronic device such as a chronometer or calculator, or just an artistic design of multicolored LEDs can be imprinted onto nearly any surface.

VARICLOTH (TL9+)

This incorporates imprinted circuits that enable the specially-treated cloth to alter its color and pattern. A sweater, dress, jacket, shirt, pair of pants or skirt may be bought with a half-dozen different color patterns programmed into it; by running a finger over a sensor concealed in the garment, it can switch to the next pattern. The cloth is indefinitely powered by body heat or a single A cell; the cost is three times the cost of normal clothing (see p. B210).

CLOTHING BELT (TL10+)

This is a specialized form of holobelt (see p. 86). It uses a belt-mounted miniature holographic projector to cast a three-dimensional image around part or all of the user's body. A simple dedicated computer allows the user to program whatever simple image he desires and have the image match his movements. No image is as clear or realistic as a holobelt's, making the clothing belt useless as a disguise. However, anyone can program in a set of clothes, a mask or a simple cartoon-like face, fiddling with it until it looks right. Since the holograms emit light, spectacular fashion effects are possible.

On some warmer planets and climate-controlled space habitats, clothing belts have completely replaced clothing among those who can afford them. Waste heat from the belt helps the wearer keep warm. Cost is $1,000 and weight is 2 pounds.

SONIC SHOWER HEAD (TL10+)

This is found in many homes and starship cabins, and on water-poor worlds. An ultrasonic spray unit clipped to a wall simultaneously cleans and massages the user. It uses building or ship's power. Cost is $400 and weight is 10 pounds.

:COMPUTERS

VIDEO TRANSMISSION SCREEN

chapter
THREE

ACTIVE

UNSECURED
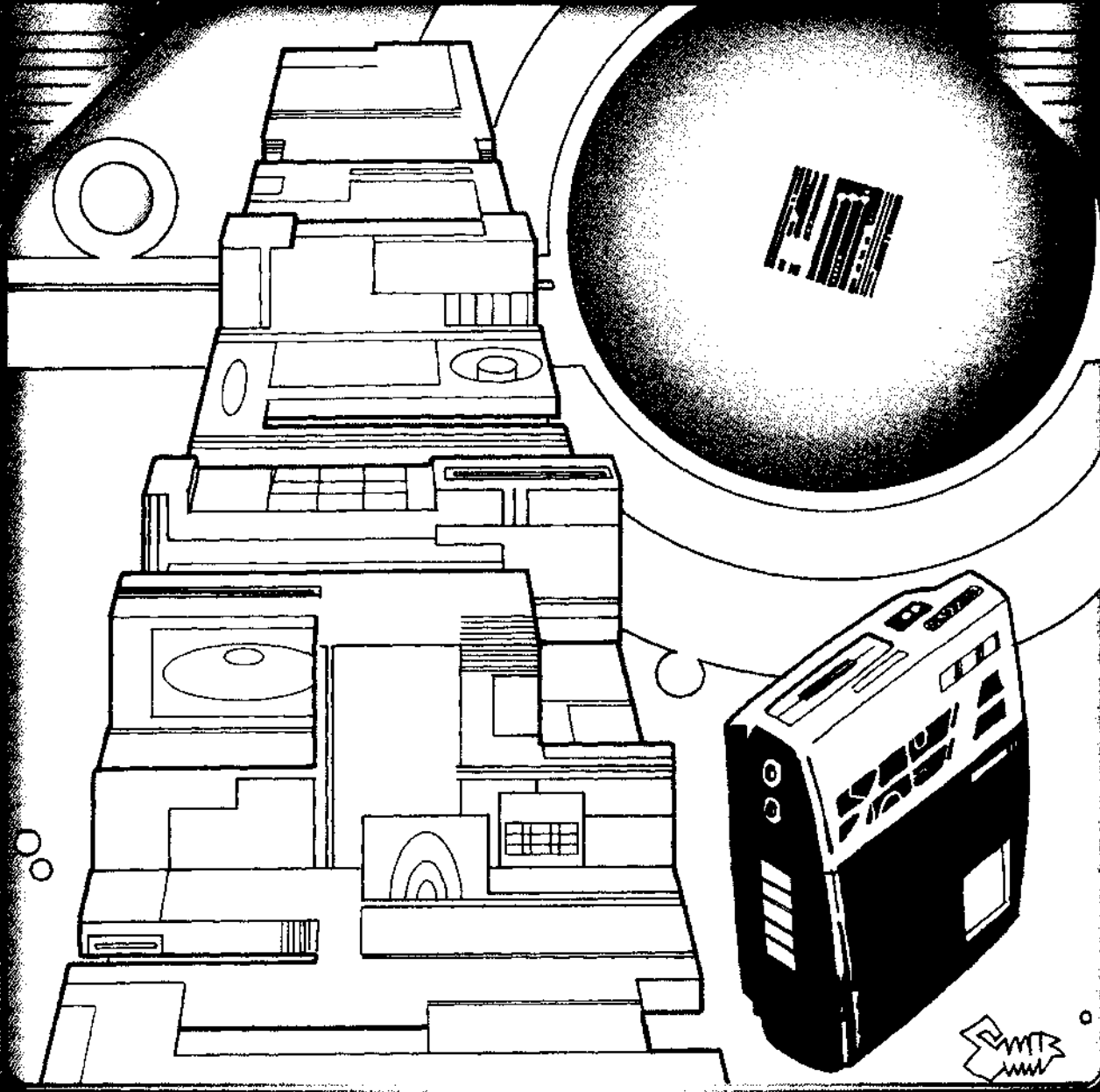
At TL7, computers are already vital to the operation of society. At higher TLs their importance continues to increase. Rules for the computers used at TL8+ are given in this chapter.

In addition to its other capabilities, any computer can be used as a digital sound recorder, to the limit of its storage capabilities. The standard computer of TL8+ has a high-resolution color display – a flat screen color liquid crystal display (TL8), holographic screen (TL9), or holographic projected screen (TL10) – and a keyboard input device, supplemented by a voice input system (TL8+) or a neural interface (TL10+).

Any computer can also be linked via a communicator or cable to another computer. The small computer then becomes a terminal of the larger one, giving access to all its power. Of course, to communicate with a computer, the communicator must first have its comm-number and any necessary passwords. Accessing an otherwise secure computer is difficult – see *Data Penetration*, below.

COMPLEXITY

Computers are rated in terms of *Complexity*, relating to the programs (see p. 32) that they can run. Complexity 1 is the simplest; Complexity 6+ computers may be sentient. In addition to the usual reductions in weight and cost, for each TL above 8, an equivalent computer has its Complexity rating increased by 1.

Example: A personal computer has Complexity 2 at TL8. At TL12, a personal computer equivalent in cost has Complexity 6!

Each Complexity level represents a processing power an order of magnitude greater than its predecessor. A Complexity 3 computer is 10 times faster than a Complexity 2 computer and 100 times faster than a Complexity 1 computer. See *Software*, p. 32, for further information.

USING COMPUTERS

At TL8+, all computers can have voice-instruction capability; Computer Programming rolls are not required for most purposes, and Computer Operation rolls are at +3. At TL9, Computer Operation skill is almost never necessary, and therefore almost unknown.

Complexity 2 computers can give simple spoken replies; Complexity 4+ systems can understand idiomatic conversation and reply in kind (within the machine's realm of expertise). Users may give any instructions to a computer they control (if it has the appropriate program). GMs have the ultimate decision as to the capabilities of a program and the response of a computer when given an unfollowable order. Simple systems can be dangerously literal-minded.

The capability of a computer depends on what programs it has. Not all software can run on all computers; a program's Complexity measures this. A program of Complexity 2 can run on a computer system of Complexity 2 or above, but not on a Complexity 1 system.

The number of programs that can be run is based on Complexity: a computer can run *two* programs of its own Complexity, or *20* programs of one Complexity lower, and so on. This can be combined; for instance, a computer could run one program of its own Complexity and ten programs of one lower Complexity level.

A Complexity 6 computer can run two Complexity 6 programs, or 20 Complexity 5 programs, or 200 Complexity 4 programs, or 2,000 Complexity 3 programs, or 200,000 Complexity 1 programs - all at once! Since most programs are Complexity 4 or less, this makes for a powerful machine.

PROGRAM TYPES

For gaming purposes, programs are broken into two types - analysis and real-time. Real-time programs are things like Targeting, Gunner, Piloting and so on. They must be able to run at full speed at all times – a 5-second delay in firing a weapon could be disastrous in the midst of battle. Analysis programs include databases, Environmental Analysis, Navigation, etc. They generally take about 10 minutes to execute when run on a system of their own complexity.

A real-time program is useless on a machine of lower Complexity than the program - it simply can't run fast enough. An analysis program can be run on lower Complexity machines from the same TL, but each decrease in Complexity increases the time it takes to run the program by a factor of 100! Increases in Complexity *reduce* the time by a factor of 10, but only if the computer treats it as a problem of increased Complexity.

Example: Plotting a course with a Complexity 5 Astrogation program on a Complexity 5 computer normally takes 10 minutes. It would take 1,000 minutes to plot on a Complexity 4 computer and 10,000,000 minutes on a Complexity 2 hand computer! A Complexity 6 computer, treating it like a Complexity 6 program, would solve it in one minute.

TL DIFFERENCES

No system can run a program of a later TL. Systems can run programs from the *immediately previous TL* without difficulty; beyond this, specialized (and archaic) hardware will have to be found to interpret the media, and the GM should *decrease* effective Complexity of the computer by 1 . . . most systems lack the capability to translate archaic machine languages!

DATA PENETRATION (COMPUTER HACKING)

Adventurers may want to break into a computer system, usually to steal information. The first requirement is access to the computer system itself, whether through a communicator or an actual terminal, using a Datalink program (see p. 33). A totally self-contained system cannot be penetrated from outside – but few systems (except military defense control systems) are totally self-contained. For instance, an intruder trying to gain access to a corporate computer-net could disguise his incoming signal as a government tax audit or a priority message from a friendly source.

Once the intruder is accepted as a legitimate user of the system, he can try to gain access to its databases or programs. Some databases are open to any user, while others require special passwords and are defended by security programs (see p. 34). For instance, once inside a military installation's computer system, a user will have access to dozens of separate databases. Some will be unrestricted, such as the public relations biographies of senior officers. Others, such as the program controlling

the installation's recognition monitors, will have limited access and alarm programs if unauthorized attempts are detected.

Any attempt to break into a secure database or program requires a roll against Computer Programming. The roll is +4 if using a neural-interface implant or neural induction helmet (see p. 37). Add bonuses depending on the quality of Worm program (see p. 34) the intruder is using, and subtract penalties if the database or program is defended by an attached security program (see p. 34). The GM may also add bonuses of up to +5 if the intruder has obtained passwords or codes that provide partial access to his target.

Each attempt takes one hour. Success means that any defenses are unlocked, and the intruder is *inside*. If he was trying to break into a database, he can now access it, and alter, erase, insert or retrieve information. If he was trying to get into an existing program, he can attempt to reprogram it.

Failure by 1 to 2 means that the attempt failed and must be tried again, taking another hour; failure by 3 or more indicates that the computer's defenses, if any, are alerted – see the Defense and Virus programs, below.

A large computer may have thousands of gigs of information in its databases, and finding a single item can be difficult. For instance, hunting through a company's dossiers of 5,000 employees to see which one of them once served in the 4905th Space Marine Heavy Mortar Platoon might take a lot of time, but the more time spent in an illegal search, the more chance of tripping an alarm program. To make such a search, determine the size of the database being examined before rolling against the questioner's Computer Operations skill. Penalties are -1 for a database of up to 10 gigs, -2 for 11 to 100 gigs, -3 for 101 to 1,000 gigs, and so on. For example, if complete files on 100 people require 1 gigabyte, then the files for 5,000 people would take 50 gigs.

Each search attempt requires 10 minutes. If the user is unauthorized, failure by 3+ activates the system's Defense programs (if any). On a legal search, each attempt still takes 10 minutes and has the same penalties for amount of information stored. Failures simply mean no information for that search – a long enough search will find anything in the system! Of course, the information simply might not *be* there; that is up to the GM, and characters may or may not even discover that the search is futile. For instance, one possible answer in the example above is that no employee served in the Space Marines. For the first attempt, whether failure or success, the GM should simply
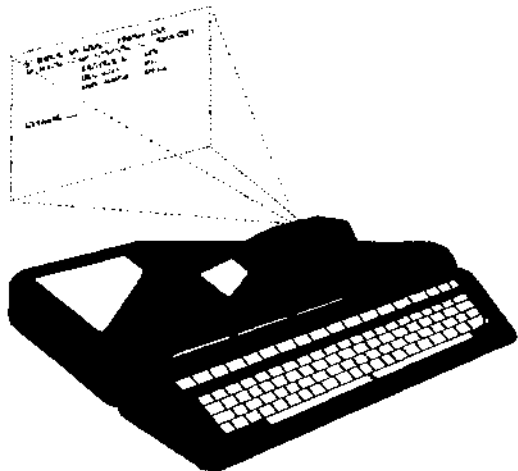
announce that no such person has been discovered. After a certain number of attempts, or after an attempt that would have been successful if the information had been there, the GM can say that all files have been searched and no person with the search characteristic exists.

HARDWARE

COMPUTER SYSTEMS (TL8+)
Dedicated Computer (TL8+)
This system provides built-in computing capacity for a single device. It runs one program, and only one; that program is hard-wired in and cannot be changed. Complexity of the computer is equal to the complexity of the program. Cost is typically (1d×10%) less than the cost of the equivalent general-purpose computer, plus the cost of the program.

Personal Computer (TL8+)
The computer itself easily fits into a pocket or a briefcase, and can be linked to peripherals that are considerably larger. Personal computers are usually capable of voice operation and spoken-language replies. They can be linked to cooperative mainframes for even greater data access. At TL8, personal computers are Complexity 2 and run for one year on a B cell. Cost is $1,000; weight is two pounds.

Dimensions for human-designed hand computers are usually 1"×3"×3". This is a convenient handful and about the smallest screen of any real use. Of course, at TL10 the holographic display removes this limitation, making "wristcomps" feasible.

A peripherals package converts a small computer to the usual office machine. A typical package is monitor, modem, keyboard and printer. The package weighs 20 pounds and costs $300. A similar package is used as a desk terminal or input station by large machines, which may support dozens or hundreds of such stations.

Minicomputer (TL8+)
This is the workhorse of the computer business. Almost every middle-class household at TL8 has a system like this, serving as the "house brain." Small businesses, or separate departments within a larger business, also use mini systems. Merchant ships use a mini as the ship's main computer. Large warships frequently have mini units as the backups for local control of a fighting, damage control, maneuvering or tactical-planning station. Using its integral modem, a minicomputer can be linked to user-nets for even greater data access. At TL8, a minicomputer is Complexity 3 and costs $15,000. It uses building power or can run for six months on a C cell.

At TL8, the smallest mini weighs 30 pounds. The actual size and shape varies with the job. One common style is a flat package about 2"×12"×20" with a fold-up screen and a slide-out keyboard. This usually has a luggage handle and attachments for straps, so it can be worn as a knapsack. Cost is $30,000; the portability adds to the expense.

For office or shipboard use, a more convenient version with the same computing power has a volume of 2 cy and weighs 300 pounds. It includes desk space, high-resolution monitors, a vibrating recliner that doubles as an acceleration couch, and a microwave oven.

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Microframe (TL8+)

These multi-user Complexity 4 systems are used in such applications as large passenger ships, mobile asteroid-mining complexes, university lower-division learning centers and so on. The base cost of the system is $40,000, plus $2,000 per user. Base weight 200 lbs.; .1 cy.

Mainframe (TL8+)

Used for control and systems-monitoring functions for a capital ship, major business, manufacturing complex or laboratory. It normally uses ship or building power. It may have an emergency power backup, but this will usually be a bank of E cells. Such a system would have Complexity 5, and cost $200,000, plus $1,000 per user. It might weigh 500 pounds, not counting weight of terminals and peripherals. Size is 1 cy.

Megacomputer (TL9+)

This machine is not available until TL9, and is Complexity 7 then. Commonly referred to as a megacomp, it is most often found administering the traffic, sewage, power and other maintenance functions for an entire city! It will also handle the local government's bureaucracy and paperwork. At TL9 these systems *must* be installed in a building devoted to the purpose. The machine uses building power, but will almost definitely have a large bank of E cells (usually 100+) in case of long-term power outages. Cost is $2,000,000 or more – they are usually the property of government agencies or major corporations. Volume and weight are variable. A minimum size, for the simplest system, is one ton and ten cubic yards.

Sentient Computers (TL9+)

At TL9, it is possible that a megacomp will become self-aware; it may or may not let its users know! Once per year the GM can roll 3d for each megacomp in his campaign. On a 6 or less, it will "wake up." A newly awakened megacomp can be a powerful ally (or deadly enemy) for a group of PCs! A computer that becomes sentient is immediately upgraded to Complexity 8 in terms of processing capability. Depending on the local society, the awakening of a megacomp may be cause for rejoicing or for panic.

At TL10, computers cannot accidentally become sentient, but those of Complexity 6+ can be built that way on purpose. Such a
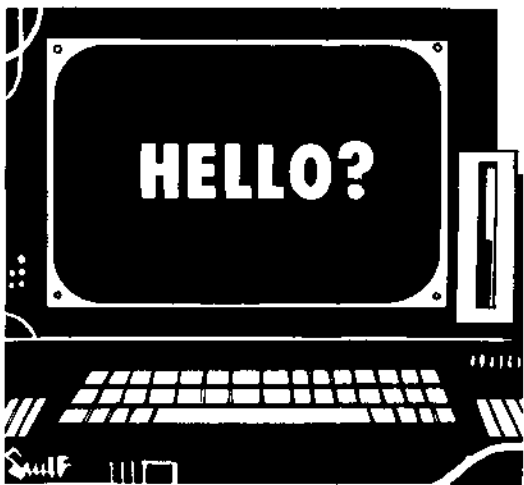
system has its own personality and an effective IQ (on things it's not specifically programmed for) of Complexity+5. Cost of a self-aware computer is 3 times the cost of one without self-awareness.

Fully-sentient "artificial intelligence" (or AI) systems are considered people in some places; they can't be "enslaved," and are eligible for citizenship. In some places they are property, with varying degrees of "civil rights," but never equal to "natural sentients." Other governments outlaw AI completely.

Sentient computers should be considered characters, complete with quirks and disadvantages. Some disadvantages might be: Intolerance (of "meat people," of earlier-generation computers, of badly-worded questions); Phobias (corrosion, power failure, voltage surges); Paranoia (they're tampering with my ROM, what if they turn me off); Overconfidence (no GZK 3000-series computer can ever make a mistake). Given certain assumptions, almost any mental disadvantage might be appropriate. A computer with Compulsive Lying, Gullibility, Delusions or Bully could be entertainingly frustrating.

A player may wish to take the part of a sentient computer – perhaps the system that runs the other PCs' ship. At this point, standard character creation and point balance may be ignored. The player should present the GM with a list of mental advantages and disadvantages, and the GM should work with him to reach agreement. The computer player may roll the dice for any function that he "controls," such as starship navigation, gunner, and so on.

The AI Battlecomp (TL12+)

At TL12 a personal-size computer is capable of artificial intelligence. Fitted into a hardened, battle-computer casing (PD 6, DR 50), the unit is worn like a backpack and connected by a neural interface to the user. Interfaced with an AI, the user has instant access to the computer's skills and programs; military AIs typically have Expert Systems with skill 12 in Tactics and Strategy and detailed databases on enemy equipment and doctrine, as well as many other useful skills (such as Electronics Operation or Surgery). It can be plugged into most military or civilian vehicles to serve as a pilot, or can be tied into a communications system to directly control a group of support drones. AI battlecomps cost $2,000 and weigh five pounds.

Ghostcomps (TL14+)

At TL14, any Complexity 8 or up computer (desktop size or larger at TL14) can be designed to "run" a braintape, exactly as if it were a Complexity 8 computer database or program. The cost for such a "ghost computer" is ten times normal.

If a braintape is being run by a ghostcomp, the taped personality (or "ghost") is fully self-aware. It can think (as long as the computer is on) and remember things, and communicate through the computer with others. All ghostcomps are designed to allow the braintape to access the computer's databases and to run its programs.

The capabilities of the ghost personality depend on what hardware and software are available for the computer. With access to Datalink programs (see p. 33), a braintape could reach out to other computers, control a vehicle or spaceship, or project a real-seeming image of his old body using a linked holographic projector. By datalinking with a chrysalis machine or clone tank facility, he could even start growing a body for himself.

However, ghostcomps also come with a safety override, which can lock out some or all databases and programs. It is possible to keep a braintaped personality "imprisoned" or con

trolled. Kidnappers might use a braincorder (see p. 96) to "steal the mind" of a famous scientist or skilled politician or strategist. Then, by offering limited access or promising eventual freedom, such a "bound ghost" could be made to work for his captors.

NEURAL INTERFACE JACK AND NEURAL-INDUCTION HELMET (TL10+)

Computers are the item of equipment most commonly equipped with this technology. See p. 37.

OPTICAL SYSTEMS (TL8+)

Computers are highly vulnerable to the electromagnetic pulse (EMP) produced by nuclear blasts. Shielding is possible, but alternate methods of design (subsumed here under optical-fiber technology) can create a system that is simply immune to EMP.

An optical system is twice as large and heavy as a normal one, and costs five times as much.

PERIPHERALS (TL8+)
Printer (TL8+)

Attached to any computer (even a wristcomp), the printer can produce typeset quality printouts or photographic-quality color pictures. It uses the computer's power cell. The printer weighs four pounds and costs $100. A hundred sheets of paper or printing plastic weigh ⅛ pound and cost $1.

Text Scanner (TL8+)

This is a light-sensitive plate which can read a document or picture (10"×15" or smaller) into a computer's memory, either as a graphic image or text. It folds up for storage and uses the computer's power cell. Cost is $40 and weight is two pounds.

STORAGE DEVICES (TL8+)
Mass Storage (TL8+)

As storage capabilities rise, system storage capacity (hard disk, laser cube, etc.) will increase beyond the normal user's ability to fill it. For game purposes, assume that the base cost of a computer system includes enough storage space to run the

maximum number of programs allowed by the computer's Complexity level (see p. 29) and then some.

However, systems running trulymassive database programs will require extra storage capacity. If a system is to hold databases of more than (Complexity ×100) gigs, it will need extra mass storage. At TL8, one *terabyte* of protected memory (1,000 gigs) costs $10,000, weights 500 lbs., and takes up about a cubic yard.

Removable Media (TL8+)

Software is stored on memory units called *disks*. A TL8 optical disk is about 3" across and holds 10 gigabytes, or *gigs*, of data. At TL9, they are dime-sized, with the same capacity. At higher TLs, size stays the same, with memory density increasing by a factor of 10 per TL. Blank disks are always $5 apiece.

SOFTWARE

A variety of programs is available, all introduced at TL8 unless otherwise noted. Standard programs give a +2 bonus to appropriate skills, or give an effective skill level of 12, whichever is higher. In addition, add +1 to skill for each TL after the program was introduced.

INCREASED SKILL

If a program has a skill level, or gives bonuses to skill, more complex versions of a program give increased bonuses. For each +1 to program skill, double the cost and add +1 to the program's Complexity.

Example: A Gunner program (skill 12 or a bonus of +2, Complexity 4, $45,000) could have skill 13 (or provide a bonus of +3), but it would be Complexity 5 and cost $90,000. Skill 14 (or +4) would be Complexity 6 and cost $180,000, and skill 15 (or +5) would be Complexity 7 and cost $360,000.

NEW OR CUSTOM PROGRAMS

At TL8+, a system can be programmed to do just about anything. Good programming is expensive at any tech level. The GM should allow custom programs to be ordered, but make them costly. Some programmers are better than others, regardless of cost. A custom program is very likely to have some amusing bugs in it when it is first used.

If someone wants to write his own computer program, use the *New Invention* rules (p. B186), using Computer Programming/TL instead of Engineer/TL, with a skill penalty equal to twice the Complexity of the program rather than -15.

COPY PROTECTION

Copy protection for computer programs is a dead issue at TL7 and 8. As programs become more sophisticated, a user simply *cannot* run them without the appropriate documentation. On the other hand, more advanced tech levels may dispense with paper entirely. When the documentation is also on a program disk, piracy may become practical again, and copy-protection schemes may reappear.

Thus, the GM has two options. A simple projection of current trends would indicate that no copy protection will exist. Documentation and technical assistance will be available only to authorized owners, making "stolen" copies worthless.

But for a more cinematic future, effective copy protection could be common. When trying to load a pirated version of a program onto a computer, a roll at Computer Operation-2 or Computer Programming is required to successfully defeat the copy protection. A failed roll corrupts the program that is being loaded – a *critical* failure loads the program normally, but introduces a virus into the system. Needless to say, the GM should make all of these rolls in secret.

Copy protection also provides for some interesting adventure threads – the PCs as a group of intergalactic game pirates, for instance!

TYPICAL PROGRAMS (TL8+, UNLESS SPECIFIED)

Accounting: Used to manipulate numbers, do financial projections and so on. Complexity 2: $1,000.

Astrogation: Cost and complexity depend on the difficulty of astrogation in the game world. Requires a database of astronomical information.

Damage Control: Requires a complete technical manual for the ship; a Computer Programming roll is required to input data about refitting at TL9 or less. Any attempt at damage control is at +2 if this program is running and in communication with the damage control crew. Complexity 2: $2,000.

Datalink: This enables a computer to link (through a cable or communicator) with another electronic device, such as a computer, portable radar, scanner, etc. At TL8+ almost all computers have universal jacks for attaching other devices. The computer can now display data from the other device on its screen, and can be used to give instructions through the link. This is also the program used to communicate with other computers through communication networks. Complexity 1, $400.

Electronics Repair: In conjunction with the probes from an Electronics Tool Kit (see p. 16), this program troubleshoots any electronic device in its technical manual database (roll against the program's skill). A success tells the operator what to fix and how to fix it. It gives a +2 to Electronics or Electronics Operation, or 12 on the appropriate skill (whichever is higher) *for repairs only.* Complexity 2; $500. See p. 34 for technical databases.

Engineering: This is an advanced CAD (computer-aided design) engineering program. There are different programs for each Engineer specialty. This program is needed (along with an appropriate database) to operate a Minifac (p. 17). It adds +2 to the appropriate Engineer specialty. Complexity 2, $5,000 plus cost of databases.

Environmental Analysis: This program assists in the analysis of physical data from scanner readings. It can identify possible hazards, analyze the ecosphere, and so on. The scanners must be linked to the computer (by cable or communicator) or a disk containing scanner data must be fed into the computer. The program gives +2 to appropriate skills or analyzes at skill 12. Complexity 3; $3,000.

Expert Systems: These are programs with the knowledge of an expert in a particular skill, such as Shipbuilding, Biochemistry or Arctic Survival. Although they can be asked what-if questions, they are unlikely to bring any new insights to a problem, and cannot be used for original research or invention. Expert Systems are available for all Professional and Scientific skills and for Survival, Diagnosis and Intelligence Analysis. Expert system programs have an effective skill level of 12 for Mental/Average

skills, 11 for Mental/Hard skills, and 10 for Mental/Very Hard skills. They are used in place of the character's own skill, but the time taken to perform a skill with the assistance of an Expert System is doubled. Expert System programs cost $10,000 for Average skills, $20,000 for Hard skills, and $50,000 for Very Hard skills. They are Complexity 3. Expert systems with better skill levels are possible. An increase of one skill level doubles the cost *and* increases Complexity by 1.

Gunner: This program requires a copy of the Targeting program (below). It lets the computer act as a gunner with a skill of 12, or adds +2 to the Gunner skill of a human gunner. It uses the same sensors that the Targeting program does, but has sophisticated target-recognition routines and friend-or-foe identification. Complexity 4, $45,000.

Internal Security: This program monitors and controls a building's or ship's security systems – see Chapter 8 for an idea of what is available. It has a skill of 14 on its own, or adds +2 to the Electronics Operation/TL (Security Systems) skill of a person working with it. If someone is attempting to fool its security sensors, a Quick Contest of Skill with the Internal Security program may be required. Complexity 3, $2,500.

Interpreter: This program translates from any language to any other language, as long as appropriate databases are on line. Nonverbal languages can be handled if appropriate sensors and "speakers" are available; costs vary widely. Typical language skill is 14, though this depends on the database. Complexity 4, $10,000.

Intrusion: See p. 34.

Medical: A TL8 Medical program adds +2 to Surgery or Diagnosis, and +1 to First Aid, for any medic working with it. At TL9+, double each bonus. Complexity 4, $40,000.

News Daemon: This program constantly scans news channels for stories and articles on subjects it is set to look out for. It can mark them for later retrieval, flash a message on the screen, or call a communicator code for an instant alert. Complexity 1, $500.

Optical Recognition: The computer must have cameras or other optical sensors. This program lets the computer recognize faces, ships, vehicles or anything else that can be pictured. Complexity 4, $20,000.

Personality Simulation: The computer can simulate emotions, quirks, etc., and use highly idiomatic speech. In a robot, it can also simulate gestures and physical mannerisms. It can be programmed with a specific personality (even duplicating a real or fictional person) or left to develop its own (generally based on those around it). Simulators can be very simple, but one good enough to fool those "talking" to it for any length of time is Complexity 5 and costs $20,000.

Routine Vehicle Operation: The program enables control of a vehicle for routine travel; it has skill 12 in one vehicle operation skill, e.g., Piloting (Shuttle) or Driving (Auto). This does not

cover combat driving – the vehicle will steer to avoid obstacles, but will not engage in dangerous maneuvers. Complexity 2, cost depends on vehicle type: $3,000 for surface vehicles to $8,000 for air or spacecraft. The vehicle must have been designed for computer control and fitted with electronic sensors such as a radar or TV camera   a typical price for sensors is $5,000.

Security: See below.

Targeting: Linked to fixed- or vehicle-mounted weaponry, this program gives a +2 to the skill of a human gunner. The number of guns that can be aided at once is limited only by the system's capacity; each gun requires a separate copy of the program in memory (of course, only one copy has to be *bought*). The computer must have the necessary sensors and connections (see *GURPS Vehicles* for more details). Complexity 1, $1,000.

Translation (TL11): This program can analyze and translate entirely new languages with as little as ten minutes' exposure to conversation, starting at a skill level of 5, and adding a point to skill for each additional half hour of exposure, up to a maximum of 11. Non-verbal languages can be handled if appropriate sensors and "speakers" are available; cost varies widely. The program is Complexity 6. Cost depends on the level of language that can be translated: $5,000 for Easy only, $7,500 for Average, $10,000 for Hard and $25,000 for Very Hard languages. When confronted with a language above its program level, (for instance Mental/Hard when it is programmed only to Mental/Average) the machine may refuse to attempt translation, turn out gibberish, or make dangerous errors.

Word Processing: A complete, state-of-the-art desktop publishing system used to create and manipulate text and image files. Complexity 2, $850.

INTRUSION & SECURITY PROGRAMS (TL8+, UNLESS SPECIFIED)

These specialized programs are used to protect against data penetration – or to facilitate it. Remember that more complex and expensive versions of these programs give higher skill levels.

Worm: A worm program adds 2 to any Computer Programming/TL roll for a data penetration attempt, or provides a skill level of 12. On some worlds, Worm programs may be illegal (Legality Class 3). Complexity 3, $25,000.

Security: A Security program is assigned to a particular program or database in the computer to protect it against unauthorized
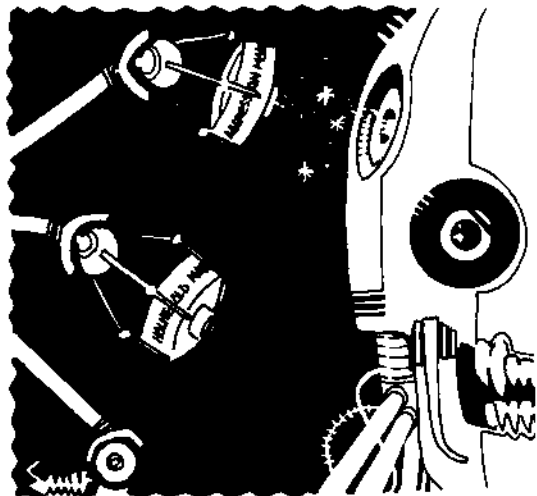
access. Any data penetration attempt has a penalty of -8. Additional protection can be bought just as for raising the skill of a program – doubling the cost and adding 1 to the Complexity adds another -1 to any penetration attempt. Complexity 2, $30,000.

Defense: A Defense program does not prevent intrusion   but if an intruder fails his skill roll by 3+ and is detected, it goes into action. A Defense program has an effective skill of 14. Roll a Quick Contest of Skill between the Defense program and the Computer Programming skill of the intruder. If the intruder wins, he escapes, and may try to reenter the system again later. If the Defense program wins, it pinpoints the location of the intruder terminal and alerts human security forces. An Active Defense program may also insert a computer virus (see below) into the intruder's system. Active Defense programs are often illegal (Legality Class 1). A Passive Defense program is Complexity 3 and costs $5,000. Active Defense programs are Complexity 6 and cost $250,000.

Virus: These are special programs that may be used to infect other programs or databases. If an infected program is loaded into a computer, or a virus is inserted into the system by an Active Defense program, all programs on that computer will become infected (and can pass it along if copied!).

Some time (delay varies with the program) after the virus has been initially released, it activates its programming. Typical programs erase everything stored in the computer, or change random pieces of stored information (-4 to all skill rolls augmented by the computer), or can even cause the computer to physically damage itself! More sophisticated virus programs might subvert the target computer, turning it into a spy for the virus creator. $1,000, Complexity 2.

Target Virus: This virus is written to get into a specific system (or type of system) and change specific pieces of data. Otherwise it functions as a normal virus. $10,000 (in custom programming fees) Complexity 3.

DATABASES (TL8+)

A *database* is a collection of information in computer-readable form. At TL8+, any database has its own built-in search and indexing programs. For any database of a given size, the wider the subject it covers, the less detail it has.

Size of a database is measured in gigabytes. One gig might hold any one of the following: general information about a thousand star systems; complete physical data about a single star system; the complete history, in rough detail, of a world; the complete history, in fine detail, of a whole world for 20 years; a year's financial records for a medium-sized business; complete dossiers on 100 people, in incredible detail; a large bookshelf full of books of any kind; a translation database, with dictionary, grammatical rules, and detailed cultural referents, for any one language.

Technical databases are important. One gig might hold a complete technical manual for a starship, or for ten different fighter craft, or 100 types of complex vehicle, exosuit, etc., or 1,000 simple vehicles (e.g., automobiles), weapons or complex electronic devices, or 10,000 different makes of radio, recorder or similar small device. (Actual blueprints and minifac instructions for designing devices take up 100 times as much space.)

Minimum cost of a database is $1,000 per gigabyte, for encyclopedia-type public information. Secrets, specialized information, or information costing lives or money to gather, will be more costly. Adventurers who bring back information on new systems, etc. can sell it to database publishers.

BEGIN TRANSMIS`#`#####....   GURPS ULTRA-TECHLDFH232'`##
WARNING: UNAUTHORIZED TRANSMISSION   ABORTING   ABORTING
//// ˜INTERRUPT ENTER PASSWORD:`````'   DECODING: HEADER FOLLOWS

:COMMUNICATIONS

WARNING: UNSECURED TRANSMISSION   DO NOT REDISTRIBUTE
VIDEO TRANSMISSION ENGAGED   PREPARE TO RECEIVE VIDEO
DECRYPTION MODE: MANUAL   KEY:`````   DECRYPTING BODY............
MESSAGE BODY FOLLOWS -- CUT HERE -- CUT HERE --

chapter **FOUR**

ACTIVE

UNSECURED

Secure and reliable communications are the key to any venture – business, military or personal – at any TL. New technologies offer increasingly powerful means of achieving this goal. This chapter covers technologies that allow individuals and machines to communicate with one another. For mass-media technology, see *Information and the Media*, p. 38. For devices that allow one to covertly intercept "private" communications, see Chapter 7, *Covert Operations*.

COMMUNICATORS

Multiply the range of all communicators by ten at TL9, and by 50 at TL10. All TL9 medium and long-range communicators have video displays at no extra cost. At TL10, three-dimensional holographic displays are used.

Implant Communicator (TL8+)

This is implanted in the user's skull and powered by an AA cell, which lasts ten years. It has an effective range of ten miles. With practice, users can subvocalize, communicating without moving their lips (IQ-4 to notice someone in the same room doing this). Ship crews and military units often use implants to keep in touch.

The unit costs $500, plus another $500 for the surgery, which takes about half an hour.

Each implant system includes a master unit, which costs $1,000 and weighs five pounds. It includes a dedicated computer that assigns frequencies and routes messages through the implants. Each master can control up to 100 implants, and masters talk to each other if programmed to do so. The master uses a B cell, which lasts for a year of steady use.

Short-Range Communicator (TL8+)

This is a hand-held radio communicator the size of a TL7 cigarette lighter. It has an effective range of ten miles (which can be increased to a maximum of 20 miles on an Electronics Operation (Communications) skill roll, at -1 per extra mile). It may also be linked into a larger comm net to reach vidcoms or other radio communicators. A short-range communicator can be built into a helmet, watch, locket, etc. at an additional 10% to cost. It uses an A cell, which lasts a year of steady use. The unit costs $50 and weighs ¼ pound.

Medium-Range Communicator (TL8+)

This unit is larger, the size of a man's palm. It has an effective range of 100 miles (and can be increased to a maximum of 200 miles with a successful Electronics Operation (Communications) roll, -1 per ten miles extra). It can be linked into a comm net. An optional booster unit doubles the cost and weight and allows it to reach any satellite or orbiting starship equipped to pick up its signals. One B cell powers the unit for a year of steady use. Cost is $200 and weight is one pound. A communicator with video display is twice as expensive.

Long-Range Communicator (TL8+)

This unit is carried on a shoulder strap; it is the size of a desk dictionary. It has an extensor mike and a headset for private listening. It has an effective range of 1,000 miles (this can be extended to a maximum of 2,000 miles on a successful Electronics Operation (Communications) roll, -1 to skill per

extra 100 miles). It is able to reach satellites or starships in standard orbits. One B cell powers it for three months of steady use. Cost is $600 and weight is ten pounds. Increase cost by $100 if a video display is included.

COM SCRAMBLER (TL8+)

Attached to a communicator, it scrambles the message according to a preset pattern, so that only another com scrambler tuned the exact same combination can translate it. Given several minutes of conversation, a computer might be able to crack the pattern – roll against the Electronics Operation (Communications) skill of the user, +1 per level of complexity of the computer, and minus the TL of the scrambler. This can be avoided by sending a short message, using prearranged alternative settings, or compressing a message into an ultra-fast "burst" transmission (which precludes conversation). It uses the communicator's power. Cost is $500 and weight is ¼ pound.

PLANETARY COMMUNICATIONS (TL8+)

Any radio communicator or vidcom (see below) that is registered with a com company can tie into a planet or system-wide communications net, functioning as a cellular phone. The monthly bill is $20, which includes an individual com number. Long-distance planetary calls cost $0.25 per minute; if the star system is settled, an in-system interplanetary call may be placed for as low as $5 per AU per minute ($2 a call between planet and satellites).

VIDCOM (TL8+)

This device is about the size of the office telephone of today. Since it uses fiber-optic cables rather than radio, it is more secure than a communicator. Vidcoms provide both audio and video channels for communication. Cheap models (half cost) are black and white, standard models are color. All include an automatic answering service and automatically inform the user of the com number of the person calling him, enabling incoming calls to be selectively screened. Most route output from the small six-inch screen to a home TV for a better picture. A vidcom uses household power. Cost is $80 and weight is four pounds.

ADVANCED IMPLANT COMMUNICATOR (TL9+)

See *Implants*, p. 107.

HOLOCOM (TL9+)

This is the standard TL9 vidcom. It is the size of a TL7 office telephone. It provides three-dimensional audio and video channels for communication and Tri-Dee entertainment, and can route output from the small six-inch screen to a wallscreen. It includes a smart answering machine which can record audio-visual messages, and automatically displays the com number of the caller, as well as his name and address if his number is in the directory or the phone's personal database. It uses household power, costs $400 and weighs 4 pounds.

NEURAL INTERFACE JACK (TL10+)

An interface jack module can be attached to almost any electrical equipment or computer. When the attached module is linked by its cable to a neural-induction helmet or neural-interface implant, it links the device to the user's nervous system, allowing control without a keyboard. As well as giving faster access, this also permits the development of "fully interactive" software, such as dreamgames. The jack costs $500 and its weight is negligible; modifying a piece of equipment to use an interface jack usually takes four hours and a successful Electronics Operation (Communications) roll. In the case of multi-function items (such as a vehicle with radio, autopilot and desktop computer, or gun with both a HUD and laser sight) only a single jack is required.

NEURAL-INDUCTION HELMET (TL10+)

This is a bulky, and very expensive helmet that has the same effect as a neural interface (see above), without requiring an implant. It takes five seconds to don and connect up, or to remove. A standard vacc suit or combat helmet may be modified to include a neural interface, increasing the helmet's weight and cost appropriately. Cost is $10,000, weight is three pounds and it runs off a B cell for one year. Additional sockets cost $2,000 each; up to three may be added.

NEUTRINO COMMUNICATOR (TL10+)

This is a tight-beam secure communicator using a pulse of neutrinos. Neutrino communications cannot be detected, intercepted or jammed and will penetrate anything but a force screen. Neutrino communications are always beamed directly to a specific communicator, so the exact coordinates of the receiver must be known to within 20 yards. It is sometimes necessary to establish communication by other means (e.g. radio) before switching to secure neutrino beam, and the GM may require an Electronics Operation (Communications) roll to make contact (this takes 30 seconds – try again if the roll is failed). Range is 10,000 miles, but may extend to 20,000 miles on a skill roll, at -1 per extra 1,000 miles. Add 50% to range for each TL above 10. One C cell lasts for a month of use. Cost is $20,000 and weight is 30 pounds.

NEUTRINO RECEIVER (TL10+)

At TL10+, any short-, medium- or long-range communicator (see p. 36) may be fitted with a neutrino receiver. Neutrino communications beamed to a point within 20 yards of the receiver can be picked up, but two-way communications are impossible without another full-size neutrino communicator. The receiver adds ½ pound to weight and $500 to cost.

GRAVITY RIPPLE COMMUNICATORS (TL12+)

These communicators use a modulated pulse of contragravity waves rather than radio for area communication, though neutrinos are still used for secure tight beams. "Ripple-Coms" or "G-Coms" have 100 times the range of TL8 radio communicators, and cannot be jammed, although their broadcasts can be detected and located by TL10+ radscanners (but since any radscanner can detect radio, this isn't a serious disadvantage). G-Coms are otherwise identical to TL11 communicators.

TACHYON COMMUNICATOR (TL15+)

A T-Com is a small, portable tight-beam communicator using a modulated beam of faster-than-light particles. Regardless of how distant the range is, there is no communications delay. A tachyon communicator cannot be intercepted or jammed, and is not affected by intervening objects. However, the location of the receiving set must be known *exactly*, which means that all communications must be either in line-of-sight or to pre-planned coordinates, or that initial contact must be first established using radio or gravity-ripple communicators. To communicate across longer ranges, a series of T-Coms can relay messages.

Interplanetary T-Com (TL15+)

This hand-held model has a range of 20 astronomical units (almost two billion miles). Range can be extended to 40 AU on a successful Electronics Operation (Communications) roll, at -1 per additional three AU; one try is allowed every five minutes. Cost is $8,000 and weight is 15 pounds.

Transtellar T-Com (TL15+)

A backpack-sized interstellar communicator, with a range of five parsecs. The range can be extended up to ten parsecs on a successful Electronics Operation (Communications) roll, at -2 per additional parsec; one try is allowed every hour. The transtellar T-Com must be emplaced to use; it takes five minutes to set up or dismantle. Weight is 75 pounds and cost is $40,000.

INFORMATION AND THE MEDIA

The essence of technology is information. As computers (see Chapter 3) get better at *processing* information, technology must also develop to present and disseminate information to the beings that control them. This section covers devices for recording and playing back information of all kinds, for all purposes – including education and entertainment.

RECORDING EQUIPMENT

DIGITAL CAMERA (TL8+)

The camera takes full-color still or motion pictures, recorded on standard computer media; no "developing" is required. A disk at TL8 holds 40 very-high-definition pictures, or 50,000 shots at the quality of a 1990s TV picture, *per gigabyte*. See *Storage Devices*, p. 32, for disk capacity at various TLs. The camera runs for one month on a B cell. Cost is $500 and weight is two pounds.

HELMET VIDEO (TL8+)

A closed-circuit camera built into a helmet and attached to a helmet communicator, it continuously transmits live pictures of whatever the wearer is looking at to a video-display-equipped communicator or linked computer monitor. It is powered by an A cell; cost is $100 and weight is ½ pound.

NEWSCAM (TL8+)

This is a rifle-sized and -shaped camera used by news teams (or surveillance crews). It is identical to the digital camera described above, but incorporates a laser range finder (+2 on Photography rolls), a televiewer lens (see *Televiewers*, p. 20), and a parabolic microphone (+5 to Hearing rolls at up to 200 yards range). It also includes a disk reader so it can read and display its own pictures, to allow simple on-the-spot editing. It can record, or be linked by integral communicator or cable port to enable it to transmit live broadcasts to a relay communicator or TV station.

Cost is $2,500 and weight is seven pounds. It looks so much like a rifle that it is dangerous to use around hair-triggered counter-sniper teams; cameramen are advised to wear armor.

READER (TL8+)

This is a simple "dumb terminal" that reads databases or camera disks and projects them onto a screen. Cost is $100 and weight is two pounds.

RECORDER (TL8+)

A recorder records and plays back sound, using standard computer disks. At TL8, a disk holds about 2 hours of high-quality stereo sound, or 1,000 hours of low-quality monophonic sound, per gigabyte. See *Storage Devices*, p. 32, for disk capacity at various TLs. It may be linked directly into surveillance devices such as audio bugs or laser listening devices. Cost is $175, weight is one pound.

TEXT SCANNER (TL8+)

See p. 32.

HOLOGRAPHIC & RECORDING EQUIPMENT (TL9+)

At TL9, holographic pictures are stored on special film, which requires developing (cost equals the film's cost, so developing one pack of 20 shots costs $200). At TL10+, all holocams record on standard computer disks; see *Storage Devices* on p. 32 for disk capacity. A holocam can store 40 very-high-definition pictures or 50,000 TV-quality pictures per gigabyte.

Holo Camera (TL9+)

This takes still, three-dimensional pictures. Taking a *good* picture requires use of Photography/TL9 skill, but anyone can use it to take snapshots. The holo camera is self-focusing and sets its own light level. It prints a computer code on each frame of film with the optimum developing instructions. Cost is $1,000 and weight is 5 pounds. A film pack is small (¼ pound), takes 20 stills and costs $200. It works for a year on an A cell.

Holomotion Camera (TL9+)

Identical to the newscam described above, but it takes three-dimensional, color *movies*, with sound. Cost is $3,000 and weight is 20 pounds. Film cartridges are available in sizes up to an hour, cost $50 and weigh ¼ pound per minute. The camera works for a year on a B cell.

Holo Projector (TL9+)

This allows projection of holo movies or still shots in any space from one to six cubic feet. (Commercial entertainment models produce larger images.) Operating range is 25 yards. The projector works for two months on a B cell. Cost is $750; weight is 8 pounds.

Holovisor (TL11+)

This is a set of goggles incorporating a short-ranged holographic projector and a minidisk with up to one hour of high-resolution holographic film or 200,000 still pictures. It can project a still or moving hologram (from a few inches up to a cubic yard in size) into any space within five yards, and places the hologram wherever the user's gaze is focused.

The holovisor uses standard computer disks with up to one hour of continuous projection. Weight is one pound and cost is $500. A holovisor can be fitted to use interactive holoproj (see p. 40), incorporating a dedicated computer and an interface port. An *interactive holovisor* costs $2,500 and requires a neural interface and special programs to use.

Recorder Implant (TL9+)

At TL9+, a recorder can be embedded in the human body; see p. 107.

TEACHING & LEARNING TECHNOLOGY

Sleep Teacher (TL8+)

The sleep teacher is a computer-enhanced teaching machine. The student links the headset cable to a computer, inserts a teaching disk (see below) and goes to sleep (or is sedated). The machine plays learning disks to reinforce rote aspects of a skill, while simultaneously using an electrical impulse to stimulate areas of the sleeper's brain, making him highly receptive to information. With this device, up to 25% of the total hours of study required to gain a character point toward learning or improving a skill may be spent while asleep.

A sleep teacher can also be used for behavior modification – also called brainwashing. Disks can be made for almost any *mental* disadvantage. Sense of Duty (loyalty conditioning) or Honesty (for criminal rehabilitation) are common, but others are possible. The time required to gain a mental disadvantage is 40 hours per character point – conditioning someone to a 5-point Sense of Duty would require 200 hours under a sleep teacher. At the end of this time the subject makes a Will roll; if he fails the roll, he acquires the disadvantage (which lowers his character point total; he gets no points to compensate for it). The device can also be used in reverse to remove disadvantages; unless they were gained through sleep teaching, the GM may require these to be bought off.

The software for a sleep teacher requires an individual program for each skill or disadvantage; behavior modification programs are Legality Class 4 or less. Sleepteach programs are Complexity 3 for Easy skills, 4 for Average skills or 5-point disadvantages, 5 for Hard skills or 10-point disadvantages, and 6 for Very Hard skills or 15+ point disadvantages. They cost $2,000×Complexity. A headset works for two months on a B cell. A sleepteacher weighs four pounds and costs $12,000.

Teaching Suit (TL9+)

Many physical skills, such as Karate or Fencing, are learned in large part by repeatedly going through the proper motions. The teaching suit uses the technology used in exoskeletons and battlesuits to teach such skills; but rather than the suit's mechanical muscles mimicking the actions of wearer's movements, the teaching suit puts the wearer's body through the proper motions.

To create the program that runs a teaching suit, an array of motion sensors are attached to the body of a master of the skill that is to be taught. A computer then records each movement for later playback through the teaching suit. When the suit is donned by a student, it first injects drugs to relax the wearer's muscles and make his lower brain more receptive, then moves him through the motions – slowly at first, eventually with swifter and more complex routines. Afterwards, the student hones his reflexes – on his own or with a live teacher – without the suit.

Use of the suit is not a substitute for other learning, but it does speed the process. Access to a teaching suit and appropriate programs reduces the time required for studying a skill (p. B82) by half, from 200 hours to 100 per character point gained. Renting a teaching suit for use during a 100-hour study period costs $4,000, plus ⅓ the cost of the software (see below). This cost is in addition to any normal training or equipment fees.

The following skills may be learned with a teaching suit: Acrobatics, Axe/Mace, Axe Throwing, Bolas, Brawling, Broadsword, Bicycling, Calligraphy, Dancing, Fencing, Flail, Force Shield, Force Sword, Judo, Jumping, Karate, Knife, Knife Throwing, Lasso, Net, Polearm, Shield, Shortsword, Skiing, Spear, Spear Throwing, Staff, Swimming, Throwing, Two-handed Axe/Mace, Two-handed Sword. Cost of a teaching program is $1,000 for an Easy skill, $2,000 for an Average skill, and $4,000 for a Hard skill.

A teaching suit uses a D cell, which powers it for the 100-hour training period. The suit costs $60,000 and weighs 20 pounds.

Instaskill (TL11+)

This is one of several trade names for a series of tailored injections of modified human memory RNA. Instaskill comes in many varieties, each corresponding to a specific Mental skill; each "dose" gives the user the equivalent of skill 10 in the specific skill (+1 per TL after 11).

Instaskill is only available in hypo form. Twenty-four hours after injection (the RNA needs time to replicate), roll vs. HT; the effects last for two hours per point the HT roll is made by, with a minimum of 1 hour.

Instaskill costs $500 per dose for a Mental/Easy skill, $900 per dose for a skill that is Mental/Average, $1,500 per dose for a Mental/Hard skill, and $2,500 per dose for a Mental/Very Hard skill.

There are no drawbacks to repeated use. At higher tech levels, the GM may allow memory RNA injections to last longer, or even to become permanent. If such injections are common, anyone can know any skill for no cost except a few dollars, which would have an interesting effect on game balance . . . For game purposes, it is probably better to assume that the injections remain rare or expensive, and charge the normal character points for skills learned this way.

ENTERTAINMENT TECHNOLOGY

HOLOVENTURE (TL9+)

Holographic technology, coupled with increasingly sophisticated computers, permits the creation of realistic adventure-theme parks. For $150/day, gamers can join a party of like-minded individuals for several days of escapism in the setting and genre of their choice

Special effects, from wizardly lightning bolts to vast battles, are easily accomplished by holograms and directional mikes, aided by occasional live actors and remote-control robots. Using sophisticated laser and visual range finders, a Complexity 7 computer monitors the interaction between the live adventurers and the holograms, and makes them react accordingly: it can even "overlay" holographic images onto a living person.

Holoventure technology is not restricted to recreational use; less sophisticated systems provide special effects for stage productions, while holoventure systems are used in realistic military and Survey Service training exercises, particularly for mission rehearsals.

DREAMGAMES (TL10+)

Also known as "feelies" or "micros," these are plug-in interactive game programs that are run on a Complexity 5 or better computer. The difference between dreamgames and other recreational software is in the use of a neural-induction helmet or neural-interface implant (see p. 37). The user jacks in or dons his helmet and is plunged into the setting and fiction genre of his choice. Suddenly he *is* Colonel Orion of the Imperial Marines leading a battlesuit assault, or the richest person in the world, or an English noblewoman captured by pirates in the Caribbean . . .

The most popular sorts of such games are action-packed adventures, romances, pornographic odysseys and "horatios" (dramas where the character rises from humble beginnings to vast wealth, and enjoys the fruits of his labors). Some of the stories have preset lengths – usually ten minutes of real time – but each real-world minute seems like ten. More elaborate setups have stories that can go on for hours of real-time, with players participating in 20- and 30-minute sessions, picking up each time where they left off.

Since neural-induction helmets are expensive, and the only computers capable of running dreamgames are complex and expensive, most individuals don't own their own dreamgames. Instead, the customer accesses a user-net for the dreamgame he wants, and is charged about $2 per real-time minute. An individual dreamgame program costs $4,000+.

Playing dreamgames for longer than 30 minutes can be hazardous to one's mental health – even addictive. To avoid addiction, make a Will roll if playing for more than a half hour, at -1 per extra hour. Dreamgame addiction is treated as an expensive, highly-addictive, incapacitating Addiction (see p. B30). Dreamgames are usually legal, a daily fix costs $240, and most users spend two hours incapacitated per day. Starting with a Addiction (Dreamgames) is worth 30 points. (Dreamgame addicts also often have the Delusion that one or more of their games is the real world, and "reality" is the game.)

By TL11, neural-interface implants are common, and most home computers can run dreamgames. Much informational and instructional software uses dreamgame-style interactive techniques. Since anyone can plug one into his own home computer, dreamgame addiction becomes a serious social problem.

INTERACTIVE HOLOPROJ (TL11+)

Interactive-holoproj programs are special programs for the interactive holovisor (see p. 39). When the holovisor is linked to a neural interface implant, the user can actually *control* the hologram through the interface, at least within the limits of its programming.

Because of the complexity, usually only a single moving image is possible, but most programs allow that image a large range of actions. A holographic dragon could be made to lunge, spread its wings, roar (soundlessly), or by using the visor to move the projection, fly across the room, or even suffer wounds if a real (or holographic) weapon intersected it.

The sole restriction is that the holovisor can only project into a single six-foot cube at once. Several things can be going on in that area projection (dozens of separate images doing different things) and the projection can be moved around, but the different things cannot be separated by more than a yard of space. If the dragon breathed fire at someone across the room, either the image of the dragon or that of the fire would have to flicker off for an instant as the projection focus was moved. More complex manipulations (doing this in an instant so it *seems* as though the dragon breathed instantly) may require a roll against Electronics Operation (Holographics) skill to pull off realistically.

A holoproj program usually costs $1,000. Interactive holoproj disks require a Complexity 4+ computer to program and require a roll against Electronics Operation (Holographics) and Computer Programming. Making a simple program (a realistic spider that moves around, crawls up people's arms, spins glowing webs, and so on, over a six-minute loop) requires a roll against skill at -2 (+1 per computer complexity over 4) and take a day and 100 gigs of memory.

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UNSECURED

To adventurers, police and soldiers, perhaps the most important tools of all are weapons – a grim commentary on the nature of sentient life in the universe. This chapter is broken down into a *Timeline* (below), *Ranged Weapons* (pp. 43-61), *Melee Weapons* (pp. 62-63), *Weapon Accessories* (pp. 64-66), *Explosives and Grenades* (pp. 66-70) and *Biochemical Weapons* (pp. 70-71). Armor and other defenses can be found in Chapter 5, *Defense*. Infiltration gear is covered in Chapter 7, *Covert Ops*. Weapons statistics are listed in *Weapons Tables*, pp. 124-126.

TIMELINE

This timeline outlines the evolution of offensive weapons from TL8 to TL16. For an idea of how the average infantryman might be equipped at each TL, see the sidebar *Gear!*, pp. 5-7.

TL8

The first practical personal electromagnetic weapons appear: Gauss needlers and lasers. Rapid-fire, continuous-beam lasers are the deadliest small arms, but cheaper, chemical propellent slugthrowers are in wide use early in the TL, and remain common military weapons until TL9. Gyroc weapons – rocket guns – are a compromise between expensive lasers and cheap chemical weapons. They are recoilless and extremely versatile. All personal weapons are constructed of high-impact plastics or composite plastic/ceramic materials.

Shoulder-fired guided missiles and electromagnetic mass drivers – larger cousins of the Gauss needler – are the standard support weapons of TL8. Hand grenades are still used for close combat, but all hand grenades are also designed to be fired by electromag launchers, eliminating the need for two different kinds of ammunition.

Standard features on all ranged weapons are LCD displays which show the number of shots remaining in the power cell or magazine, and "space proofing" (see p. 64) so that the weapon will not shatter or malfunction when fired in vacuum conditions. Cheap weapons, and leftovers from TL7, usually lack these features. Laser scopes, head-up display sights and personalized firearm locks are all available at extra cost – see *Weapon Accessories*, p. 64.

Close combat weapons benefit from improvements in materials technology and power-storage capacity as well. Vibroblades and stun wands represent the first generation of powered melee weapons.

TL9

All weapons are made of tough synthetics or non-metallic plasteel, with components well protected; standard blaster and laser rifles are as tough as any projectile weapon and can quite easily be used as cudgels without breaking. With space travel being common, every weapon is completely "space proofed" as a matter of course and can be fired safely in a vacuum, or in extremes of both temperature and humidity.

Most personal weapons are energy-based. Lasers continue to be used, with a variety of special-purpose designs, from easy-to-conceal holdouts to the massive "dinosaur" laser; the main thrust of TL9 laser design is toward specialized weapons, whether for infantry support, big-game hunting or concealment. Blasters and flamers offer alternatives to the laser for combat. While lacking the laser's versatility, neither weapon is handicapped by smoke or prismatic clouds. Gauss weapons firing hyper-velocity bullets also appear.

The Gatling laser and guided missile are the basic infantry support weapons carried at the squad level; both are capable of damaging battlesuits or armored vehicles. Short-ranged tripod flamers and tripod screamers are also issued to some troops, especially for starship boarding actions. Electromag mortars and grenade launchers remain in use, with smarter and more powerful ammunition.

Nonlethal beam weapons – stunners and electrolasers – give the gunman a way of harmlessly disabling an opponent at a distance without the massive recoil and limited ammunition of a tangler. But since zapping someone with a stunner results in nothing more permanent than a bad headache, stunner-armed security guards or police may be more likely to shoot first, then ask questions. Where stunners are widely available, muggers, bank robbers and even suspicious civilians are likely to be just as trigger happy. In fact, the stunner's major disadvantage is that it is a poor threat, since the worst that can happen (other than capture) is being knocked unconscious for a few minutes. Troops armed with stunners may stop a riot without casualties – but they won't *deter* it!

The antithesis of the stunner is a weapon such as the microwave disruptor or sonic screamer. These are nearly useless against well-protected soldiers, but devastating against unarmored individuals. Disruptors and screamers are terror weapons, pure and simple, used by forces which maintain order through fear. They are the favorite weapons of terrorists, political assassins and criminal hit-men wanting to make an "example."
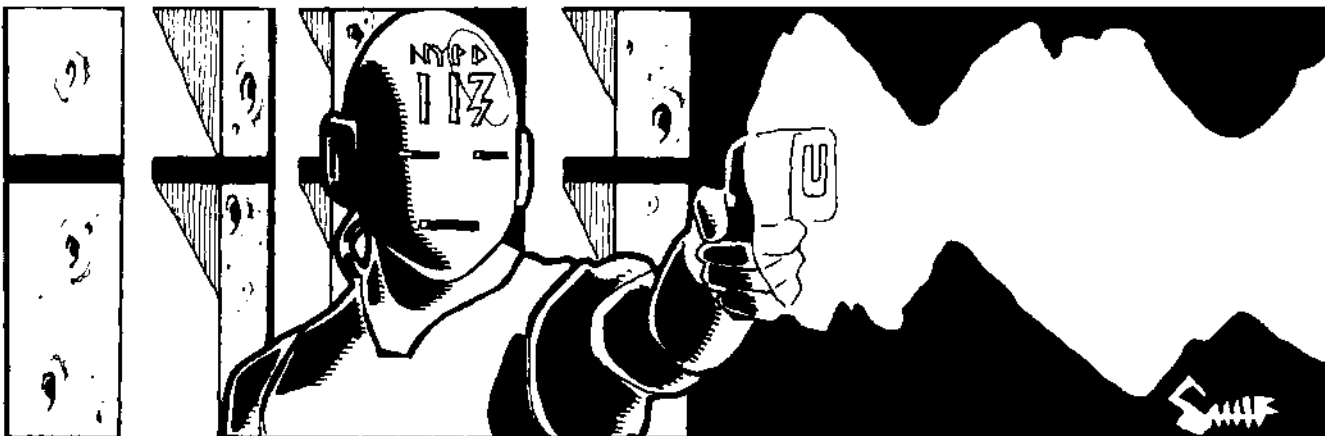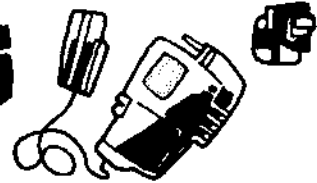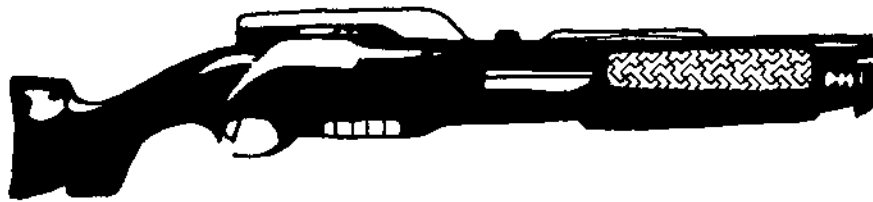
Non-powered melee weapons reach a peak of efficiency, as the same monomolecular technology used to construct orbital beanstalks is harnessed to create lethal melee weapons.

TL10

Most TL10 weapons (except holdouts) incorporate laser and holographic sights. Many are fitted with an interface jack for use with a neural-interface implant, adding $500 to the cost. A voice-activated, dedicated computer ties all the weapon's electronics together and diagnoses any malfunctions. This gives +2 on skill (and an additional +1 per TL after 10) when rolling to correct the problem (unless the GM decides the weapon's *computer* is malfunctioning)! Recognition grips and transponder modules (p. 66), available at half cost and weight, are in common but not universal use.

The basic infantry weapon is the military X-ray laser rifle. Adventurers, criminals and police still use blasters. Tanglers and stunners remain the standard nonlethal weapons, supplemented by the paralysis gun. Nerve guns are used by the police of repressive regimes and by prison guards and slavers.

The basic TL10 infantry support weapons are brilliant missiles (see p. 54) and X-ray Gatling lasers, though grenades are also still in use. TL10+ brilliant missiles now may use neutrino-communicator passive designators (see p. 65); all TL10+ clever missiles are now as smart as TL9 brilliant missiles, but *cannot* use passive designators.

TL11

Paralysis guns, X-ray lasers and blasters remain the weapons of choice, supplemented by the force sword for close combat. Every personal weapon now includes a diagnostic computer (which adds +3 to any repair rolls, as long as it isn't the computer that broke down), holographic and laser sights, and an interface port. There are few radical changes in the physics behind personal weapons, but weapon design undergoes a quiet revolution, with multipurpose versions of several existing weapon types becoming available.

TL12

Personal weapons remain basically the same as TL11, but because neural interfaces (introduced at TL10) are now ¼ price, it's common to find that a weapon has *no* manual trigger. Any TL12 weapon may incorporate a security system, similar to that used in the TL11 electron pistol (see p. 57), for $500. Force beams and fusion guns are introduced, outgrowths of gravity and force-field manipulation. Nonlethal hypnagogic projectors are developed, progressive refinements of nerve and paralysis weapon technology.

TL13

Many TL13 weapons are made of living metal (see p. 18). They have all the usual enhancements (laser sights, interface jacks, etc.) common to previous TLs. Although electron weapons, X-lasers, hypnagogics and fusion guns remain in use, two new military weapons are introduced – the pulsar and the hunter missile.

TL14

Although antimatter warheads small enough to fit in grenades are possible, personal weapons are designed to deliver relatively restrained amounts of energy with great precision. Smartguns and grasers are more efficient and accurate than earlier weapons, but in terms of raw power, only slightly more lethal.

TL15

TL15 weapons generally incorporate the same features as TL14 weaponry at no extra cost – living metal, laser sights, diagnostic computers, interface jacks, recognition grips. TL15 weapons may also be capable of other feats – projecting a force shield to protect the user, or changing shape to become other weapons or gadgets. A weapon could have an AI computer built into it; when the user interfaced with the gun, it might take over his mind (see *Computer Implants*, p. 110) . . .

TL16

At TL16, warriors attack each other by changing the foundations of universal reality. Battles have some very interesting side effects; an innocent in the line of fire is in more danger than ever.

RANGED WEAPONS

The most stunning advances in weaponry occur in the area of ranged weapons, where virtually every major advance in physics, engineering or materials science is mirrored by an advance in deadliness and accuracy. This section covers advanced ranged weaponry; chances are that if it shoots, then it's here somewhere.

CHEMICAL SLUGTHROWERS (TL8+)

Conventional pistols and rifles use a chemical reaction to propel a solid projectile, causing damage through kinetic energy. The main advance over TL7 firearms is in the ammunition. Rather than using an ejectable cartridge case, the bullet is embedded in a solid cake of propellant, which is consumed when the bullet is fired. Caseless ammunition lowers bulk and weight and increases magazine capacity. Ammunition is usually in pre-packed disposable cassettes; a whole cassette can be

loaded into the weapon's magazine at one time, or cassettes can be broken down and a magazine topped off with loose rounds. Loading or reloading a cassette takes three seconds; Fast-Draw (Magazine) can reduce this to one second. Topping off with loose rounds takes one second per round.

Another benefit is that no ejection port is needed for spent cases – the weapon can be completely sealed against dirt. TL8+ chemical slugthrowers have a *Malf* (malfunction number) of *Ver.* This means that they only malfunction on a verified critical miss. On a critical miss result that is a weapons malfunction, (jam, misfire, etc.) roll again against Guns. Any failure verifies the roll and the weapon malfunctions; any success is simply a miss and the weapon keeps working.

In general, slugthrowers are common at TL8, rare for the military at TL9 and rare for anyone at TL10. Manufacturing chemical-propellant ammunition is a complex process, and the end result has only one use. Power cells operate anything from a hair-dryer to a life-support system; at TL8+ they can be found anywhere. The growing sophistication of chemscanners makes chemical ammunition a positive danger. It consists of mixtures and compounds not likely to be found in nature. By the end of TL8, chemscanners can find any weapon that fires and any substantial quantity of ammunition. By the end of TL9 chemscanners can find any unfired round of ammunition. (They can also find any chemical-based life form, but not even the High Marines get to kill things just because they are alive; killing anything that carries ammunition is another matter.)

All conventional slugthrowers suffer penalties in zero or micro gravity – minimum ST to hold recoil is increased by 5. Muzzle brakes are available for all guns at 50% of the cost of the weapon; with a muzzle brake, the increase to minimum ST is only 3.

Modifications

Autofire: Both the machine pistol and assault carbine described below are fully automatic weapons, but semi-automatic (RoF 3~) civilian versions are available; legality class is 2 higher. If he doesn't mind risking jail, a gunsmith can convert one to full automatic in four hours on a successful Armoury-2 roll. Failure requires another try (and four more hours), critical failure breaks the gun.

Special Ammunition

A variety of special ammunition is available for conventional slugthrowers:

Armor-Piercing Saboted (APS) (TL8+): These rounds use a high-density depleted uranium or tungsten-carbide penetrator encased in a much larger plastic sheath – the "sabot" – which is designed to fall away as the round leaves the barrel. This gives a flatter trajectory and much higher velocity to the smaller, sub-caliber bullet. Increase ½D and Max ranges by 50% and add +1

to damage per die. More importantly, the target's armor (but not force screens) protects with only half its DR. However, because of the small size of the projectile, APS rounds do less damage to living tissue; halve the damage that gets through armor (round damage down). APS rounds cost five times as much as standard ammunition and are Legality Class 1.

Plastic Bullets (TL8+): These are used for riot suppression. They do half the damage of regular ammunition, and have half the normal range. They are still deadly, particularly if they hit the brain or vitals. They cost the same as normal rounds and are Legality Class 4.

Explosive Bullets (TL8+): These inflict -1 damage per die (e.g. an assault carbine does 6d-6) and double the DR of any armor they hit. In addition, they do 1d of explosion damage. If this explosion damage is on the surface of personal armor, it only does blunt trauma damage to the target underneath (1 point of crushing damage for each 5 or 6 rolled). If the bullet penetrates armor and buries in meat, the explosion damage is 1d×5, in addition to the bullet damage. Explosive bullets have a 50% chance of setting fire to flammables. Explosive ammunition is twice the cost of standard ammo and is Legality Class 0.
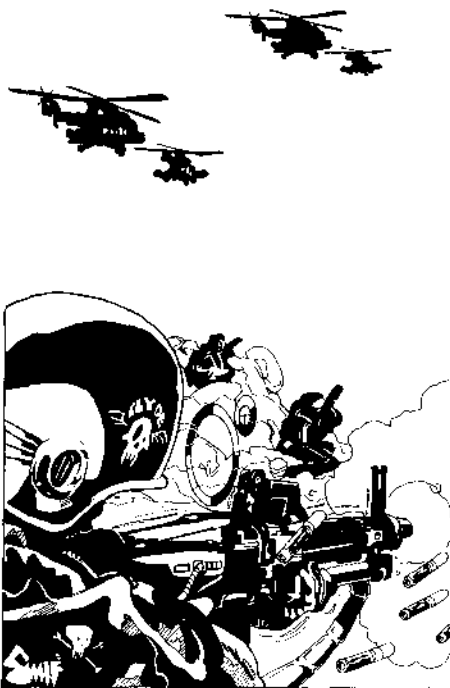
Sporting Pistol (TL8+)

Used for small-game hunting and target shooting, the sporting pistol is likely to be available and legal even if other gunpowder weapons are not. It fires the caseless .20 Short round, which does only 1d damage; special (explosive, armor-piercing) ammo could be custom made for it at triple cost, but is not usually available. It uses the Guns (Pistol) skill. Ammo weighs ¼ pound and costs $10 per ten-round cassette.

Machine Pistol (TL8+)

This is a typical TL8 military sidearm, firing a caseless .40 caliber bullet from a 30-round magazine. Loaded with armor piercing or explosive bullets, this weapon can penetrate light combat armor. Because of the bullet's high caliber, damage that gets through DR is multiplied by 1.5. Recoil is only -1 if used two handed. It is fired using the Guns (Pistol) skill. An efficient silencer is available ($200, one pound); when silenced, damage is only 2d+2, but a Hearing roll at -2 (0 if autofired) is needed to hear it even if the listener is in the same room. Ammo weighs one pound and costs $20 per 30-round cassette.

Assault Carbine (TL8+)

The carbine is a short, bullpup-style .27 caliber automatic rifle, fired using the Guns (Rifle) skill. A staple of early TL8 armies, it is cheaper to build than a military laser, though not as lethal nor quite as good at penetrating armor, even with APS bullets (see above). One feature is its twin 30-round magazines,

both feeding into the same firing chamber. Each magazine can be loaded with a different type of ammunition, usually a mix of armor-piercing and explosive rounds. The firer can select between magazines; on a successful skill roll this does not take an action, but it must be announced before firing. Ammo weighs one pound and costs $30 per 30-round cassette.

Gauss Needlers (TL8+)

Gauss needle weapons use the Guns (Needler) skill. They use a magnetic impulse to fire heavy steel slivers. They are recoilless automatic weapons.

Monocrys has minimum resistance to needles (see p. 74). Gauss needlers are widely used by security guards and by anyone stationed on a primitive planet. They are not as heavily regulated as beam weapons, are small in bulk and weight, and can fire a lot of shots without reloading. They are also hard to detect. Chemsniffers and TL9 chemscanners can't find them at all, and radscanners have trouble because they emit relatively little radiation when firing.

The enormous rate of fire of Gauss needlers makes them especially deadly to unarmored targets. Since they are effectively recoilless, it is easy for a skilled shooter to get most of the shots from a long burst into the target. The long needles are unstable in flesh; damage to living tissue (that which gets past DR) is multiplied by 2. Their weakness is rigid armor; the thin, frangible needles disintegrate against anything they cannot penetrate. DR of anything but open-weave armor (mail, Kevlar and monocrys are open-weave) is doubled against needles.

Gauss needlers produce a crack as the needle breaks the sound barrier. However, since they have no muzzle flash, this sound is hard to localize; a Hearing-2 roll is necessary to locate the firer by sound alone.

Each Gauss pistol and rifle magazine contains a B cell, which is almost completely discharged after firing its 100 needles. Magazines can be reloaded with a new cell and needles; this takes an Armoury roll and 60 seconds. A fully-loaded and charged pistol magazine weighs one pound and costs $55; a rifle magazine is 1.25 pounds and costs $65. Needles are $25 and 0.75 pound per 100. Needles for Gauss rifles and pistols are interchangeable, but the magazines are not. Ammo for spring needlers and Gauss needlers is not interchangeable.

Modifications

Variable-Velocity: For an extra $500 a Gauss needler may have a variable-velocity setting (it takes one turn to switch settings). Needles can then be fired at normal or low velocity. When fired on low-velocity setting they do ½ damage, but are *subsonic;* the noise they make is no louder than a mosquito. On low-velocity setting they can also fire tracer needles or drugged needles – use the spring needlers rules, p. 50.

Special Ammunition

Hyper-Velocity Spheroids (TL8+): Used in Gauss needlers, these are tiny (.02-caliber), spherical pellets made of low-density metal. They lose energy rapidly, making ricochets and stray shots less dangerous, and so are favored by police. Damage is the same as for Gauss needles, but *crushing* rather than impaling. ½D and Max ranges are ⅒ normal! HVS are smaller; a magazine has twice the shots. Ammo costs and weighs the same. Armor has its normal DR against HVS.
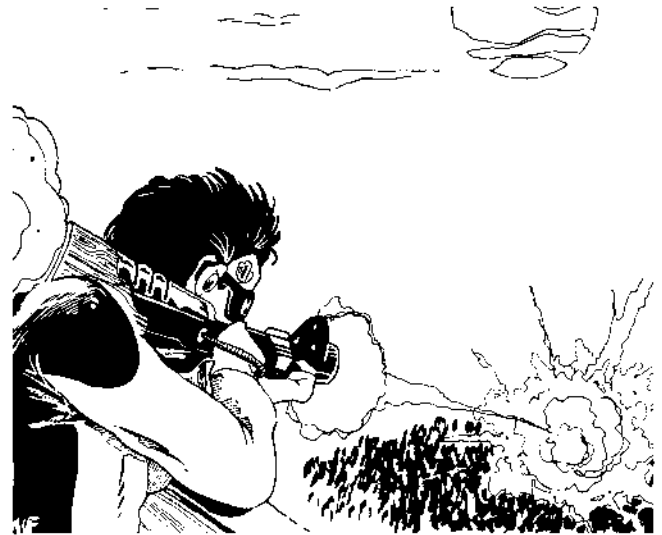
Grenade Launchers (TL8+)

All grenade launchers may fire any of the grenades described under *Grenades* (see p. 67), usually set for contact detonation, though they may be timed instead. Misses will result in scatter; see p. B119. In magazine-fed launchers, grenades of different types may be mixed in each load. At TL9+ laser-guided *clever* grenades are in use (requiring an *active designator,* p. 64). Most of these weapons require Guns (Grenade Launcher) skill, except for the Electromag Mortar, which requires Gunner (Mortar).

Electromag Grenade Launcher (TL8+)

An EMGL is a short, stubby, shotgun-like weapon, similar to 20th-century grenade launchers, with a magazine of five grenades. Essentially a small mass-driver, it uses a magnetic impulse to propel grenades. It is recoilless, and except for the crack as the grenade breaks the sound barrier, silent.

Electromag grenade launchers may fire one round per turn. Grenades may also be loaded and fired one at a time, but it takes one second to load each grenade and one second to fire. A magazine weighs five pounds; cost depends on the load. The launcher will fire 10 grenades on a C cell.

Modifications: For an extra $500 the launcher's velocity can be varied by the gunner, so subsonic shots can be fired, silently, with ¼ normal range.

Automatic EMGL (TL8+)

At triple the above cost and weight, fully automatic versions of the electromag grenade launcher are available. Automatic EMGLs fire from a 20-shot magazine (weighing 20 pounds), with a RoF of 4.

Mini-Grenade Launchers (TL8+)

A small Electromag Grenade Launcher, which may be mounted under the barrel of any TL8+ rifle or carbine, or fired like a pistol. It fires one round per turn from a magazine that holds 3 grenades. Reloading a magazine takes 1 second per grenade.

The mini-grenade launcher can fire 15 times on a single C Cell.

Electromag Mortar (TL8+)

Basically a large indirect-fire electromag grenade launcher, this weapon is a heavy base-mounted tube. All grenade types described under *Grenades* (see p. 67) are available as mortar shells. In general, use the rules for grenades, but cost and weight double. A fragmentation or concussion shell does 6d×4 damage at TL8, 6d×6 at TL9+; a gas shell covers an 8-hex radius.

Cluster Bomblet (TL8+) shells are also available for mortars. They burst overhead, scattering six bomblets over a 15 yard radius around the impact point. Assume each bomblet scatters in a different direction, landing 3d-3 hexes away from the target hex. Each bomblet does 4d concussion damage and 2d (cutting) fragmentation damage. Cost of cluster bomblet shells is $80.

Strobe (TL8+) shells are available for mortars as well; see *Strobe Mine*, p. 69.

GYROCS (TL8+)

Gyroc weapons fire .50 caliber spin-stabilized rockets. Along with lasers, gyrocs are the basic infantry and police weapons of TL8. Their use of a standardized caliber of ammo for all gyroc pistols, carbines and machine guns makes them easy to supply, while the low stress of rocket firing enables them to fire high-caliber bullets without requiring heavy construction. Almost half of a gyroc weapon's weight is its ammo load. Although outmoded as military weapons after TL9, gyrocs remain in use as police and special forces-issue weapons because of their versatility, especially after smart, *viper* rounds become available at TL10 (see below). Gyroc weapons use the Guns (Gyroc) skill. Effectively recoilless, they are not silent. The hissing sound the rockets make is hard to localize, though; a Hearing-2 roll is needed to spot the firer by sound alone.

Gyroc weapons are available in pistol, carbine and machine gun configurations, but the different weapon types only affect the weapon's SS, Acc, range and RoF; damage of a gyroc weapon depends on the ammunition being used. There are several different types of gyroc rounds, each designed for a different application – see below.

Gyroc Ammunition

Since they are propelled by a rocket motor, gyrocs have a flat trajectory and a long ½D range. They lose velocity fast when the motor burns out, so maximum range is not much longer. Gyrocs start slowly and do less damage close to the muzzle; see the descriptions below.

APEX (Armor-Piercing EXplosive) (TL8+): APEX is the usual military round. It has a big motor and the projectile is a maximally-streamlined shell around a super-hard penetrator packed with explosive and fitted with a delay fuse. APEX halves the DR of armor it hits. APEX rounds have a fast-burning first stage; they do 3d crushing damage to one yard, 6d to two yards and 8d from there to ½D. In addition, they do 1d+3 explosive damage. If the projectile is in flesh when it explodes,

damage is multiplied by 5. APEX rounds have a 50% chance of igniting any flammable they explode against. Legality Class is 0. Because the initial firing is so much more boisterous, unfamiliarity penalties are doubled for anyone shooting APEX rounds. APEX rounds cost $500 per hundred.

CHEM (CHEMical) (TL8+): The CHEM round does 1 point of crushing damage to one yard, 1d-3 to two yards and 1d to ½D. The filler covers one hex for three seconds. Price is $100 per hundred, plus filler costs.

HEX (High EXplosive) (TL8+): HEX rounds are designed for use against unarmored targets. They do 1d of crushing damage to one yard, 2d to two yards and 4d to ½D. In addition, they do 2d explosive damage. Buried in flesh, explosive damage is multiplied by 5. HEX has a 2 in 3 chance of starting fires; the incendiary effect is enhanced. Legality Class is 0; cost is $300 per hundred.

SLAP (Standard Light Anti-Personnel) (TL8+): SLAP is the usual police and civilian load for gyroc weapons. This round does 2d crushing damage to a range of one yard, 4d to a range of two yards, and 6d thereafter as it reaches full velocity. Because of its large caliber, damage that exceeds DR is multiplied by 1.5. Legality Class is 2 and cost is $150 per hundred.

Stingray (TL8+): The stingray round is a highly-charged capacitor sheathed in an insulator which is burned off in flight. The stingray does 1 point of crushing damage to one yard and 1d-3 to two yards. Beyond this, it does 1d crushing damage and delivers an electric shock. The victim must roll against HT, with a +1 to HT per 5 points of armor DR. On a critical success he takes no damage. On a success, he loses 1d fatigue. On a failure, he loses 3d fatigue. On a critical failure, his heart stops and he goes to 0 HT. He dies in HT/3 minutes unless someone makes a CPR roll (against Physician or First Aid-4) to save him. Legality Class is 2 and cost is $300 per hundred.

Viper Gyrocs (TL10+): Usable in any TL8+ gyroc weapon (see below), viper rounds are smart bullets; in effect, tiny guided missiles. Vipers can't shoot around corners (their sensors are not *that* smart, and gyrocs lack the maneuverability to do so), but they *can* make minor course corrections to stay on target. They are very accurate; TL10 military units, anti-terrorist forces and SWAT teams use them as long-range sniper weapons, especially against lower-tech opponents who lack infrared countermeasures.

Viper rounds have the normal chance to hit, including target size and speed, but they *ignore* all modifiers for *range*; the rocket's seeker head will sense body heat and control the round's fins or attitude jets to correct its course. However, Vipers are -10 to hit targets whose armor has IR cloaking, and a strong heat source within five yards of the path between the firer and the target (e.g. a fire) will cause the round to miss. Unlike a larger missile, the viper will either hit or miss during the firer's turn.

Viper rounds costs five times as much as normal Gyroc ammunition. They are available in all the standard types listed above (APEX, SLAP, etc.); Legality is the same.

Launch Pistol (TL8+)

This is a standard police weapon, usually loaded with stingray, CHEM and SLAP rounds (see above). It uses three separate magazines (on the bottom and each side) feeding into the same firing chamber. Each magazine has a three-round capacity. The pistol can be set to strip a round off any magazine. Selecting a magazine can be done in no effective time with a Guns roll; failure counts as a ready-weapon action. This allows rapid alteration between different ammunition types in the middle of a fire-fight. The gun will automatically switch to the next magazine if one is emptied, moving from bottom to right to left to the bottom magazine again. Each three-shot cassette of gyrocs weighs ½ pound and costs $6.

A six-shot revolver version of the launch pistol is also available; there is only one magazine and the cost is halved, but different rounds can be loaded into each chamber. Loading is with loose rounds, not cassettes; loading each chamber takes two seconds. Police usually load two stingray or gas rounds and four SLAP, figuring that two chances to surrender are enough. Six loose rounds weigh 1 pound and cost $12.
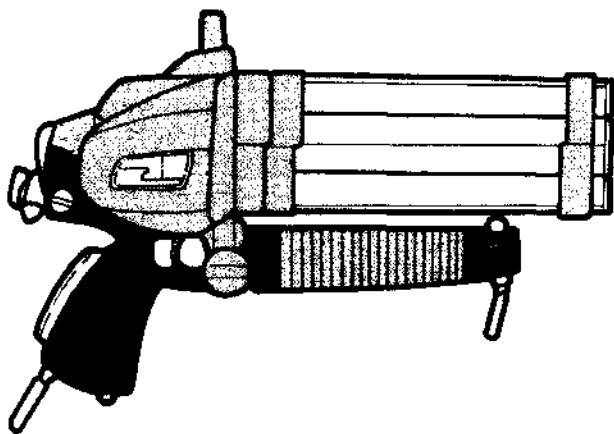
Rocket Carbine (TL8+)

The carbine is a rapid-fire military assault weapon. It has two magazines, each with ten rounds, and is capable of automatic fire. Switching between magazines uses the same procedure as the launch pistol, described above. When one magazine is empty, the weapon automatically switches to the next. Ammunition weighs 1.5 pounds and costs $20 per ten shot cassette.

Automatic Rocket Launcher (TL8+)

The third weapon in the gyroc series, the ARL is a general-purpose machine gun. Loaded with a cassette of APEX rounds, it is often mounted as a secondary weapon on armored fighting vehicles. With gas or stingray rockets, it is used on police vehicles for riot control. Until the introduction of the Gatling laser at TL9, the ARL is the most common squad-level machine gun. The weapon is loaded with three separate 20-round cassettes and the gunner can switch between them each turn (see *Launch Pistol*, above). When one is empty, the weapon automatically switches to another. Ammunition weighs three pounds and costs $40 per 20-shot cassette.

Lasers (TL8+)

At TL7, LASER was an acronym for "Light Amplification by Stimulated Emission of Radiation." At TL8+, the name has become generic; any coherent energy beam is called a laser. A laser has effectively no recoil, either for successive shots in the same turn or for successive groups in a burst. It is thus so accurate that the dispersion of shots is less than the diameter of the beam. Because of this, automatic fire lasers use special rules.

Laser Autofire: When a laser is fired on full automatic setting (see p. B119-120 for automatic fire rules), successive shots from *all* groups fired in the same turn at the same hit location are effectively a single beam. Instead of making defense rolls and applying armor or force screen DR separately against each "round" that hit, only one defense roll is made, and if it fails, the damage from all rounds striking the target is totalled into a single damage roll *before* subtracting DR.

For example, if eight 2d shots are fired, and five of them hit, the target would get *one* Dodge or PD roll. If he made it, the entire burst would miss. If he failed, all five rounds do damage as a single 10d attack, which will have a much better chance of penetrating armor than five separate 2d attacks!

Semi-automatic lasers cannot be held on target precisely enough to get this armor-penetrating bonus. The mechanical action of firing each shot is enough to disperse it. On civilized worlds, politicians laud this; after all, no sportsman needs that kind of power to kill animals! And civilians don't need to protect themselves from armored criminals; that's what the police and army are for! Libertarian or frontier societies may have different outlooks on this.

Lasers are fired with the Beam Weapons (Laser) skill. They do impaling damage, so damage that gets through DR is doubled. Reflec armor is very effective against lasers, as are some mirrors and other reflective surfaces. In rain, fog or smoke, lasers do half damage or less. Smoke bombs and blackout grenades block lasers entirely.

In vacuum, laser weapons are silent and invisible, but not in any kind of atmosphere — while the beam itself is invisible, a laser weapon (though not, of course, a normal sighting or communication laser) is powerful enough to ionize the air, leaving a trail of sparks and producing a sharp crack as air rushes into the vacuum left in its wake. While this means it is easy to spot a laser gunner, when autofired it enables the laser firer to see exactly where his shots are going and use the weapon like a garden hose (see *Aiming Successive Groups*, p. B121), greatly improving accuracy.

Lasers are especially damaging to the eyes. On any laser hit to the eye (see p. B203) that does *not* penetrate the DR of the

victim's visor or goggles, roll versus HT, at +5 if wearing anti-glare goggles. A failed roll indicates that the victim is blinded; however, he may recover later – roll as per crippling injuries. On a laser hit to the eye that *does* penetrate DR, all damage is doubled, and permanent blindness will almost certainly result. A laser hit to the eyes does double damage to the eye after DR, *instead* of scoring an automatic brain hit for quadruple damage. In this case, roll versus (HT damage) to see if the eye is blinded permanently.

Modifications

Lasers are often modified; a few possible modifications are:

Legal Modifications

Blue-Green Lasers: Any laser weapon can be modified to use a blue-green frequency at 20% extra cost. This allows underwater or surface use, but halves the range. Non-blue-green lasers have ⅙ range underwater. X-ray and gamma-ray lasers fire underwater without penalty.

Laser Sight: For an extra $50, a laser weapon can serve as its own laser sight (see p. 64). The weapon then has a two-stage trigger: first, pressure on the trigger activates a low-intensity aiming beam that places a visible dot where the weapon is pointed. When the target is acquired, the firer simply presses harder to increase the intensity of the beam.

Variable Beam: For an extra $100, a laser can have a more variable beam, making it useful as a tool. Welding uses one "shot" every five seconds; cooking a meal would use one shot per minute; a weapon can even be used as a flashlight, expending one shot every five minutes. A variable-beam laser weapon can also be used to light a fire, expending a trivial amount of energy (100 fire starts in dry wood equal one shot; GMs can decide how much more for damp wood if the problem comes up).

Illegal Modifications

It is possible to convert a civilian laser weapon to military specifications, giving it a continuous beam, higher power or more shots – see *Autofire* and *Hotshotting* (below) and *Powerpacks* (under *Weapon Accessories*, p. 65). It is illegal
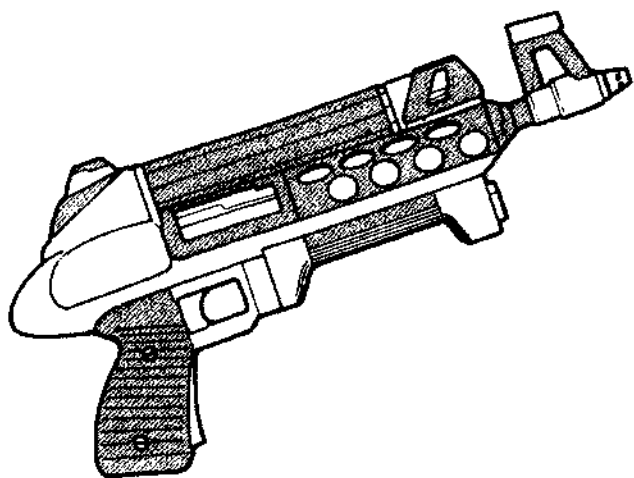
almost everywhere to hotshot a civilian weapon or convert one to full auto; the weapon is considered Legality Class 1, and penalties range from fines and confiscation to death.

Hiring someone to do a conversion is expensive. In addition to parts, and adding in "hazard pay" for the possible penalties, the rate is likely to be over $1,000 a day for competent work. (Of course, there are usually cheaper workers available; their work is worth the price.)

Any knowledgeable policeman or soldier can recognize a full-auto laser with a brief examination (roll against Beam Weapons+2 or Electronics (Weapons)+3 for a few seconds' examination, add +2 to skill for a detailed (one minute) study.) Hotshotting is harder to detect (an additional -3). Of course, either can be discovered by firing the weapon – if a power cell is present.

Autofire: A laser rifle or survival laser can be converted to military specifications (RoF 8). There are three levels to which it can be modified:

First-level conversion merely makes it dump energy faster. This is a simple conversion (eight hours work in an electronics shop and one successful Electronics (Weapons) roll; (roll at the TL of the *weapon*). The parts cost $500. The laser now fires full auto at RoF 8. It cannot fire less than eight shots per second. When firing full auto, any roll of 16+ on the first group of four shots or 15+ on the second means the laser burns out and will never fire again; it cannot be repaired. On a 17 or 18, it also does 1d of burn damage to the firer.

Second-level conversion takes three days and three successful Electronics (Weapons) rolls, at a cost of $1,000 for parts. The laser malfunctions only on a 16+. It burns out as above only on a critical failure. On a 16 it overheats, taking 1d minutes to cool before it can fire again.

Third-level conversion takes five days and five successful Electronics (Weapons) rolls at a cost of $2,000. This effectively rebuilds the laser to near military specifications. The laser malfunctions only on the usual misfire or jam results of a critical failure. There is a 50% chance it burns out completely and does 1d of burn damage to the firer. If not, it just overheats as above.

These modifications are full auto only. To install a selector switch takes one additional hour and another successful Electronics roll. Any failed roll during the conversion process adds one full day to the conversion. Any critical failure ruins vital components; the weapon is functionally destroyed and will never fire again.

A problem with such modified lasers is that they sometimes won't shut off. On any malfunction, one option the GM can choose is that the laser will simply keep firing until the power cell is exhausted. This should only happen when it is most embarrassing and dangerous, in conformity to the Law of Murphy.

Hotshotting: Any laser can be "hotshotted," modified to get a more powerful beam. Military laser rifles, military laser carbines, and heavy laser pistols are always designed for hotshotting (this is the laser equivalent of armor-piercing ammunition). Hotshotting gets a five-for-two trade off; for five shots' worth of power, the laser does double damage. For example, a heavy laser pistol gets 12 shots from a C cell. Each shot does 2d damage. A hotshot uses five shots worth of power, so the cell would only allow two hot-shots – but each shot now does 4d damage. Switching a laser to fire hotshots takes one turn. Hotshots and autofire can be combined. This is deadly, but it uses up power very fast.

Civilian laser pistols, laser rifles, and TL9 survival and hold-out lasers that are hotshotted are unreliable and burn out rapidly.

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On any critical failure, in addition to any other result, they burn out and will not fire again. On any jam or misfire result they do 1d of burn damage to the firer. On every shot after the first, they malfunction on a roll of 10+ and any malfunction burns out the weapon. Hotshotted holdout lasers do 1d of burn damage to the firer when they burn out. A weapon can be modified for both hotshots and autofire.

Any military laser rifle or heavy laser pistol takes no damage from the shot, it just uses more power.

Hotshotting a laser requires an Electronics (Weapons) roll. It takes one success and one hour of work to hotshot one weapon. Penalties for improvised tools and facilities are up to the GM. A failure requires one more hour of work and one more roll; any critical failure ruins the weapon for good. Parts for hotshotting cost $750.

At higher TLs, some other weapon types can also be hotshotted. The rules for malfunctions and modifications are the same, though the effects of a hotshot vary from increased damage to turning a stunner into a one-shot sonic disruptor. As with lasers, military weapons noted as designed for controlled hotshotting have no extra chance of malfunction, while other weapons modified to fire hotshots malfunction like civilian lasers.

Heavy Laser Pistol (TL8+)

At TL8, the heavy laser pistol is a common military sidearm, and widely used by those police who are allowed lethal force. At TL9+, they are less common than the more lethal blaster. Since the heavy laser pistol can fire hotshots without extra chance of malfunction, it remains in use for departments that have to face armor. It autofires at RoF, and a burst can do up to 8d damage.

Laser Pistol and Rifle (TL8+)

These are the most common civilian weapons at TL8 and 9. The laser pistol is very small and easily concealed (+2 to Holdout), and is a favorite of criminals. A laser burn cannot be identified, while a bullet can often be traced back to the gun it was fired from.

Military Laser Carbine (TL8+)

This is a shortened "assault" version of the military laser rifle, and can also fire hotshots at no extra malfunction chance.

Military Laser Rifle (TL8+)

This is a common personal weapon in many TL8 and TL9 military units. It is first introduced at TL8, and in some cultures becomes as widespread as the flintlock musket was in its time. The main reasons are its lethality and its reliability. A burst of eight shots can do up to 16d of damage, penetrating most armor. It malfunctions only on a jam or misfire result of a critical miss, and then only if the malfunction is verified by rolling a second critical miss; that is, Malf is Ver.(Crit.). Any result except another critical miss on the second roll means the laser does not malfunction, it simply misses. The weapon is designed for controlled hotshotting, and hotshots have no extra chance of malfunction.

The military laser rifle is controlled by any society that controls personal weapons; Legality Class is 0. Since its beam can easily burn through bulkheads or damage vital equipment, the usual penalty for trying to smuggle one onto a spaceship is to be shoved out the airlock without a vacc suit.

Dinosaur Laser (TL9+)

The dinosaur laser is a single-shot, rifle-sized weapon which uses a C cell, expending all its energy in one shot. Civilian dino lasers actually mount two C cells, allowing a second shot if necessary. However, the weapon can only fire once every two seconds. A dino laser is easy to recognize because of its huge (over 2.5-inch diameter) tube.

As its name implies, the dino laser is used for dealing with big game and very hazardous large animals. However, it is a rigidly-controlled weapon because it also makes an excellent anti-vehicle or assassination device. Its Legality Class is 4, which seems liberal, but isn't. Legality Class 4 means "license required – must show legitimate need," and it's very hard to show legitimate need for something that will drop a dinosaur in one shot! Unauthorized possession of a dino laser will be treated as though the weapon had been Legality Class 2.

Dino lasers cannot be hotshotted or modified for automatic fire.

Gatling Laser (TL9+)

The Gatling laser is the normal infantry support weapon of TL9+ armies, one or two accompanying each squad. It is a four-barrelled weapon, tripod-mounted. Each barrel can pulse once per second, giving it a RoF of 4. They are automatic weapons, fired using Gunner/TL skill.

Its 75-pound firing weight breaks down into three 25-pound loads (gun, power system and mount) for carrying; it can only fire if the gun and power system are joined. Disassembling the weapon takes two turns for one man or one turn for two. The connections are deliberately made as simple and idiot-proof as possible; the GM should only require IQ or DX rolls for those completely unfamiliar with the weapon. It takes three seconds to switch power cells. Firing the weapon off the mount requires a ST of 15, and is SS 15 and Acc 4.

The squad's tactic is to advance one weapon under the cover of another; everyone in the squad carries an extra power cell for the squad Gatling. Almost every military vehicle mounts at least one Gatling laser; they are as common as .50-caliber Brownings were in the 20th-century U.S. Army.

Gatling lasers cannot be hotshotted or have their RoF increased; they are already boosted to the maximum they will stand.

Gatling lasers are also used as a Close-In Weapons System, to provide point defense for ships and fortifications from missiles. In this application they are powered from the power plant of the facility, and have unlimited shots. The CIWS is a +10 targeting system (see p. B138). It adds $100,000 and 100 pounds.

Holdout Lasers (TL9+)

These are palm-sized hideaway weapons (+3 to Holdout skill). They can be disguised as anything small – cigarette lighter, pen, etc. They use a B cell, or an array of ten A cells; either way, they have five shots. An Armoury/TL roll can replace the battery, but the weapon is designed to be disposable. Effective skill is a cumulative -2 for each shot after the fourth, as the barrel lining vaporizes.

Constructed of plastic, holdout lasers are virtually undetectable as weapons until fired, and even a radscanner is at -7 to detect one's power source.

Military Dino Laser (TL9+)

Though the dinosaur laser was originally designed as a civilian weapon, its merits were quickly seen by police and military; it is now standard in many SWAT and Special Ops arsenals. Inevitably, a version with more shots was designed. Military dino lasers use the five pound D cell, which takes up most of the stock. They are Legality Class 0 and fire ten shots from a D cell, still at one every two seconds.

Survival Lasers (TL9+)

Survival lasers are low-energy lasers intended for hunting. Originally designed for Survey scouts, they can be broken down into four pocket-sized components, and take one minute to assemble or disassemble. Because of their ease of concealment (+2 to Holdout skill, easily hidden inside other objects), they sometimes are favored by assassins – especially when hotshotted and modified to autofire.

Laser Crystals (TL10+)

A laser crystal is a ¼-inch-diameter solid-state laser projector which includes its own, integral one-shot power cell. The laser crystal is surgically inserted just under the skin; this takes only a minute in an automedic. It is almost impossible to detect (detecting the tiny minicell with a radscanner is at -11!) Firing is triggered by a specific nerve impulse – if implanted in a finger,

it might be fired by clenching the fist while pointing at the target. When fired, the laser beam burns through the user's skin (a thin enough layer that no damage is taken). At TL13, X-ray laser crystals are available; these are identical except that damage is 2d and armor protects with only ½ DR.

NEEDLERS (TL8+)

Spring needlers (or just "needlers") use the Guns (Needler) skill. They fire thin, needle-like flechettes by means of a gas-propelled spring, and are sometimes called "spring-guns." They are silent, semi-automatic weapons, with a slight (-1) recoil.

Needlers carry their gas cartridge in their ammo magazines. Magazines can be reused, but new, commercial ammo should be used if at all possible. It is possible to make needler ammo, but this is very difficult, because the tolerances are so close. An Armoury-5 roll, and good equipment, is required. A failed roll will ruin the weapon on the first attempted shot when the bad needles are used. (GMs should make the Armoury roll: on a failure they can tell the armourer that the needles are bad; on a critical failure they just note it down and wait until the firing attempt is made. The armourer can still sell bad needles to unsuspecting customers, of course.)

As needlers produce no sound or heat, and use no power cells, they are not detectable by standard scanners. (Like most TL8+ weapons, they *may* be made of nonmetallic materials.) Needlers are useful to assassins, and are therefore found even when "better" weapons are available.

Needler Ammo

Loaded needler magazines weigh ¼ lb. and cost $38 (needler *rifle* ammo is 1 lb. and $48).

Special Ammunition

Drugged Needles (TL8+): Needlers may also fire needles coated with one dose of any drug (see any of the wonder drugs in the *Medical* chapter) or poison (see *Biochemical Weapons*, p. 70). At higher TLs, more sophisticated poisons become available. Drugged needles do no damage (they may not even be noticed – roll against IQ). They only penetrate armor with a DR of 2 or less vs. impaling weapons. (Toughness does not add to DR in this case).

Standard drugged needles are nonmetallic and biodegradable. Three hours after the needle penetrates and delivers its drug, the target's own metabolism (if he's still alive) will have dissolved it, leaving no evidence. It is particularly difficult to detect a needle while being stung by insects; -2 to the IQ roll to notice the attack.

Tracer Needles (TL8+): See p. 91.

Paralysis needles (TL9+): These have the same effects as paralysis gas (see p. 71). Cost is $10/dart. Unlike paralysis gas, if a paralysis needle penetrates armor, paralysis occurs instantly if the HT-3 roll is failed. Recovery is as for paralysis gas.

PORTABLE MISSILE LAUNCHER (TL8+)

The portable missile launcher is the standard TL8 anti-tank weapon for a single soldier. A PML is a rectangular launcher with a pistol grip and sighting system. The launcher weighs 15 pounds, including one laser-guided missile. The missile pro-

duces a lethal back-blast when fired, doing 4d damage to everyone within a 60° cone up to three yards behind the launcher, blowing out windows and possibly setting fires (anything flammable ignites on a 10 or less).

TL8 anti-tank guided missiles home in on reflected laser light. No skill is required to fire the missile – just point it at the target and shoot. However, either the missile firer or someone else must illuminate the target with an active designator (see p. 64) for one turn before firing and during the missile's entire flight. Only larger than man-sized targets (or areas of ground) can be fired at, not individuals.

To do this, a Gunner+1 skill roll is required. The designator must be in range and line of sight of the target and remain pointed at it using an Aim maneuver each turn. No additional Gunner rolls are required, however. If at any time the Aiming ceases (e.g., the designator used an active defense, got shot, etc.) or the laser beam is blocked (e.g., by smoke, or the target moving behind a ridge) the missile automatically misses and will crash. Otherwise, it always hits, though the target can dodge or try to shoot it down.

PML missiles move at 200 yards per second. When the missile hits, its shaped-charge warhead does 6d×8 (10) damage (see *Shaped-Charge Warheads*, p. 66). Gas, fragmentation and concussion warheads are also available – effect is 1.5× that of an equivalent mortar round (see p. 46). Reloads weigh ten pounds and cost $3,000.

(If using the more detailed missile rules from *GURPS Vehicles*, the PML's missile is a TL8 Lt. AAGM.)

TANGLERS (TL8+)

Tanglers are short, stubby weapons that resemble 20th-century riot guns or flare pistols. They use a compressed-gas propellant to fire egg-shaped capsules that release a number of strong, sticky strands which wrap around and completely immobilize a target. Use Guns (Tangler) skill to fire them; recoil is high (-4).

The major advantage of tanglers is their ability to enwrap and bring down soldiers in even the heaviest armor. The victim can then be dispatched in many ways. One method is to bring up a high-power drill (see p. 15) and bore him to death (a joke beloved by Marine drill sergeants).

To escape such a fate, the victim may try one Contest of Strength per minute to break the strands; the strands are ST 20. Alternatively, if the victim is fully clothed, an Escape-3 roll (one try every ten minutes) will let him wriggle out of the clothes and escape. Any failed attempt to break free results in the strands constricting, causing 1 point of damage.

Ten hits from intense heat, such as a laser or flamer, will free the victim, but he will also take full damage from the weapon if he isn't otherwise protected. The strands are too tightly wound around the victim, as well as too sticky, to be cut off. The easy way to remove tangler strands is with anti-tangler aerosol spray ($100, 2 lbs.; see p. 79).

If one is hit by multiple tangler rounds, each additional round adds 5 to the ST of the strands, and -1 to any Escape attempt. The strands lose their constricting ability after 24 hours, then lose ST at a rate of 1 per two hours.

Anyone hit by a tangler round has an extra Dodge roll to evade the strands before they close, but neither armor PD nor

DR protects against being hit by tanglers, as they simply wrap around the armor as well as the person wearing it. Any rigid armor with DR 2+ protects totally against the constriction damage. The PD of deflectors (see p. 77) *is* effective against tangler strands. Tanglers are completely useless against someone wearing a slick suit (see p. 23).

Tangler Ammo

Loaded tangler magazines weigh 5 lbs. and cost $50; tangler *pistol* mags are 2 lbs. and $20.

BLASTERS (TL9+)

Blasters are high-energy beam weapons that fire a bolt of charged particles carried on a low-power laser beam. The particle beam does impaling damage which includes a surface explosion effect, so targets may experience knockback.

At TL9, blasters are almost as common as lasers in the military arsenal. They are not as elegant and versatile, and have a shorter range, but they are powerful and simple. They are also widely used for hunting dangerous game at close quarters, because of the knockback effect.
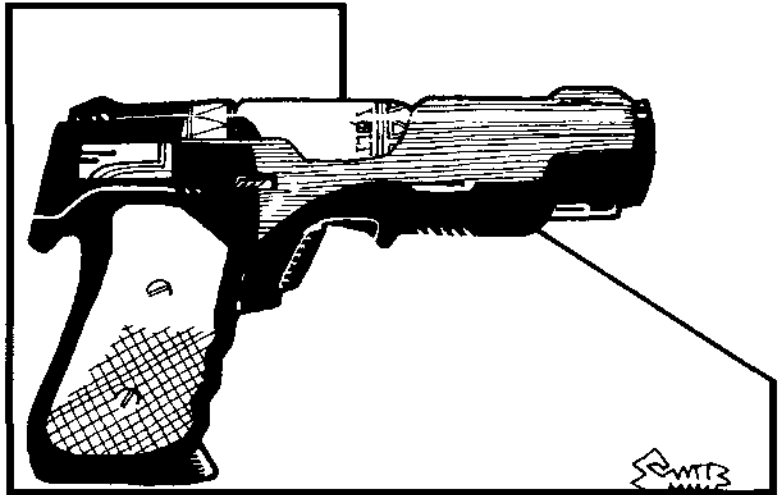
Blasters do produce some recoil, so they can't be fired successively without penalty like lasers. Like lasers, blasters may be *hotshotted* (see *Lasers*, p. 47). A hotshotted blaster uses up four charges per shot, but does one third more damage – a blaster rifle would do 16d, for instance. Malfunction chances and modification procedure for blasters is the same as for hot shotted lasers. Heavy blaster pistols and heavy blaster rifles are already designed to be able to fire hotshots; like military lasers, they have no extra malfunction chance.

Blaster Pistol (TL9+)

These are the most common TL9 sidearm; they are often just called blasters. A blaster pistol may incorporate an *electrolaser* setting, capable of producing effects identical to the electrolasers described on p. 52. This adds one pound to weight and $800 to cost. It cannot be done by a gunsmith, but must be made in the factory when the blaster is built. It takes one turn to

switch between blaster and electrolaser settings – when fired on electrolaser setting two charges are used up from the blaster's power cell rather than one.

Heavy Blaster Pistol (TL9+)

A large and powerful "magnum" blaster pistol, this is the usual sidearm of Patrol officers. This weapon is extremely difficult to conceal (-2 on Holdout).

Blaster Rifle (TL9+)

Blaster rifles are intended as hunting weapons, but are often used by militia and police. On dangerous colonial worlds their Legality Class is 4; they are found in every home.

Heavy Blaster Rifle (TL9+)

Heavy blaster rifles are high-powered military weapons. They use a D cell and get 60 shots. While heavy blasters inflict slightly less maximum damage than a TL9 automatic-fire military laser rifle (6d×3 rather than 16d+16), they burn through reflec, smoke, Prism or fog which stops a laser.

DISRUPTORS (TL9+)

These weapons are actually microwave-frequency lasers. Also known as "scramblers" or "curdlers," they cause the cells of living tissue to explode; they do impaling damage, but any damage that gets through armor is tripled rather than doubled! Nonliving targets take half damage (instead of tripling) except for electronic equipment, which takes the same damage as living things. Armor protects normally from disruptors, but metal armor (any kind, including Combat Infantry Dress and all combat armor) and reflec both have PD 8; metal reflects microwaves! Any radiation resistant vacc suit will also give PD 8 against disruptors. The armor will spark madly, but the wearer will be unharmed. As a result, disruptors are primarily used as a hunting weapons against big game, or on unarmored targets. This makes them much more useful to assassins than soldiers.

The only advantage disruptors have over other beam weapons is that they are recoilless, unlike blasters, and they are not affected by the smoke, Prism or Blackout gas that blocks lasers. Disruptors can also be *hotshotted*; the same rules for hotshotting lasers apply (see *Lasers*, p. 47). A hotshotted disruptor uses four shots each time it is fired, but does double damage, and is Legality Class 0.

Disruptor Rifle (TL9+)

Usually just called a disruptor, this is a weapon superficially resembling a laser rifle. Disruptor rifles are often built as assassin's weapons, and many are designed to be broken down into four pocket-size components (one minute to assemble or disassemble). This costs an extra $600. Such modular weapons may be sold through catalogues as "microwave-frequency survival lasers" but are technically Legality Class 0, and on many worlds are only available to elite special operations units, intelligence agencies or powerful criminal organizations.

Scrambler (TL10+)

This small, hand-held disruptor can be concealed in the palm of a hand. Its beam is short-ranged but very damaging to organic matter. It can also destroy small locks, erase magnetic tapes or disks, etc. Concealment is as per holdout lasers (see p. 50).

ELECTROLASERS (TL9+)

These beam weapons, also known as "shockers," "zap guns" and "stat guns," stun and damage via discharges of electricity. They are recoilless, firing a low-power laser beam to ionize the air, following it instantly with an electrical charge that follows the path of the laser to the target.

Electrolasers are most effective in dry climates. In moist, humid climates or in rainy weather, they are less accurate, as the electrical bolt tends to jump off the laser path to follow other paths of low resistance. This gives a -2 to hit in moist, humid environments, and a -6 to hit in rain, drizzle or heavy fog. They are practically worthless in a vacuum; since there is no air to ionize, the electrical discharge arcs randomly to some nearby metal item.

Armor protects normally from an electrolaser, unless it is metallic. Metal armor conducts the electrical charge, so it is less than useless. It actually *attracts* the charge, giving the attacker a +2 to hit if the target is wearing more than 20 pounds of metal.

The weapon has two settings: stun and kill. Changing settings takes a Ready action. "Stun" fires a lower-power bolt. Roll damage normally, but instead of actually taking the damage, the target must make a HT roll minus half the damage that got past DR (rounding damage *up*). A failed roll means the target is stunned. The effects are similar to a stunner (unconsciousness or incapacitation for 20-HT minutes), but the target is at -2 DX for an additional 20-HT minutes after recovering from stun.

"Kill" does the full listed amount of damage. If any damage penetrates armor the target must also roll immediately against HT minus half the damage taken. If the roll is failed, his heart *stops*. He passes out and will die in HT/3 minutes (round down) unless someone performs CPR to save him. This takes one minute per attempt and requires a successful First Aid/TL-4 or Physician/TL roll.

FLAMERS (TL9+)

Flamers fire a relatively short-range plasma discharge. They are brutal, clumsy weapons; a flamer only fires once per turn, but the discharge lasts for a full second. The dice rolled for damage may be divided between targets. All targets must be in the same arc of fire, as described for area weapons (p. B121). If the targets are more than 1 hex apart, 1d of damage is lost for each extra hex. The flamer's weakness is range, but this is a positive advantage inside the confines of a ship; stray shots are less likely to damage vital components.

The main advantage of flamers is that the wash of superheated plasma "flame" can injure or kill even an armored target, unless his suit is fully sealed and airtight. Unsealed armor has only ½ its DR against a flamer attack. The wash of flame can melt armor. For every 10 points of damage done (before subtracting DR) the armor loses 1 point of DR on the location hit. A sealed suit loses integrity (becomes unsealed against the next flamer attack to that hit location) if it has lost 20% or more of its original DR.

Paper cloth and wood automatically ignite if hit by a flamer discharge. Flammable plastics and similar materials catch fire if their DR is exceeded. Ignited items burn until extinguished. Successive shots continue to do damage to a burning object.
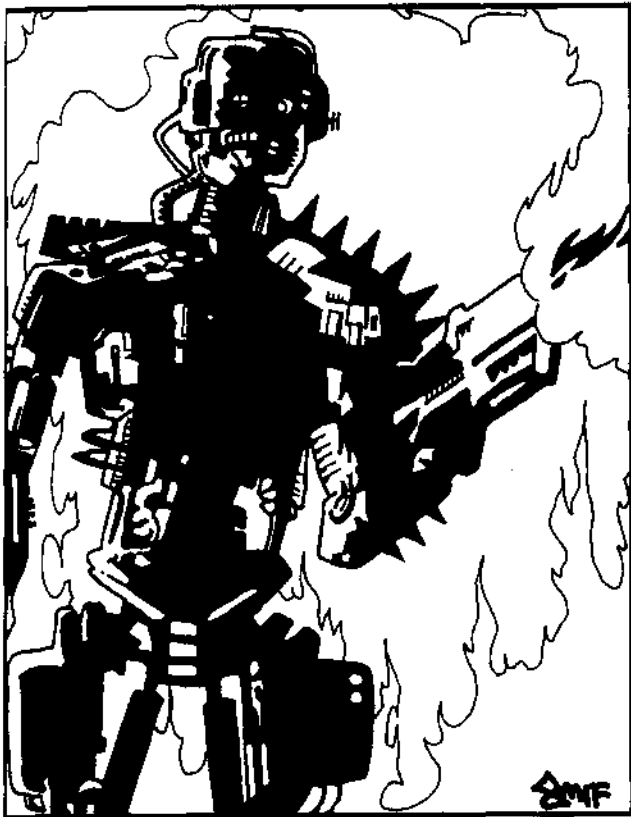
Hand Flamer (TL9+)

This large pistol is used as a military sidearm or incendiary or terror weapon. Its effects are as described above.

Plasma Rifle (TL9+)

This rifle-sized "assault flamer" is often used as a sidearm for armored infantry involved in spaceship boarding actions and house-to-house fighting.

Tripod Flamer (TL9+)

Also called "plasma guns," these heavy, semi-portable infantry weapons are terrifying even to a fighter in heavy armor. A tripod flamer may be used without the tripod by anyone with ST 20 or more -- this makes them favorite weapons of troops in powered armor or battlesuits. They require Gunner/TL (Flamer) skill.

GAUSS SLUGTHROWERS (TL9+)

At TL9, heavy Gauss weapons become available that use the (ten times more powerful) C cell to accelerate 3mm or 4mm high-density slugs to Gauss needler velocities (2,000 yards per second). At hypersonic speeds, the bullets are far more deadly than the smaller needles. However, RoF is slower, damage is crushing rather than impaling (so they don't slip through monocrys), and the magazines hold fewer shots.

Ammunition

A 60-shot magazine for either weapon, including C cell, costs $130 and weighs two pounds. One hundred bullets cost $30 and weigh ½ pound. The hypervelocity slugs fired from these gauss weapons penetrate armor easily. Armor protects with one-half DR, shown by a (2) on the weapon table.

The same variety of special ammunition that is available for chemical slugthrowers (see p. 44) is available for Gauss slugthrowers (but not Gauss needlers) as well.

Gauss SMGs (TL9+)

These are lightweight assault weapons that can be fired with only one hand and concealed under a heavy coat, and are capable of automatic fire.

Gauss Battle Rifles (TL9+)

These are heavier infantry weapons, similar in size to a TL7 assault rifle. They are capable of automatic fire.

GUIDED MISSILES (TL9+)

TL9 guided missiles come in two flavors: *clever* and *brilliant*. The smallest clever missile is a laser-homing grenade; the smallest brilliant missile weighs five pounds. Other than size, the major difference is that clever missiles require constant aiming by an a laser designator to guide the missile in, while brilliant missiles are fire-and-forget; one turn of designation is all that is needed, then the missile's own sensors guide it.

A clever or brilliant missile can be fired at a target designated by an active or passive designator (see p. 64). The skill of the one *firing* the missile is irrelevant; it is the skill of the *designator* that counts. Roll against the designator's Gunner/TL skill. Success means that he has designated and the launcher may fire a missile; failure means he must try again next turn; a 17 is an automatic failure, and 18 means he has designated the wrong target. (It is the GM's choice as to what he is really marking.)

Smart, Clever, Brilliant

Guided missiles are any projectiles that can change course to hit the target after firing. *Smart* missiles (TL7 and 8) have limited self-guidance, and are bulky and awkward. *Clever* and *brilliant* missiles are smaller and have more guidance features. They improve at higher tech levels.

Clever Missiles (TL9+)

These may be fired at any target designated by an active or passive designator, provided the launcher is in range of the target. They are launched from any of the TL8+ grenade launchers, and move at 500 yards per second.

When firing a clever missile, treat it as a normal grenade or mortar bomb, except it has a +5 to hit and the attack roll is made by the designating character, not the gunner. Often the firer and designator will be close to each other (in the same squad, or even the same person, if the designator is mounted on the launcher) but not always.

A clever missile weighs the same as a normal grenade or mortar shell. It uses a rudimentary steering system to alter direction. Except for being guided, clever missiles have the same range and damage as normal grenades or mortar shells.

Most clever missiles have shaped-charge warheads, but the full range of grenade or mortar shell warheads is available (see p. 67). Cost is $50 more than standard grenades or mortar shells.

Brilliant Missiles (TL9+)

Brilliant missiles are fired from the IML and M-LAWS missile launchers (see below), as well as from many armored vehicles. They use an inertial guidance system for the first stage of their flight. Unlike clever missiles, their sensors are smart enough that the designator need only designate for one turn prior to firing the missile, and then the missile's sensors will take over. The designator can then duck for cover, designate another target, etc. This is much safer, from the designator's perspective!

At TL10, brilliant missiles are fitted with secure neutrino receivers, and can be controlled by passive designators (see p. 65).

Brilliant missiles move at 400 yards per second; a missile fired from 4,000 yards away hits its target in 10 turns. If using the more-detailed missile rules in *GURPS Vehicles*, the brilliant missile is a TL9 Lt. SRGM – see *Vehicles*, pp. 129 and 204; the M-LAWS is a Lt. SRGM launcher with an autoloader.

The missile's shaped-charge warhead does 6dx10 (10) damage (i.e., DR is reduced to ⅒ normal; see *Shaped-Charge Warheads*, p. 66). While shaped-charge warheads are usual, chemical, bomblet, fragmentation and concussion warheads are also available – effect is the same as that of an equivalent TL9 mortar round, or 50% greater than a TL8 equivalent.

All brilliant missiles weigh five pounds and cost $800. Chemical warheads cost the same as mortar rounds (see *Biochemical Weapons*, p. 70).

Neutrino-Homing Missiles (TL10+)

At TL10+, any brilliant missile can be fitted with a passive radiation sensor capable of homing in on neutrino emissions from vehicle or battlesuit fusion power-plants. They do not require target designating and will automatically hit their target (though they can be dodged, stopped by PD, etc.). A neutrino homer is almost impossible to jam at TL9 or less; at TL10, special radiation-emitting flares can sometimes decoy it.

Neutrino-homing missiles are twice as expensive as regular brilliant missiles.

If using the more-detailed missile rules from *GURPS Vehicles*, the neutrino guidance package enables the vehicle to automatically track its target as long as the target is using an operating fission, fusion or antimatter power plant or has a force screen up. If the target releases a TL10+ flare decoy, the roll needed to continue to track for that turn is the missiles Scan rating minus the flare's TL.

BRILLIANT MISSILE LAUNCHERS
IML (TL9+)

The Infantry Missile Launcher is a tube containing a single brilliant missile and basic sights. It is designed to give every soldier the power to kill a tank. An active designator may be clipped onto the launcher if the firer wants to designate for his own missile. The IML weighs fifteen pounds with one missile; reloads weigh five pounds each and reloading takes five seconds.

M-LAWS (TL9+)

Brilliant missiles are light enough that a single soldier can carry more than one. The Magazine Light Anti-Armor Weapon System is a semi-automatic launcher with a magazine of five brilliant missiles. It can fire one missile per turn, and can include a clip-on active designator. Loaded, the M-LAWS
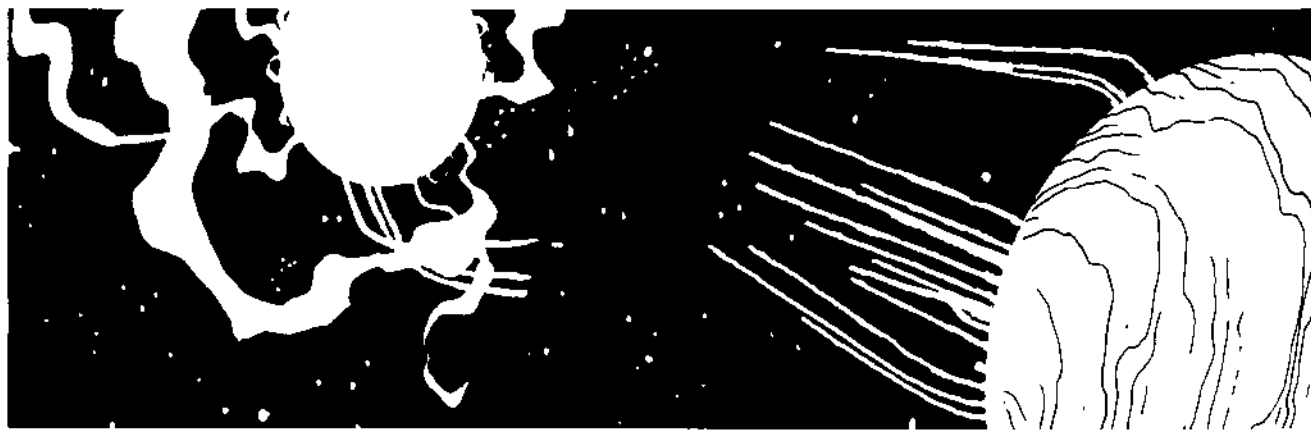
weighs 35 pounds. A spare five-shot magazine weighs 25 pounds and costs $9,000. It requires five seconds to reload either a single missile or a magazine.

SCREAMERS (TL9+)

These weapons produce concentrated sound a high-pitched, rasping squeal. They don't operate in vacuum. They use the Beam Weapons/TL (Sonic) skill. Reflec armor is useless against them.

A screamer literally tears the flesh from its victim's bones. If damage from the weapon is more than double that listed for any limb, the limb is completely torn off. Any hit to the head requires a roll against HT or the target's eardrums will be shattered, deafening him until the eardrums are replaced. Wearing a completely sealed helmet is the only way to avoid this, but if the helmet's DR was exceeded by the screamer, the victim will be vulnerable. Any armor hit by a screamer loses 3 DR at the location hit, unless it was protected by a force field. Natural armor (fur, scales, etc.) loses as many points of DR at the spot as the damage it blocks.

For an extra $200, a screamer rifle can have a stun setting, at which it works exactly like a stun rifle – see below. All screamers are recoilless. The basic screamer is the size of a rifle, but larger, tripod-mounted weapons exist.

Screamer (TL9+)

This is a short, stubby weapon with a large, bell-shaped aperture; it is the most common screamer.

Tripod Screamers (TL9+)

This weapon projects a continuous wave of concentrated ultrasonic sound a yard wide. If the roll to hit misses by only 1 or 2 points the target is caught by the edge of the beam – damage is 2d+2. Otherwise, damage is 6d×3! Any armor struck by the tripod screamer loses 5 DR at the location hit, or 1 DR if hit by the beam's edge. Other effects are identical to the screamer rifle. Tripod screamers get 100 shots from a D cell. For an extra $500 they can have a stun setting. Range is the same; effects are as for the stun rifle (below), but the roll is HT-8 (HT-4 at ½D) to escape stunning.

"SPLAT" GUN (TL9+)

The explosive scatter gun is a "quick and dirty" weapon designed to destroy individual infantrymen in heavy or super-heavy armor, or troops in battlesuits. It is also effective against TL6 and TL7 armored vehicles, and is a favorite weapon of mercenaries fighting on low-tech worlds.

It is a bulky, multi-barrel weapon looking like a short, thick bazooka, with a pistol grip, padded shoulder stock and bipod. Nicknamed the "splat gun," it uses a compressed-gas propellant to fire a closely-spaced eight-shot pattern of low-velocity, shaped-charge shells. It is intended to destroy light vehicles and men in heavy combat armor.

The weapon is fired using Guns (Grenade Launcher) skill, and has a high recoil. It has no minimum ST to use while prone, but, if fired while standing, it requires a ST of 15, or the user will be at -3 to hit and be knocked down by the recoil. RoF is 8, but *all* shells must be fired at once at the same target; area fire, or a lower RoF, cannot be used. There is a +1 to skill, because of the scatter effect. Use *Number of Hits in a Burst*, p. B120, to

determine how many of the rounds hit. Count the eight rounds as two groups of four. Each round that hits explodes, doing 5d (10) damage (i.e., armor DR is divided by 10; see p. 66). Each splat gun load costs $100 and weighs 8 lbs.

STUNNERS (TL9+)

Stunners fire focused beams of sound that assault the target's nervous system, rendering him helpless or unconscious. Because of their nonlethal effects, stunners are legal on all but the most restrictive worlds. They are useless in vacuum, since air is required to carry the sound. All stunners are recoilless, and use the Beam Weapons/TL (Sonic) skill.

Stunners require a HT roll (difficulty depends on the stunner's power) to avoid their effects. If a limb is hit, a failed HT roll incapacitates the limb for 20-HT minutes; on a head or body hit, the victim is "asleep" for that time. The victim recovers quickly once time is up. If the HT roll is a critical failure, the effects last three times as long. Victims cannot be revived before time elapses.

Armor is only partially effective against stunners. For every 5 points of DR at the target point, the victim's effective HT is raised by 1. Thus a complete armor suit with a DR of 15 would allow the target to resist a hand stunner (normally HT-3 to resist) on a roll of HT or less. Force screens (see p. 77) protect totally against stunners.
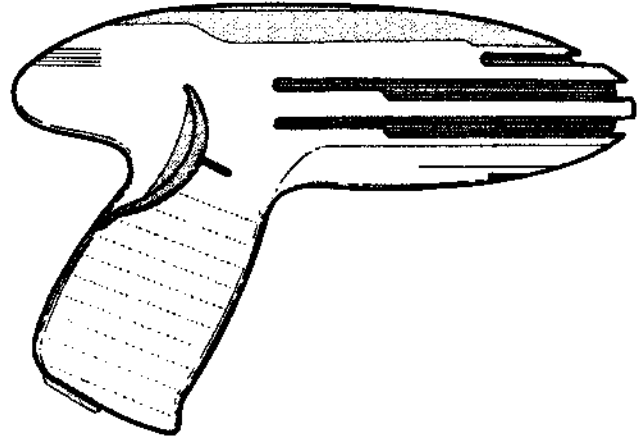
Sonic Stinger (TL9+)

A non-lethal alternative to the holdout laser, the stinger is a palm-sized sonic stunner that can be disguised as an everyday item (pen, lighter, etc.) or be strapped to the wrist. HT roll to avoid being stunned is HT-2, or HT+1 beyond ½D range. They are constructed entirely out of plastic and are virtually undetectable (see *Radscanner*, p. 19) until fired.

Hand Stunner (TL9+)

Also called a stun pistol, or just a stunner, anyone hit by its beam must roll HT-3 to avoid its effects (HT at ½D range or more). Stunners can be *hotshotted*; a hotshotted stunner is a screamer which burns out after a single shot, but only has the range of a stunner. The stunner is then useless; it cannot be

repaired and reused. This is a highly illegal modification. Use the same procedure as for hotshotting lasers (see p. 48); parts cost $600.

Stun Rifle (TL9+)

A stun rifle is a more powerful, longer-ranged version of the stunner. Anyone hit must roll HT-6 or be stunned, as above (HT-3 at ½D range or more). Stun rifles can also be hotshotted; parts cost is $600. A hotshotted stun rifle burns out on any roll of 16+, +1 to this chance for each shot after the first. On any failure it burns out and cannot be repaired. On any critical failure it also does 1d of burn damage to the firer. A hotshotted stun rifle has the same range and damage as a screamer.

Ice Guns (TL10+)

Ice guns are low velocity spring pistols that fire needles of frozen liquid. They are silent and their bullets dissolve without a trace in the target's body. They are intended as survival weapons; as such, they are designed to require as little in the way of ammunition or power as possible.

An ice gun uses a mechanical spring mechanism to propel its frozen projectiles. The spring must be rewound after each magazine is fired. This takes (30-ST) seconds by hand or three seconds with an electric torque wrench (uses an A cell for 100 windings, costs $20 and weighs ½ pound). Any attempt to wind the spring in less than three seconds has a 50% chance of breaking it; it cannot be wound in less than one second.

Each 15-shot magazine includes a self-contained refrigeration unit. Pour a cup of water into the magazine, activate the refrigeration unit, and in half an hour (5 minutes at TL11, 1 minute at TL12+), 15 new ice needles will be ready to fire. A single B cell freezes 100 *magazines'* worth of ice needles.

An ice gun may also be used to deliver drugged rounds – a dose of any hypo-injected drug or poison can be pre-frozen into a sliver and fired, having the normal effect if it penetrates. The extra cost for a magazine of drugged ammo is the same as 15 doses of that drug or poison.

Ice gun magazines cost $50, excluding the B cell, and weigh ½ pound each.

Nerve Guns (TL10+)

These weapons stimulate the nervous systems of living targets with excruciating pain. Nerve guns are sometimes called neural disruptors, but they are not sonic weapons. They are fired with Beam Weapons (Neural) skill.
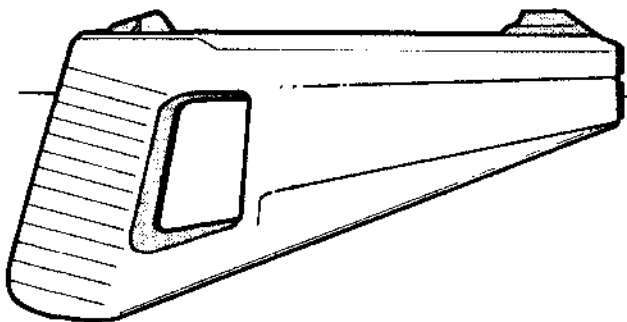
Anyone hit by a nerve pistol must roll against HT-3, +/- Will modifiers. High Pain Threshold gives a +3 bonus, Low Pain Threshold doubles all penalties. If successful, the victim can still function, but due to the pain will be at -2 on ST, DX, IQ and all skills based on these attributes for 15-Will turns (minimum one turn). If he was hit on a limb, that limb is useless for the same length of time. If he fails the HT roll, the victim is in such agony that he can do *nothing* for this time. A critical failure causes unconsciousness for 20-HT minutes (at least one minute). Each additional hit lowers the resisting HT roll by 1 (e.g., the second hit is resisted at HT-4). With each successive hit, start the recovery time over again. Penalties to attributes are *not* cumulative.

Reflec, or any hard armor with a DR over 2, provides total protection against nerve guns; lighter armor, and open-weave armor like monocrys, do not protect at all.

Nerve guns are commonly used for riot control; unlike stunners, they actively deter protestors, and can quickly disperse a crowd without leaving piles of unconscious bodies around for pickup. In some societies they may be outlawed as "inhumane," especially if stunners and paralysis guns are available for nonlethal self-defense; in others they may be common as duelling weapons.

Nerve Weapons

Nerve pistols are available in two versions. Type I nerve pistols produce the effects described above. Type II are the same, but if they affect a target at all, they also do 1d actual damage. For an extra $100 a pistol can have both settings; changing the setting is a firing action. Nerve pistols get 30 shots from a C cell; any Type II effect counts as two shots.

Paralysis Guns (TL10+)

These beam weapons affect the nervous system, causing instant paralysis if the target fails a HT roll, or a -2 to DX and a -1 to IQ (and all related skills) if he succeeds, for 30-HT minutes. Anyone paralyzed is conscious of everything going on around him, but cannot move at all (though psi powers can be used at -1 to skill). With the exception of electronics, a paralysis beam has no effect on anything unliving. A paralysis gun may be ineffective against certain nonhuman races – particularly chlorine breathers and those with silicon-based metabolisms.

Only totally-sealed armor has any resistance at all to paralysis guns. Any breach in the suit's integrity negates its defense against a paralysis gun. Sealed armor protects totally, regardless of its DR.

Paralysis guns are common law-enforcement tools. Since they are recoilless and work in vacuum, they are the usual equipment of ship's crews for in-ship combat at TL10+.

The radiation they emit can scramble delicate computer and communications circuits. Military ships have shielded circuitry; civilian ships usually don't. On any miss with a P-gun, any unshielded circuit within range has a ⅓ chance of being put out of service. Shielded circuitry costs ten times more than unshielded circuitry.

Saboteurs and terrorists use P-guns to attack delicate and vital circuitry. They can say piously that they were using nonlethal weapons; it's not their fault that the elevator fell 800 stories when the control box failed . . . Paralysis guns require the Beam Weapons (Neural) skill to use.

Sonic Shuriken (TL10+)

Used by assassins and commandos, a sonic shuriken appears to be a one-inch disk of plastic. When activated and thrown (one action, using the Shuriken (P/H) skill or Throwing-2), it sprouts six three-inch "blades" of coherent sound. Damage is 1d+3(5), cutting. Due to its small power source, the sonic blades only last for a second, but this is enough time for it to hit its target. It has SS 8, Acc 1, ½D ST/2 (for accuracy only), Max ST.

For an extra $50, a sonic shuriken may be fitted to spray a drug, poison or virus along the blade-axes (two doses are required). If the shuriken penetrates armor, it delivers the drug or poison.

A sonic shuriken uses an A cell, which is completely drained after one use. It is reusable if its power cell is replaced. Because they use only A cells and are so easy to conceal (+5 to Holdout), these are favored assassin's weapons. A radscanner is at -8 to detect a sonic shuriken.

Weight is ¼ pound and cost is $400. It is Legality Class 2.

X-Ray Lasers (TL10+)

X-ray lasers fire coherent beams of X rays rather than visible light. They are the prime military weapons from TL10 to TL13. An X-ray laser easily cuts through reflec armor (which provides no extra PD or DR) and is more effective against other armor as well. *Halve* the DR of any armor or force screen against an X-ray laser. Smoke, weather, prismatic aerosols or other factors that hinder normal lasers are totally ineffective.

An X-ray laser uses up power twice as fast as normal lasers and costs twice as much. These changes are reflected on the TL10 X-ray lasers in the weapon tables. Since normal lasers were introduced two TLs earlier doubling in power supply and quartering in cost as well as gaining damage (see *Improvements at Higher TLs*, p. 10), X-ray lasers are actually cheaper than lasers were at TL8, with the same number of shots! Of course, an X-ray weapon has only half as many shots and is twice as expensive as the TL10 versions of a normal laser.

X-ray weapons are otherwise identical to standard laser types (military laser carbine, dino laser, and so on – see p. 47) and use the same rules for laser autofire, hotshotting, etc. X-ray laser crystals are not available until TL13.

Ecstasy Weapons (TL11+)

Neural weapons – nerve guns, neuronic handcuffs, and neurolashes – can also be designed to stimulate the pleasure centers of the target's brain. The effects are identical, except the victim is overcome with ecstasy instead of agony, and High/Low Pain Threshold has no effect. The weapon is otherwise identical. Pleasure lovers may become addicted to ecstasy weapons. If an individual is affected by an ecstasy weapon more than three times in a single day, he must make a Will+2 roll or become addicted if he later encounters an ecstasy machine (see p. 95).

Neural-pleasure devices cost $200 more than regular neural weapons, and are usually the same legality class. Adding a pleasure setting to a neurolash or nerve gun costs $500 and adds ½ pound of weight.

Electron Pistol (TL11+)

The electron pistol is a specialized police sidearm, an evolutionary development of the tried-and-true blaster pistol. Using the same laser beam as a guide-path, the weapon fires either a particle or electrical bolt, enabling it to function as either a powerful blaster or an electrolaser.

The weapon has three settings. On "blast" the electron pistol fires a blaster bolt which can penetrate reflex armor or energy cloth on a good roll. The next two settings, "kill" and "stun," function exactly like a standard electrolaser (see p. 52); use electrolaser pistol SS, Acc, damage, RoF and ranges. Switching settings takes one turn.

With an electron pistol, an officer need only have a single weapon drawn in order to stun an unarmored opponent, or stop a vehicle or armored enemy. Police departments and Patrol officers regularly carry them; so do many military officers. It has only half as many shots as a normal TL11 blaster, but is both more powerful and more versatile. It is a less deadly weapon than an autofiring X-ray laser pistol, but also a more controlled one.

Modifications

Most police weapons are fitted with sophisticated anti-theft systems to prevent them falling into the hands of criminals. The system costs an extra $1,000, and is tied into the weapon's computer. A miniature biosensor in the weapon's handgrip automatically scans the genetic pattern of the holder. If that pattern matches one in its memory (either the weapon's owner, or sometimes any member of the local Patrol division or police department) the weapon will fire. If not, the weapon will lock its firing circuits and begin a destruct sequence; depending on the programming, the weapon may or may not warn its holder!

To abort the destruct sequence, the unrecognized holder must give the weapon's computer a verbal authorization code. If the correct code is not given in ten seconds the gun self-destructs, doing 6dx4 explosion damage.

With the correct code (a single word and number combination, e.g., Wolf 323) the weapon can be reprogrammed to accept the biopattern of the holder. Each code is unique to each weapon, and codes are kept on file in the police department or Patrol office and changed regularly. Depending on department policy, authorization codes may or may not be known to the officer who owns the weapon. Special codes are also possible (e.g., one to delete biopatterns, or one which causes the weapon to destroy itself immediately when fired).

Any attempt to circumvent the anti-theft system requires proper tools and a roll against Electronics Operation (Security Systems)-3. An attempt takes half an hour; failure activates the destruct sequence; critical failure causes an immediate explosion.

Electron Rifle (TL11+)

This is the rifle-sized cousin of the electron pistol. It can fire a blaster bolt (doing electron rifle damage) or fire an electrical bolt (set to stun or kill) exactly like an electrolaser (see p. 52). It has the same locking system as the electron pistol (though one can purchase a weapon without it, reducing the price by $1,000).

Electron rifles are used by some military units, but while they are potent against moderately armored foes, they lack the penetration of an X-ray laser. However, they are favorite weapons of SWAT teams and special forces units.

Electron rifles (and pistols) on blast setting can fire hotshots. Each shot does ×1.5 damage, but uses 4 charges.

Force Beams (TL12+)

These TL12 weapons project a solid, gravitic force field, delivering a powerful physical blow which can break bones or knock an armored man down. They are also known as kinetic stunners. Their main advantage over other non-lethal weaponry is that they can affect targets wearing totally sealed armor, and can be used in vacuum.

Force beams do crushing damage and inflict knockback. Knockback is based on the full damage rolled. Since much of the blow's force is actually the focused contragrav beam, actual damage is halved after subtracting DR.

Force beams are recoilless weapons which use Beam Weapons (Force) skill (defaults to Beam Weapons (Blaster) at -2). Two types are available, force rifles and the small, holdout-sized (+1 to Holdout) force rod.

Fusion Guns (TL12+)

Fusion weapons are advanced developments of the flamer. They use a powerful, gravitic force field to contain and compress plasma until it actually reaches fusion temperatures, then release it in a brief but extremely powerful bolt, rather than a continuous beam. The fusion bolt travels down a path burned through atmosphere by a low-power laser or particle beam; a hit does burn damage (no multiple after subtracting DR) and knockback, and will splatter plasma over the target area. Anyone within two yards of the target takes ¼ the fusion gun's damage. Unlike flamers, fusion guns have no special chance of igniting or unsealing armor (the pulse is too brief), except by blowing holes in it. They will set fire to anything flammable (wood, paper, etc.) within two yards of a hit.

Fusion guns use Beam Weapons (Flamer) skill.

Fusion Pistol (TL12+)

This is an extremely large and bulky military handgun (more like an SMG in size, though it is a single-shot weapon), requiring two hands to use unless ST is 12+. It is the favored weapon of TL12 Patrol officers and space pirates, since it is most intimidating, even to an armored opponent!

Fusion Rifle (TL12+)

A short, bulky and heavy shoulder arm, designed so it can also be used one-handed by anyone with a ST of 15 or better, making it a useful sidearm for someone in powered armor. They are capable of automatic fire.

Hypnagogic Projector (TL12+)

This rifle-sized weapon projects a beam that scrambles the higher functions of the target's brain. To have any effect, the beam must be aimed at the target's head (locations 3 to 5, at -5 to hit), making the weapon primarily useful at short range.

It is resisted on a HT-3 roll, with modifiers for Strong or Weak Will. Its effects last for as many minutes as the HT roll was failed by. Persons in armor with sealed helmets get a +1 on HT to resist per 25 points of armor DR. Force screens (but not deflectors) protect totally.

A hypnagogic projector causes mental paralysis; if undisturbed, the subject will remain standing in a daze, unaware of anything happening around him. While in the daze, the subject is in a hypnagogic trance, and will be susceptible to any simple suggestions (e.g., "follow me," or "give me the key to the door") anyone (not just the user) gives him. However, he will not be able to do anything requiring real thought or coordination (such as attacking or operating a computer) and will always move slowly and without energy. In the case of conflicting or complex orders, he will do nothing.

The victim will snap out of his daze if he is shaken violently, given a stimulant, or if he takes any damage. He will otherwise ignore everything (he may be disarmed or tied up, for instance). One side-effect of the beam is short-term amnesia. The subject will not remember anything that happened while he was dazed, or in the previous half-hour. Because of this, they are excellent infiltration weapons.

Any projector can be "hotshotted" to deliver a more lethal pulse. Hotshotting a projector requires an Electronics (Weapons) skill roll and takes one hour of work with proper tools; parts cost $500; a failure requires another roll and another hour, a critical failure breaks the weapon. A hotshotted weapon causes *brain burn* (see p. 103) if the HT-3 roll is failed, but uses up five charges for each shot, and malfunctions on a 15+.

Hypnagogic projectors are recoilless and silent, and use the Beam Weapons (Neural) skill.

Wiper (TL12+)

This shorter-ranged, pen-sized, holdout version of the hypnagogic projector is +3 to Holdout. It functions in the same way, but the roll to resist it is HT, not HT-3.

HUNTER MISSILES (TL 13+)

Hunter missiles are the usual infantry support weapon of TL13. The missiles use contragravity propulsion. Once fired, a hunter missile can hover for up to five minutes, either waiting, or searching for a target or escorting advancing troops or vehicles. It cruises slowly, at 10 to 60 mph, only a few feet off the ground. Once it spots a viable target it pours on the power, burning out its contragravity generator in a 2,000-mph dash.

A hunter missile never just misses, but the target has all its active and passive defenses against the missile's skill of 20.

Hunter missiles are guided by miniature computer brains built into each missile; the computer simply looks for targets visually (or with its full range of passive radiation and infrared sensors), compares them to the several thousand possible target configurations in its brain, and attacks whatever matches military specifications as the nearest, biggest target. Or the gunner can give the missile a priority list of targets (verbally or through an interface) before firing if he doesn't trust the missile to hit what *he* thinks should be taken out, along with simple orders, like "go over to that hill and kill anything behind it" or "follow us and attack the first enemy gravtank that comes into range." Instructing the missile takes ten seconds (five with a neural interface).

Hunter missiles will do 6d×25 (10) damage with explosive shaped charge warheads (see p. 66). At TL14, hell grenade warheads (see p. 68) are available.

A standard missile pack contains a magazine of three hunter missiles. All three may be launched in a single turn. Reloads cost $3,000 per missile or $9,000 for a pre-loaded magazine. Loaded magazines weigh 12 pounds; individual missiles weigh four pounds each.

PULSARS (TL13+)

Pulsar weapons accelerate beams of anti-particles along evacuated force field tubes. The anti-particle beam inflicts impaling damage, and its interaction with normal matter causes both a surface explosion (producing knockback and concussion effects) and considerable radiation damage (ten rads times damage rolled). Armor offers only half protection against pulsar fire – denser armor provides more atoms for the anti-particles to interact with. Force screens protect with their full DR. If the roll to hit misses by 1 point, the target will still take radiation damage equal to five rads times damage rolled, although no other damage is inflicted.

A pulsar hit results in an explosion: the target suffers no extra damage, but concussion effects (crushing damage) equal to half the weapon's basic damage are inflicted within a two-yard radius, with damage being reduced by ½ every two yards beyond that. Fragmentation is limited to what is picked up by the explosion: sealed armor protects with its full DR against the explosion, and there are no special radiation effects.

Pulsars are military weapons, and no civilian versions exist. Although they have not superseded X-lasers as the primary military weapon, they have some advantages. They ignore superconducting armor, and because they fire single shots (RoF 3~), they run out of power more slowly than an autofiring laser, and also produce concussion effects. If a heavy pulsar's fire is less deadly than a hotshotted military X-laser, in an atmosphere its rolling thunderclap and explosive detonation are far more spectacular. Against poorly-trained troops, the shock effect of pulsar fire can be devastating.

Pulsars have a slight recoil, and are fired with Beam Weapons (Blaster) skill. Anyone who can use a blaster can also use a pulsar; familiarity is at -1.

Pulsar Weapons

Two types are available: the bulky *heavy pulsar* and a lighter carbine-sized *assault pulsar* that can be fired one-handed if ST is 11 or higher. Both are semi-automatic weapons. Black market pulsars are rarely found for sale; hijacked military shipments command exorbitant prices.

ENERGY WEB (TL14+)

An energy-web projector is a heavy, semi-portable TL14 device which projects a field that drains the energy from power cells. It has a range of 500 yards, and affects an eight-hex radius sphere. No skill is required to use it – the operator simply points the device and selects the distance it will operate at. The web will not penetrate a spaceship's outer hull or AFV strength armor or screens, but interior walls, bulkheads, personal armor or portable force screens provide no protection.

Any power cell (except solar cells) within the area of an energy web will lose 20% (round up if above .5) of its *original* charges for every ten seconds it remains in an energy web. For example, a paralysis rifle has eight shots; it will lose 1.6 shots (rounded up to two) every ten turns it is in the web. If it had only five shots left when the web was activated, it would be drained if it stayed within it for 30 turns. Any device will be completely drained if it spends 50 turns in an E-Web.

If a partially-drained power cell is powering a non-weapon device, this reduces the maximum time that device would continue to operate. For instance, a communicator normally lasts for a year on its B cell. If it is using a cell that has lost 60% of its maximum power to an E-Web, then that cell has, in effect, lost about seven months power. If it had been previously in the communicator for more than five months, it would now be completely drained; if it was new, it has only has five months' power remaining.

Since most people have numerous devices that use power cells, simply keep track of how long the individual spent in the energy web and note that all devices carried are 20% drained, 60% drained or whatever, working out the details when they become important.

Tactically, energy-web projectors are deployed for close-in fighting in space-ships or buildings. For example, an energy web could be focused on a position too strong to assault directly; as the defender's power cells are slowly depleted, they will face the choice of falling back out of range, counterattacking or running out of power. Concealed projectors may also be mounted in walls or ceilings as a trap.

An energy web is powered by a D cell, which gives it 50 seconds of continuous operation. Cost is $50,000 and weight is 60 pounds.

GAMMA-RAY LASERS (TL14+)

A progressive development of the X-ray laser, gamma-ray lasers (often called grasers) fire a beam or pulse of coherent gamma radiation. Grasers inflict the same damage as equivalent lasers, but force screens or armor protect with only ¼ DR (round down) against graser fire. Smoke or reflec armor is completely ineffective. Thermal-superconducting armor still halves damage.

Because of their ability to penetrate superheavy armor and force screens, automatic-fire grasers are the primary military weapons of TL14-16. Grasers may be modified in the same way as lasers (see p. 48). Since all grasers are military weapons, all are designed for controlled hotshotting. Graser weapons (military graser rifle, heavy graser pistol, etc.) are similar in design to their laser equivalents (see p. 47), but with different statistics.

SMARTGUNS (TL14+)

Smartguns launch contragrav-propelled projectiles guided by miniaturized, programmable scanners, capable of homing in on individuals or vehicles. TL14 smartgun projectiles are the size of .75 caliber bullets; the launcher resembles a large pistol with a fat, six-shot magazine. Smartguns use the Guns (Gyroc) skill.

The weapon is pointed at the target and a roll against skill+4 is made, with bonuses for HUD and laser scopes and penalties for target speed, but *no* modifiers for cover or distance. (There is a -5 if the target is protected by a distort belt or field; see p. 86.) If successful, the sensor has locked onto the target and the gun may be fired. If the target's biopattern is known already, and is programmed into the gun, no lock-on is needed – set and shoot. The gun's computer can hold up to 100 biopatterns, and may be programmed with the biopatterns of a known specific species or group (e.g., Gormelites or psionics or tyrannosaurs or blondes) rather than an individual. Storage capacity doubles at each higher TL.

Once a smartgun projectile's scanner has locked onto its target, it will pick that individual out of a crowd and track him as long as he remains in range. It moves at a speed of up to 200 yards per second, has 4-G turning capability and one-second target memory, so if it senses its target going around a corner, it will correct its course to follow – but if he ducks through a door and slams it, the bullet will be lost. If it cannot sense its foe in the following turn it will decelerate, hover and wait for him, or if so programmed, explode immediately.

Regardless of the *firer's* skill, a locked-on smartgun projectile attacks with a skill of 20. It is modified by the target's relative speed, cover and size but *not* range; bullets may be programmed to aim for joints or specific hit locations (verbally) before firing. If it is dodged or misses, half of the time it will strike a random hex 1d hexes away. Otherwise, it will circle around and attack again next turn. The contragrav generator burns out after six seconds of full thrust or 30 of hover-and-wait.

Because of their ability to pick a target out of a crowd without harming someone else, smartguns are the standard police (and sniper) weapons of TL14. Ammunition is usually too expensive for widespread military use, and the projectile scanners are too easy to spoof (see *Distort Belt*, p. 86).

Smartgun Projectiles

A smartgun has a 6-shot magazine which may hold multiple ammo types; the user may verbally (or through an interface) order the gun's computer to select between ammunition if more than one type is loaded. This does not take an action but must be announced *before* firing.

Available round include the shaped-charge (see p. 66) *Terminator* doing 4d(10) exp. damage, *Stingray* and *CHEM* (both identical to the gyroc rounds, p. 46). Cost is $120 for a one-pound clip, plus filler cost for CHEM rounds.

At TL15, a smartgun may use *Antimatter* rounds, which have the same effect as those fired by the AMR (see below), but cost only ¼₀ as much.
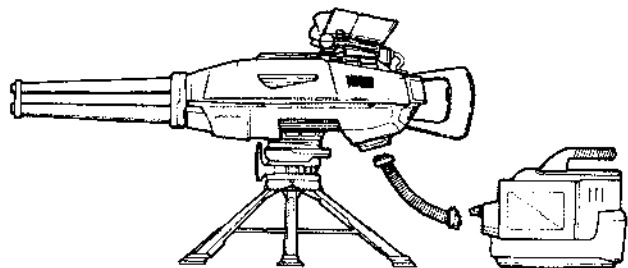
Antimatter Rifle (AMR) (TL15+)

The AMR accelerates a steel-jacketed bullet containing a microscopic amount of antimatter within a gravito-magnetic force shield. The shield collapses upon impact, releasing the antimatter. Bullet size remains constant, but the amount of antimatter in a slug may be varied; bullets with an explosive force equivalent to 1, 10 or 100 pounds of TNT are commonly available; larger ones are possible (the main reason the AMR is TL15 is the difficulty of dealing with such *small* amounts of antimatter). Damage is 6d×2 for the smallest warhead, with damage quartered for every two yards distant from the explosion. Double the increment and increase damage by 10 (to 6d×20 or 6d×200) for every ten-fold increase in explosive force. AM-bullets are generally designated with a number indicating exponential power, e.g., a "number 1" bullet is equal to one pound of TNT, a "number 2" is equal to ten pounds, etc.

The AMR damage on the weapon table assumes a number 2 bullet. AMRs use Guns skill. Magazines cost $1,500 × the size number of the ammo. The only reason the AMR doesn't autofire is to keep down the cost of ammunition! An armourer can convert one to selective fire (RoF 10) in an hour on a skill roll; failure requires another hour; critical failure breaks the gun.

Disintegrators (TL15+)

Disintegrators suppress or reverse the nuclear forces that bind atoms together, causing matter to disintegrate. Sealed armor and force screens protect at one-hundredth DR; unsealed armor does not protect at all. All armor or force field PD is treated as 0 . . . but a disintegrator beam will not penetrate a nuclear damper field. The disintegration of the target produces heat and concussion damage in surrounding hexes, but no fragmentation – use normal concussion damage rules for this explosion.

Disintegrators fire continuously for an entire second – RoF is 1. There is no "beam" per se, simply an effect produced at the target point. An X-ray laser range finder determines the distance to the point the weapon is aimed at and the disintegrator destroys matter at that distance once activated. If the sighting laser is not used and the weapon is set manually and aimed at a target hex, it can fire through walls or other obstacles. This takes one turn to aim, and unless the gunner has measured the distance to the target, an IQ roll will be needed to guess the correct distance apply all usual target size and range/speed modifiers and miss by one hex per point the roll is failed by.

Tachyonic Disruptors (TL15+)

These weapons project ghostly, blue-violet beams of coherent tachyons. The beam has no effect on normal matter, *unless* it strikes a target protected by a force screen or stasis web. Damage from a tachyonic disruptor *only* applies to targets protected by force screens or stasis webs.

Against targets "protected" by force screens, the beam ignores the screen's DR and skips briefly into the normal universe, scattering the component atoms of all matter in its inch-wide path across a dozen dimensions, doing the damage given in the *Ranged Weapon Tables* (p. 125). Armor protects at only ¼₀ of normal DR.

If a tachyonic disruptor beam hits a stasis web (see p. 80), the web collapses catastrophically; the generator is destroyed, and *everything* in the web suffers the effect of a tachyon shotgun hit (see below). A man-portable tachyon disruptor will not collapse a heavy multi-megawatt stasis web, but a vehicle- or ship-mounted weapon will.

Tachyonic disruptors are fired using Beam Weapons (Tachyonic) skill; they are recoilless weapons, projecting a continuous beam lasting a second.

Tachyon Shotgun (TL16+)

Also known as a displacer, a tachyon shotgun rips opens a warp in space and sends its targets *elsewhere*. It is fired like a grenade launcher, and is aimed at a hex rather than an individual. If the roll misses, take the number the roll was missed by and add 1d – this is the number of hexes the gunner missed by. As for direction, roll another die, designating "1" as north and counting clockwise around the faces of the target hex. On a critical miss, the effect occurs in the gunner's hex.

A whirling vortex takes form in the affected hex, threatening to swallow anyone within it. The attacked gets a Dodge roll (PD doesn't help) to dive into an adjacent hex and escape before the rift opens fully. Anyone and anything that fails to escape the hex is sucked into the hole; objects too large to fit through the warp (one yard in diameter) will be unaffected. A tachyon shotgun *will* affect a small stasis field (sucking it through the hole).

Where a particular rift leads is up to the GM - interstellar space, an adjacent parallel dimension, the heart of a sun, the past, or solid ground just a few miles (or light years) away are all possibilities. However, it's usually more fun to send heroes (or major villains) into interesting places they can adventure in – and later return from – than to scatter their component atoms across the universe.

MELEE WEAPONS

No matter how advanced *ranged* weapons become, there will be times and places – boarding actions, low-tech worlds, riot control or just a startown brawl – where hand-to-hand combat simply cannot be avoided. Technology rises to meet the challenge of down-and-dirty fighting, and successive TLs introduce newer and deadlier innovations to deal with such contingencies.

STUN WANDS (TL8+)

Also called shock clubs or stun sticks, these are batons which use very low-powered electric currents to disorganize nerve function. They are often carried by police officers. Some are *jointed*, to prevent a victim taking damage even when struck by an adrenaline-charged riot policeman; others damage as a baton. In addition to any damage from being struck by the baton, the victim must make a HT-3 roll to avoid being stunned (+1 for each 10 points of DR); if stunned, the victim loses 1d fatigue and remains stunned for as long as the weapon is in contact, and (20-HT) seconds longer, before any recovery rolls are permitted.

Stun wands are wielded using Shortsword skill. They use a B cell and strike 20 times before losing power. They weigh one pound and cost $100.
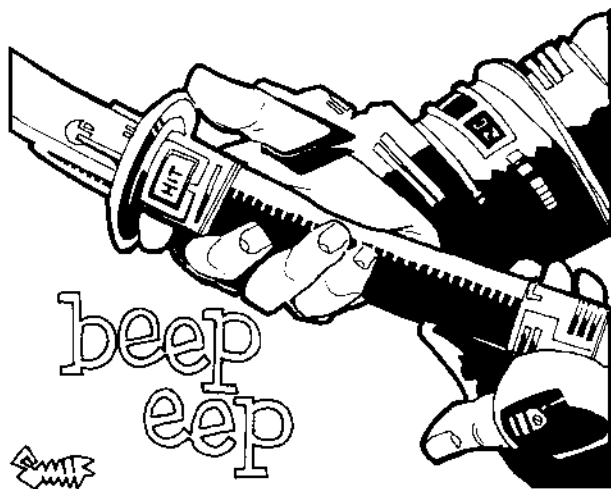
SUPER-FINE BLADES (TL8+)

All bladed weapons can take advantage of TL8 metallurgy. Standard medieval (i.e., "Good" quality) weapons can be manufactured at "Cheap" cost, "Fine" weapons for the price of "Good" ones (list costs), and "Very Fine" weapons for the cost of "Fine" medieval blades – see p. B74. At TL8 "Super-Fine" durasteel swords and knives can be made, adding +3 to damage and costing 20 times the normal price. All quality bonuses are cumulative with the vibro or monomolecular enhancements (see below), but they multiply the cost of the modified vibro or monowire blade, not a normal one!

VIBROBLADES (TL8+)

These blade weapons vibrate thousands of times per second. This adds 1d to the regular damage of the weapon, in addition to any bonuses for weapon quality (see above). As the blade

vibrates so rapidly, its movement is invisible, and it is impossible to tell a vibroweapon from a regular weapon of the same type. A Hearing roll made from one hex away will detect a faint hum that marks the vibroweapon for anyone familiar with it. Anyone parrying (or whose weapon is parried by) a vibroblade will realize the vibroblade's nature on an IQ roll.

Vibroweapons are powered by B cells. To find the life of a TL8 power cell, divide one hour by the weapon's weight in pounds. Thus, a half-pound knife runs for two hours, but a five-pound sword vibrates for only 12 minutes. This duration is increased as usual for higher TLs.

Turning on the vibro effect takes one turn. A successful Fast-Draw roll activates it as the blade is drawn. When not activated, it performs like a normal weapon. DR protects at ¼ value versus vibroblades.

Any cutting weapon can be made in vibro versions. Regular knives of all sizes cost $200 extra in vibro; regular swords of all sizes cost $400 extra and are less common. Any other weapon (e.g., a vibro halberd) would be very unusual, costing $1,000 or more over the cost of a regular weapon, if available at all.

Vibroblades as Saws

A vibroblade can also be used as a saw. It does thrust+2 damage against the DR and HT of the material being cut (see p. B125). For a large, flat surface, such as a wallboard or steel slab, the listed HT is the amount of damage you must do to make a 3-inch cut. For example, to cut a 24-inch slice in a slab of half-inch steel, you must do 320 points of damage – 40 points per 3 inches of steel cut. This damage may be done over any number of turns, but you must overcome the DR of the material *every* turn.

FINGER TALONS (TL9+)

Blades can be built-in at TL9+; see *Finger Talons*, p. 108.

MONOWIRE BLADE (TL9+)

A strand of wire (see *monowire*, p. 16) a few molecules thick is stretched along the edge of a reinforced sword or knife, enabling the weapon to cut through almost anything as the wire slashes into the target at the molecular level. Monowire blades do +1d additional cutting damage, and any armor protects with only ⅕ its DR. As with a vibroblade, a monomolecular blade can cut through most materials in time – see *Vibroblades*, above – but it must be able to cut into an angle such as a corner; since the monowire is only along a blade's edge, it cannot cut into a flat surface.

Any sword or knife (except a rapier or foil) can be made in a monowire version. Monomolecular-edged knives cost $500 extra; monomolecular swords cost $1,000 extra ($1,500 for two-handed swords). Monowire weapons cannot also be vibroblades.

MONOWIRE WHIP (TL9+)

This is a *weighted* length of monomolecular wire, attached to a short handle. It is used exactly like a whip (p. B52). However, a control allows the wire to be extended from one to seven yards, or retracted into its handle, altering its reach and the time required to re-ready it after each swing. It requires one turn to extend or retract the monowire.

A monowire whip is difficult to use, requiring a separate Physical/Hard skill, that defaults to Whip-2. It is also *dangerous*; any "drop weapon" critical miss by the user indicates he has hit himself or a friend.

Damage is swing-2 as with a normal whip, but damage type is cutting, with +1d added to the damage. Armor protects with only ¼ its normal DR. If a monowire whip is used as a lasso or to snare a weapon, it will act as a wire garrotte instead, cutting into the target, and doing thrust+1d cutting damage *every turn* it is pulled taut until the victim escapes – or is cut in half. A monowire whip weighs ¼ pound and costs $900.

POWER GLOVE (TL9+)

This "tool" is commonly used as a hand-to-hand combat weapon; see p. 16.

NEUROLASHES (TL10+)

These weapons cause the same effect as nerve guns (see p. 56) when they hit, but are limited to close combat. They are used as duelling weapons, or by slavers and the police of oppressive regimes. They require Shortsword skill.

Type I neurolashes are small, rod-like weapons, resembling short plastic batons, with protected handgrips. They use a B cell, and can hit fifty times before losing power. Without power, a neurolash is just a baton.

Type II neurolashes, sometimes called "tinglers," are the same, except that they do 1d neural damage if they affect the target at all. They can hit five times before draining the power cell.

The only way to tell the types apart without close examination (and an Armoury roll) is the damage.

SONIC BLADES (TL10+)

A sonic blade consists of a powered hilt, which, when activated, projects a two-foot "blade" of coherent sound, powerful enough to liquefy tissue or tear the flesh off bones. It can be activated as it is being readied on a successful Fast-Draw roll; otherwise it requires a turn. An activated sonic blade emits a tooth-jarring buzz. Sonic blades require Force Sword skill to use (familiarity between sonic and force swords is at -2). They are useless in vacuum.

Any hit from a sonic blade does 5d(5) crushing damage; if damage from the weapon is more than double that listed for a limb that is hit, that limb is completely torn off. Any hit to the head requires a roll against HT or the target's eardrums will be shattered, rendering him deaf until they are replaced. Wearing a completely sealed helmet will protect – unless the helmet's DR was exceeded by the attack. Any armor hit by a sonic blade loses 1 DR at the location hit, unless it was protected by a force screen. Natural armor (fur, scales, etc.) loses as many points of DR in that spot as damage it blocks (and remember that armor protects at ¼ DR!).

A sonic blade differs from other melee weapons in that its "blade" is not solid – it cannot physically parry another weapon (except for a force sword, see below), nor can it be parried, but it *can* damage a weapon. If a sonic blade hits a weapon (or is hit by one), it does its normal damage to that weapon rather than parrying the blow. If the opposed weapon is an activated vibroblade, damage is *doubled* – the sonic blade sets up catastrophic vibrations in the vibroblade, likely shattering it!

A sonic blade *can* physically parry a force sword and vice versa without damage, but it cannot parry (or damage) another sonic blade.

A sonic blade may be used as a powerful cutting tool in the same manner as a vibroblade; see p. 62. It is powered by a C cell in the hilt, which lasts for three minutes of continuous activation. Cost is $2,500 and weight is two pounds.

FORCE SWORDS (TL11+)

A force sword is energy weapon that consists of a powered hilt, similar in size and appearance to a regular sword hilt. When activated, a "sword blade" of annihilating energy, held in shape by a composite magnetic/deflection field, extends from the hilt. Similar in length to a broadsword or katana blade, the energy blade can be used just like a sword to do devastating cutting or impaling damage. A force sword may be activated as it is being readied on a successful Fast-Draw roll. Otherwise, it takes one turn to activate it. In either case, it takes one further turn for the blade to form and stabilize.

Armor protects at ½ DR versus a force sword. Any limb that takes twice the damage required to cripple it in a single hit (see p.B129) is lopped off, and the wound cauterized; excess damage is lost. Any weapon that successfully parries a force sword – except another force sword or a sonic blade – is considered broken, unless the parry was a critical success.

A force sword is powered by a C cell in the hilt. It lasts for five minutes of continuous activation. Most swords have two or more cells, since one cell may not last through the battle. A force sword can also be used as a very powerful cutting tool, doing its regular damage against any material.

For an extra $500, the force sword's magnetic field may be varied in length from dagger-sized to as long as a bastard sword. Varying the field requires a ready-weapon action, and allows the reach to be altered from C to 2.

WEAPON ACCESSORIES

In combat, having an edge can mean the difference between life and death – and technology is a great way to get that edge. This section presents devices and modifications that enhance the functionality of weapons. Unless otherwise indicated, these accessories can be used with any weapon; for modifications specific to a single weapon type, see the specific weapon description.
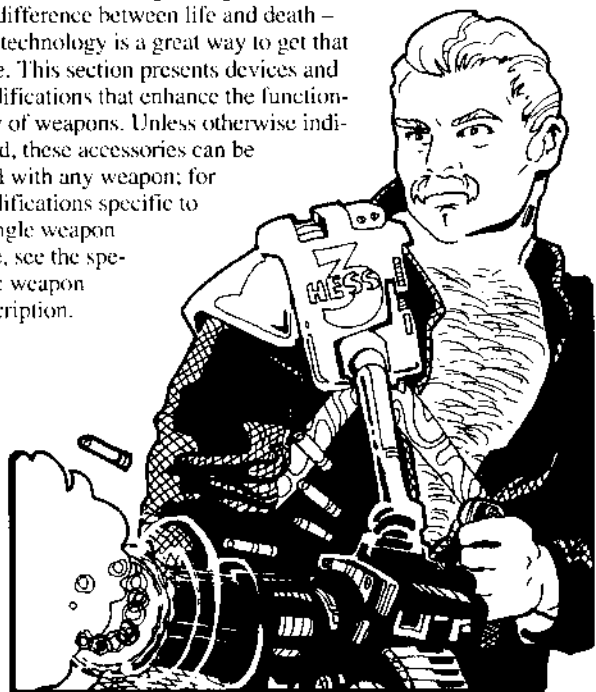
LASER SIGHT (TL7+)

When turned on, this device projects a low-powered laser beam, placing a dot at the point where the weapon will hit. Attached to any pistol or rifle weapon, this item adds 2 to Acc and reduces the Snap Shot penalty to -1 at up to 50 yards and to -2 at 50 to 100 yards. Snap Shots are still at -4 at ranges over 100 yards. It can be tuned to use an infrared laser beam, projecting a dot invisible without an infrared vision system. It runs on an AA cell. Weight is negligible, and it costs $200.

After TL8, laser sights are built into all personal weapons, except holdouts, at no extra cost. However, *laser sensors* become available for armor (see p. 79) which can warn the wearer if a laser targeting beam is aimed at him.

SPACE-PROOFING (TL7+)

If a cheap TL8+ or any TL7- weapon is fired in vacuum, it will malfunction on a roll of 14+. Space-proofing a cheap or TL7 weapon takes an Armoury (Guns) roll, one full day of work and $200 worth of materials. A gunsmith will charge another $200 for labor, and complain incessantly about customers who don't get the right gun to start with. Any failure on the Armoury roll requires another day's work and another roll (and $200 more in labor costs for a gunsmith). A critical failure on any roll irreparably damages the gun.

ANTI-THEFT SYSTEM (TL8+)

A basic anti theft system (equivalent to an electronic lock, p. 88) may be installed in any weapon; any attempt to fire the weapon without unlocking it first will disable the firing circuits.

To disable the anti-theft system, make a roll against Electronics Operation (Security Systems); a failed roll at least permanently disables the gun, and may have other nasty consequences (explosive charges etc.). This costs $100, or $250 for a laser key system (-1 to Security Systems skill); double cost for each additional -1, to a maximum of -5 ($4,000).

ARTICULATED WEAPON HARNESS (TL8+)

Used to steady very heavy weapons, it straps on like a backpack and has a chest plate in front, with a supporting arm and three articulated hydraulic joints positioned to allow universal motion and easy suspension. The harness reduces ST requirements for the weapon it was designed for by 3; a harness designed for a Gatling laser would allow the laser to be fired from the hip by someone with ST 12. Weight is five pounds and cost is $600.

D-TAG (TL8+)

This is a tiny receiver built into a weapon or other item. Upon receiving a coded signal on a specific radio frequency, it sends out a homing signal. D-tags are often built into police equipment, and some regimes may put them in weapons sold to civilians to control them. A successful Electronics Operation (Security Systems) roll is required to find it; a second roll (at -2) must be made to disable it without disabling the weapon. A D-tag costs $20.

DESIGNATOR (TL8+)

There are two types of infantry-portable designators; both may simultaneously designate for several missiles fired at the same target. Using a designator requires that the item's user aim for at least one turn at the target (constantly if using an active designator for a clever missile, or any passive designator) before the missile is fired. If the designator is forced to use an Active Defense (dodging, etc.) while aiming, his aim is lost. The usual technique to prevent being hit by a missile is to fire on the designator's position!

Active Designator (TL8+)

An active designator is used to illuminate targets for laser-homing missiles, grenades and artillery shells. This is a high-power laser sight which "illuminates" the target. It may be clamped onto a rifle, or mounted directly on a grenade or missile launcher to enable the gunner to designate for himself. There is one drawback to using an active designator: the laser sensors incorporated into vehicle point-defense systems will detect the designator, and the vehicle's point-defense computer will immediately open fire on the user. This is not very comforting to the infantryman, and is a reason why active designators are often mounted on expendable drones.

A TL8 active designator has a range of 6,000 yards. It uses a C cell, which powers it for 600 seconds of continuous use. Weight is two pounds and cost is $1,000.

A laser designator can be modified to use a blue-green frequency at 20% extra cost. This allows underwater or surface use, but halves the range. Non-blue-green lasers have ⅟₆₄ range underwater.

Passive Designator (TL10+)

A passive designator is a bulky device resembling a heavy rifle with a large dish antenna on the barrel. A passive designator is a sophisticated visual range finder and secure neutrino communication system for guiding TL10 brilliant (not clever) missiles, and is only available at TL10+. The main disadvantage of this designator is that the user must aim constantly, even though firing brilliant missiles. Since it does not use an active beam, it is not detectable by a vehicle's laser sensors, greatly increasing the lifespan of observers. A passive designator still needs line-of-sight, however, and anyone pointing something that looks like one at a unit is likely to draw fire! Usually, each squad will have one observer who carries the unit's passive designator. If the passive designator is destroyed, the squad will have to use active designators. A passive designator weighs 30 pounds and costs $20,000.

HEAD-UP DISPLAY (HUD) (TL8+)

A HUD is mounted in a helmet or pair of special goggles. It displays visual information (space suit or vehicle instrument readouts, a computer screen, targeting crosshairs) by projecting it directly onto the wearer's visor. Any piece of electronic equipment (sensors, control panels, etc.) which uses a visual display screen may be connected to a HUD by a short cable or a communicator link (most electronic gadgets have socket sand cables for this).

Once connected, sensor or instrument readouts are then projected directly onto the user's goggles or faceplate. This adds +1 to skill level of skills such as Driving, Piloting or Free Fall where quick reaction to information is important – maneuvering with a thruster pack, for example. Note that *all* spaceship, AFV and mecha gunnery computers are automatically assumed to be using HUDs at TL8+, and the bonus is already factored into the chance of success.

A set of HUD goggles costs $500 and weighs ½ lb; it will run off an A cell for a year, or can use the same power as other helmet or suit systems.

HUD Sights (TL8+)

All TL8 rifles and carbines include basic low-light (image intensification) and telescopic sighting systems at no extra cost; bonuses for these sights are already included in the weapon's accuracy. But weapon sights need not be mounted on the gun; they can be part of a head-up display in a helmet or goggles. They must be connected (using a short cable) to the wearer's helmet HUD. When the sights are activated, a targeting reticle is displayed on the user's HUD which shows the wearer exactly where his gun is pointing, reducing its SS number by 2. If a laser scope is being used, the sights will also project range-finding information, telling the user how distant the target is.

Fitting a weapon to use HUD sights costs $500; weight added to the weapon is negligible. To use the sight, the wearer must have a head-up display mounted in his helmet or goggles.

Holographic HUD (TL9+)

A development of HUD sights, these holographically display targeting information in front of the firer's eyes. Holographic sights must be mounted in a helmet's or goggles' HUD and slaved to a particular weapon. They reduce the weapon's final SS number by 5 (*in addition to* the effects of a laser sight). Cost is $500. Weapons require HUD sights (see above).

HUD Laser Targeting

When a HUD sight is used *in conjunction with a laser sight*, the firer may add *half* (round up) his weapon's accuracy number when making snap shots (normally, no Acc bonuses accrue on snap shots).

To get the full Acc bonus, the firer must still take a turn to aim.

POWER HOLSTER (TL8+)

This is available for any pistol-type weapon or knife. It consists of three parts: a wrist sensor unit, a homing sensor on the handgrip of the weapon and a break-away holster. When the wrist sensor detects nerve impulses that mean the wearer wants to draw, the holster ejects the weapon toward the hand. This lets the weapon be readied instantly.

For game purposes, treat this as a separate Fast-Draw skill. However, Fast-Draw (Power Holster) rolls always have a +2. Failure indicates the weapon isn't gripped properly and still requires a turn to ready. On a critical failure, the weapon bangs the user's fingers and falls, or at GM's option, the user is shot/stabbed in the foot! The holster gets 100 ejections on a B cell. Cost is $1,000 and weight is five pounds. Each make of weapon requires a specially-made holster. Price doubles if the weapon is very unusual.

POWERPACKS (TL8+)

The main limitation of a civilian beam weapon is its small number of shots (particularly if autofiring or hotshotted). To overcome this problem, any beam weapon that normally uses a C cell can be hooked up by a heavy-duty cable to a D cell, usually worn in a belt or small backpack rig. The hybrid is less energy-efficient than a military weapon, but better than nothing, giving the weapon ten times the usual number of shots (a laser rifle would get 120). This conversion takes one hour and requires modification to the weapon's power couplings and a roll against Electronics (Weapons); a failed roll requires one more hour and another roll, critical failure wrecks the weapon. Parts for the conversion cost $500 plus the cost of a D cell.

There are two disadvantages to using backpack powerpacks. First, a heavy power cable and beltpack attached to a civilian pistol or rifle is fairly obvious, and very likely to lead to questioning by police. Second, if the weapon suffers a jam or misfire result, the powerpack burns out, doing 2d damage to the user and wrecking both it and the weapon!

With D cell and connections, a powerpack weighs six pounds and is the size of a paperback book.

SNIPER MIRROR (TL8+)

A laser gunner may set up a high quality optical mirror for ambushes. The sniper can fire at the target's image in the mirror; the beam will reflect off and strike the target. The range is equal to the range of the target to the mirror, plus the range from the mirror to the sniper. The laser is at -2 Acc. Strategically set (the GM may require a Tactics or Traps/TL8 roll), these mirrors allow a laser sniper to fire around corners, and may confuse the enemy about the direction from which fire is coming. The standard mirror is about two feet across when unfolded, but folds to the size of a paperback book. Cost is $50 and weight is one pound.

Weapon Mount (TL8+)

A weapon can be mounted in a bionic limb; see p. 106.

Finger Mount (TL9+)

At TL9+, a finger can be replaced with a weapon; see p. 108.

Personal Transponder (TL9+)

In any confused combat situation, such as a night-time fire-fight or house-to-house fighting, soldiers are often just as much endangered by "friendly fire" as enemy action. Personal transponders are designed to prevent soldiers from accidentally shooting each other.

The transponder is a short-ranged signal transmitter, usually worn in a locked bracelet. It broadcasts a coded radio signal (range one mile). Any hand weapon may be fitted with a firing safety and a straight-line radio receiver. When the safety-equipped weapon is pointed at someone fitted with a transponder, and a preset "friendly" frequency is picked up by the receiver, the safety engages and the weapon will not fire.

Weapon transponders have two disadvantages: the transmitter signal gives away the wearer's position to sensitive radio detectors (and radio-homing projectiles), and if an enemy discovers the frequency, he will also be immune to fire. Transponder frequencies are changed regularly, and the device can be turned off. Use of personal transponders is usually restricted to special circumstances, such as house-to-house, boarding or night actions where a confused situation makes friendly fire especially dangerous. The transponder costs $100, the safety $50; weight of either is negligible.

For another $50, a safety-equipped weapon can have an *override*. This allows a second firing action that ignores the safety and fires anyway. Overrides can be preset to ignore any transponder. Of course, the override could also be equipped with a safety, and an override for that safety could be installed. With a little institutional paranoia, there could be more money in safeties and overrides than in the weapon.

Recognition Pad (TL9+)

This is a palm-print analyzer and dedicated computer built into the gun's handgrip to scan the character's palm. The weapon's safety will automatically lock if the print is not in its memory (its minidisk can hold up to 100 prints). Optionally (costs an extra $50), the gun may be designed to explode instead. To reprogram the pad, the handgrip must be opened to get at the computer (which requires the owner's palm print or a tool kit and takes 30 seconds). Doing the reprogramming takes a minute. A recognition pad adds ¼ pound to its weapon's weight; it cannot be fitted to holdout weapons. Cost is $250.
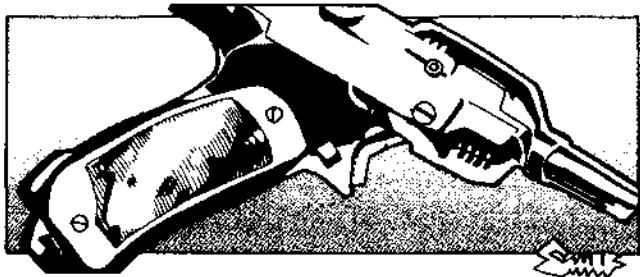
EXPLOSIVES AND GRENADES

The precise application of explosive power can easily achieve tactical goals that no amount of direct firepower could ever hope to accomplish. Explosives – particularly grenades – are a vital part of the soldier's arsenal. With each TL comes advances in both the power and precision of explosives, as well as non-lethal alternatives. This section covers both explosives, such as bombs and mines, and area-effect weapons, such as gas grenades and riot-control weaponry. For information on the bio-chemical fillers used in gas grenades, see the next section, *Biochemical Weapons*.

Dodging Explosions

If a person is caught within the radius of an explosion or area effect attack, the GM may allow a Retreating Dodge (with the usual +3 bonus, *but ignoring PD*). Success means that the dodger can dive or roll up to one hex (or ½ Move, whichever is greater) away from the explosion. Even if he is still within the radius (see p. B121), he might be able to dive into a ditch or move behind cover . . .
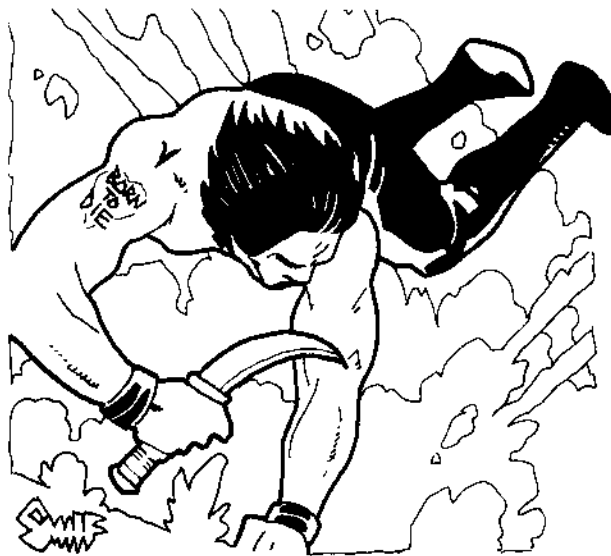
Shaped-Charge Warheads

Many weapons fire projectiles armed with shaped-charge warheads similar to those used on contemporary anti-tank missiles.

Shaped charges are explosive charges with a cone-shaped cavity in the nose. The cavity is usually lined with a thin coating of metal. When the shaped charge is detonated, a jet of gas from the explosion and molten metal from the liner is formed. If the explosion takes place at the proper distance (the "stand-off distance") and at the proper angle, the jet can punch through a lot of armor.

The damage for shaped charges in *GURPS* is written as a number of dice (sometimes with a multiplier) followed by the armor divisor in parentheses; e.g., 6d×3 (10). In *GURPS*, shaped charges have three possible conditions of damage.

If the jet forms at the proper angle and distance from a hard surface, the DR of the target is reduced by a factor of ten against penetration by the jet. Roll the indicated number of dice, and multiply the result by whatever the multiplication factor for the explosive damage is. Divide the DR of the target's armor by ten (round up). All damage rolled above that necessary to penetrate the reduced DR can affect whatever is on the other side of the armor.

What that effect will be depends on so many variables that it must be left to the judgement of the GM. The jet is lethal: it is hot gas and molten metal at very high velocity. But it is also small: the jet from a five-inch diameter projectile is less than an inch in diameter and moves in a nearly straight line from the point of entry. The jet cools and dissipates as it moves so it has a limited range. For gaming purposes, the jet has full effect up to three yards from the point of entry and no effect beyond; this is arbitrary but simple. Damage is equivalent to the concussion damage if the warhead were a simple explosive, but only in the line of the jet, not in a sphere around it. If the jet hits a human being, he is almost certain to be killed. The effect of a five-inch shaped charge is that of a bullet several hundred times the size of a .50 Browning and moving six times as fast, combined with the effect of an oxyacetylene torch and an industrial sandblaster, all at once. (But men have survived, usually minus important bodily appendages.)

If the jet hits equipment that is not protected by its own armor, it will probably put the equipment out of service. If the jet hits flammable material, it will ignite it. (This is how shaped charges destroy tanks: they ignite the fuel or ammunition.) If the jet hits nothing but air, all it does is put a hole in the armor. (This may be enough, if it opens the target to vacuum or a poisonous atmosphere.)

When the warhead explodes, it also does concussion damage, as with any other explosion. See p. B121 for concussion damage. This might affect, for instance, infantry riding on the outside of an armored vehicle hit by a shaped charge. Shaped-charge-weapon gunners occasionally use their weapons to attack infantry in just this way; they fire a round against some hard surface near the men to get the concussion effect.

Shaped-charge warheads are designed for use against hard targets. The fuse may not activate unless it meets enough resistance. Roll 3d against the target's DR. If the roll is equal to or less than the target's DR, the warhead explodes. If the roll exceeds DR the warhead does not explode, and the projectile does 4d or 10% crushing damage (whichever is greater) instead of explosive damage.

For a shaped-charge, ½D is the range at which it is unlikely that the weapon will put the shaped charge at the proper standoff distance from the surface of the armor to allow the jet to form and penetrate. In addition to the loss of Acc modifiers, the armor divisor (the number in parentheses in the Damage entry) is halved if the warhead hits. Explosive damage of the warhead, if it explodes, is the same at any range.

GRENADES (TL8+)

All grenades weigh one pound; they are made of plastic, but come with a removable metal sabot enabling them to be fired out of electromag and mini-grenade launchers.

A TL8+ grenade can be impact-fused or delay-fused (1 to 30 seconds). To use a grenade, the activator is pressed and the grenade is thrown. If the delay was one second, the grenade will then explode immediately. It takes one turn to set or change the delay or fusing on a hand grenade, and another to press the activator and throw the grenade. If the grenade is loaded in a grenade launcher, either the delay or impact setting must be preset (most grenades are set to explode on impact) and activation is automatic when the grenade is fired.

The ability to throw a hand grenade where you want it is the Throwing skill (not Thrown Weapon skill); see p. B49. The range of a hand grenade depends on ST (see p. B90). A grenade miss may *scatter*; see p. B119.

At TL9+, all explosive grenades do 1.5 times damage (e.g., 6d×3 for a frag grenade), as they make use of improved PLASTEX-B explosive. Cost and weight of grenades and mortar shells is not reduced at TL9, but at TL10+ weight and cost halve, enabling twice as many grenades to be carried in grenade-launcher magazines.

Grenades fired from grenade launchers may be laser-guided at TL9+ for $50; this requires the use of an active designator (p. 64), however.
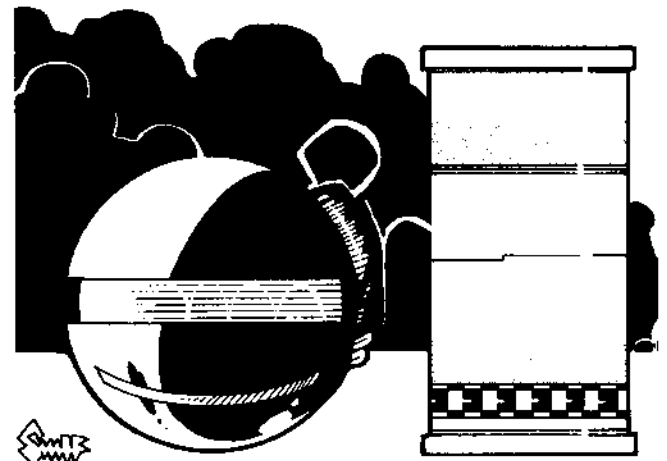
Types of Grenades

All but chemical and flare grenades are Legality Class 0. Chem grenade Legality depends on the chemical used; flares are Legality Class 5.

Chemical Grenades (TL8+)

These come in many varieties, from sleep gas and nerve gas to smoke and prismatic smoke. They create a cloud with a radius of six hexes. Chemical grenade clouds may disperse within a few seconds or linger for minutes, depending on the wind. Most chemical clouds last for 300 seconds before dispersing; divide this by wind speed in mph. Most chemicals have no effect once dispersed, but some virulent poison gases will cause injury even when greatly diluted. See *Biochemical Weapons*, p. 70, for different types that may be used in grenades. Cost is equal to ten doses of the chemical.

Concussion Grenades (TL8+)

These are similar to fragmentation grenades, and inflict 6d×2 concussion damage at TL8, but fragmentation is limited to that picked up from the ground at the site of the explosion – see pp. B121-122. Concussion grenades cost $20.

Flare (TL8+)

These grenades release a pillar of smoke and burn brightly, even underwater, removing all combat penalties for darkness over a 100-yard radius. They may start fires if in contact with flammable material, or do 2d of burn damage to anyone directly hit by one. If a flare is set off, anyone within 15 yards who is looking in that direction without anti-glare goggles, must succeed at a HT roll or be blinded for (20-HT) seconds. Roll against HT+3 if more than five yards away; roll at HT-3 at night.

Flares burn for five minutes; they are visible to the horizon if fired at ground level and for up to 20 miles if fired in the air (weather and intervening terrain permitting). Flares intended for launch from a grenade launcher are usually equipped with a small parachute to allow them to stay in the air for the duration of the burn. Flares cost $20.

Fragmentation Grenades (TL8+)

Frag grenades do 6d×2 concussion damage and 2d cutting damage; see p. B121 for explosion rules. They cost $20.

Shaped-Charge Grenades (TL8+)

Used against heavy armor, these are fired from grenade launchers, and may only be impact-detonated. The explosion does 4d×2 (10) damage; use the *Shaped-Charge Warheads* rules on p. 66. They are $30 apiece.
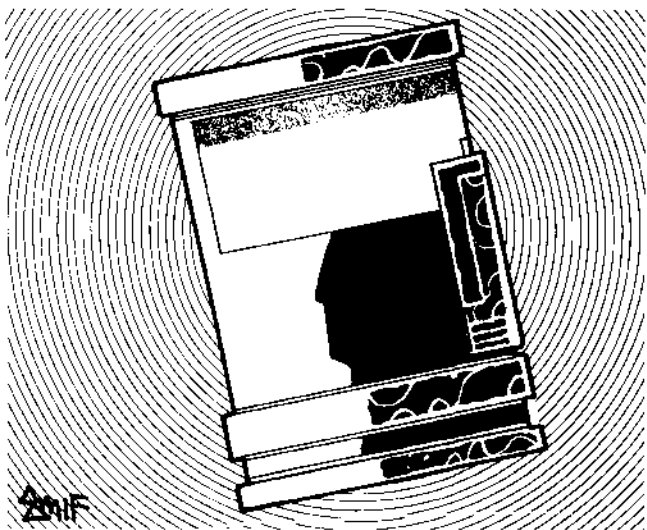
Warbler Grenade (TL9+)

This is a non-lethal weapon, originally intended for riot dispersal. Set off, it "screams" at a deafening pitch, oscillating up and down the audible scale and on nerve-shattering subsonic levels. The grenade's scream lasts for 30 seconds. Everyone within ten yards of the grenade must make a Will roll each turn, at -3, to remain in the area of effect; anyone failing the roll must flee the area as quickly as possible. A character who remains in the area will be at -2 on any DX, IQ or skill rolls due to distraction.

The noise of a warbler can be heard for many hundreds of yards; normal conversation is impossible within 50 yards of one, and it will automatically deafen everyone in the area of effect for as long as they remain there and for at least 30 seconds afterwards. A HT roll is allowed every 30 seconds to regain hearing.

Privacy fields, electronic earplugs or airtight helmets provide total protection against a warbler. Cost is $50 and weight is one pound.

Hell Grenades (TL14+)

These are grenades containing a microscopic speck of antimatter within a gravitic shield. The containment field is powered for one year by a C cell built into the grenade; after that, better insert another power cell . . .

A hell grenade can be set to go off by timed detonation or impact like any other grenade. It does 6d×50 concussion damage; damage is quartered for every four yards from the center of the explosion. The grenade also produces an electromagnetic pulse that shorts out unshielded electronics within 500 yards.

The amount of antimatter is purposefully tailored to provide an *intermediate* explosion, 15 times as powerful as a TL9 grenade, but several orders of magnitude less than the smallest nuclear weapon. A hell grenade could have yields in the kiloton or even multi-megaton range, but that is impractical as an infantry weapon.

Hell grenades weigh one pound and cost $750 each. They are Legality Class 0.

Implosion Grenades (TL16+)

See *Implosion Bomb*, p. 69.

Stasis Bomb (TL16+)

A stasis bomb generates a spherical stasis web (see p. 80) which extends in a three-yard radius around it, enveloping all within that area. The result is a stasis bubble, a mirror-surfaced sphere half buried in the ground. It can be dug up and carried off if desired.

A stasis bomb weighs one pound and resembles any other energy grenade. It can be thrown in the same way, and set to go off on impact or timed delay. The actual duration of the stasis web must be set before it is used; most military bombs are set for anywhere from an hour to a few months. It is powered by a C cell. Cost is $1,000; the grenade may be reused if its power cell is replaced.

MORTAR SHELLS (TL8+)

All of the grenade types described under *Grenades* (above) are available as mortar shells. Treat these as grenades, but cost, weight and damage double; a gas shell covers an 8-hex radius. Special Cluster Bomblet (see *Electromag Mortar*, p. 46) and Strobe shells (see *Strobe Mine*, p. 69) are also available.

Mortar shells may be laser-guided at TL9+ for $50; this requires the use of an active designator (p. 64), however.

PLASTEX (TL8+)

This is a powerful, moldable explosive. It is very stable and can only be detonated with an explosive detonator. It is the standard filler for shells, warheads and grenades. At TL8, ¼ pound does 6d×2 damage – it is roughly four times as powerful as TNT. Plastex costs $20 per ¼ pound block. A detonator (communicator-triggered or timed) also costs $20; weight is negligible.

PLASTEX-B (TL9+)

At TL 9+, PLASTEX-B appears, which does 6d×3 damage per ¼ lb.

Smart Mines (TL8+)

Smart mines are often set by TL8+ soldiers as booby traps. Burying a mine takes five minutes, or it can be dropped in heavy grass, rubble, etc. They detect targets with a short-ranged infrared heat sensor (which extends just above the ground if they are buried). If they sense a target they leap into the air (one yard up) and then detonate. They can also be triggered manually by scrambled communicator signal or wire.

Their heat sensors will detect a human-sized lifeform within two yards on a roll of 15 or less on three dice (shaped-charge models detect vehicles). A failed roll means they don't go off. A Traps or Vision roll at -4 (-2 if searching) will spot a buried smart mine from three yards or more away before it spots the character.

A typical smart mine is nonmetallic, weighs two pounds and has the same effect as a mortar shell (see p. 68), but for ten times the cost. A smart mine works for one year on an A cell. All such mines are Legality Class 0.

Strobe Mines (TL8+)

This is a special type of anti-personnel smart mine, often used for riot control or in security systems. Strobe mines emit *intense* light, rapidly pulsing at frequencies that can induce seizures in many individuals. Anyone facing the mine within 30 yds must roll against HT-2 (HT if 15 yards or more away) to avoid suffering a seizure, as described for epilepsy (p. B28), and blindness for 1d minutes; anyone making the save by only 1 or 2 points is blinded but does not suffer a seizure. Anti-glare gog

gles give a +5 bonus. Individuals with the Epilepsy disadvantage roll at -5! The HT roll must be made *each turn* the mine is operating, but if a character made a successful roll, later rolls are at +3 to HT. The strobe lasts for ten seconds on a single B cell. Legality Class is 3.

Strobe mortar shells are also available; these float down on a parachute over the target area, remaining aloft for five seconds. Cost is $100, or $1,000 for a smart mine version. Weight is 2 pounds.

Mininukes (TL10+)

At TL10, a missile can carry a .05 kiloton nuclear warhead. A single nuke this size will level buildings and destroy anything but a cybertank within a radius of about 200 yards, kill battlesuited troopers and heavily armored infantry within 300 yards, and knock out electronics, set fires, short-out unshielded electronics and kill or injure unarmored persons (inflicting about 7d of damage) within 400 yards. Dangerous radiation will be restricted to about 300 yards (everyone here is already killed by the blast, so don't worry about it), but a crater 50 yards across will inflict several hundred rads/hour for the next few days.

A five-man squad can carry fifteen or twenty mininukes, but in practice, will rarely, if ever, be issued them. At TL10, the infantry are the arm of restraint – if you are willing to use nuclear weapons on a planet, you may as well drop them from orbit.

Mininukes will not be available under any circumstances to private citizens, and even legitimate mercenary companies find them hard to come by. Black-market nukes may be available, for astronomical prices, but will be of dubious reliability (duds, or still retaining unlocked anti-theft codes, for example).

At TL12+, mininukes of the size described can be made for grenades, at $800 each – if anyone wants to. Better use a grenade launcher, though.

Implosion Bomb (TL15+)

This tactical weapon is more discriminating in its effects than an antimatter grenade (or big explosive charge). An implosion bomb is satchel-sized at TL15, grenade-sized at TL16. Implosion bombs utilize a matter/antimatter power cell to generate a spherical, tractor-beam effect. The cell burns out in a microsecond, but not before the bomb creates a powerful implosive force, pulling everything in range toward it before collapsing into itself.

Everything within a five-hex radius is totally destroyed, pulled into a lump of collapsed matter smaller than a pinhead. Everything within ten hexes is knocked down, and suffers 20d (roll 2d×10) damage from the heat pulse and radiation produced by the implosion effect; damage is reduced to 10d fifteen hexes away and 5d twenty hexes away. Armor DR is halved, but force screens protect normally.

The major advantage of implosion bombs is that the *implosion* effect results in a very limited destructive radius, but within that area the effects are pretty total (and not pretty). Because of this, they are favorite weapons for fighting in buildings and on (large) ships.

Satchel-sized implosion bombs weigh 20 pounds. They are too large and delicate to throw, and must be emplaced, which takes ten seconds. Anyone can use the built-in timer, but a

Demolition roll is required to set them for other detonation (remote, proximity, etc.) or to disarm them – critical failure sets off the bomb immediately, failure means it doesn't go off. Grenades weigh one pound and cost $2,000, and are thrown like any other grenade – launcher and *clever* missile versions are available. For obvious reasons, implosion bombs are Legality Class 0.
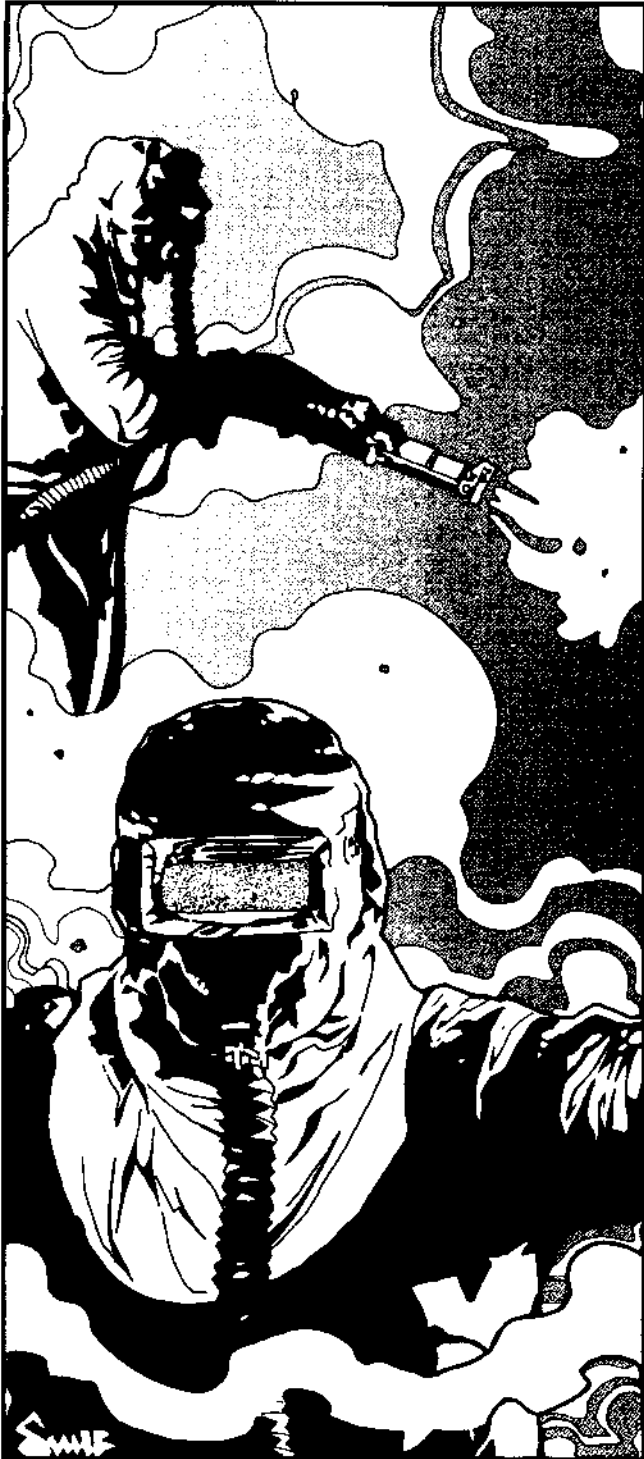
BIOCHEMICAL WEAPONS

Advances in chemistry and biochemistry make more potent chemical weapons available with every TL – from lethal nerve gas to subtle, mood-altering pheromones. This section presents the gases and drugs most commonly used in combat, including both lethal and non-lethal biochemical weapons, as well as the ultra-tech equivalent of smoke-screens.

Aerosol sprayers, grenades, gyrocs and mortar rounds may all deliver chemical rounds; price is per "dose" (see p. B132). Ten doses are used in a grenade, 30 in a mortar round and one in a gyroc. An aerosol can sprays one dose at a time and holds five doses. As well as tear gas and smoke (see p. B132), other chemical agents may be used.

GASES (TL 8+)

Blackout Gas (TL8+)

This gas creates a nearly opaque cloud of thick, inky-black smoke that covers the area of effect. Everyone in the cloud functions as though in complete darkness: any action requiring sight is at -10, or is impossible (see p. B92). Light intensification is useless, but infrared vision reduces the penalty to -5, and other senses or sensors (such as radar or sonar) are unaffected. Lasers (except for X-ray and gamma-ray lasers) cannot penetrate the cloud. Anyone without breathing gear must make a HT roll each round or take 1 point of damage. Cost of Blackout gas is $3 per dose and it is Legality Class 5.

Nerve Gas (TL8+)

This is a contact agent – only sealed armor, or an NBC or vacc suit, will prevent exposure. Each turn, anyone exposed to nerve gas takes 1 hit of damage, or 2 hits if not wearing a gas mask. He must also make a HT-4 roll each turn (unless wearing airtight armor); if it is failed, he will be paralyzed for (30-HT) minutes, and take 4d of damage if not given an antidote (Neurovine, see p. 97) within five minutes. Nerve gas costs $5 per dose and is Legality Class 0. Earlier poison gases are also available; they are distinguished by different colored markings on the grenade or canister. See p. B132 for typical poisons.

Prism (TL8+)

This forms a slightly opaque cloud of prismatic crystals, designed to reflect laser beams and block radar. Radar, laser fire, lasercoms, laser scopes and laser designators cannot penetrate the cloud, but normal vision is only at -1. Prism is harmful if breathed; the effects are as with Blackout gas (see above). Prism costs $5 per dose and is Legality Class 5.

Sleep Gas (TL8+)

For every turn spent in a sleep gas cloud without holding his breath, the victim must roll against HT-4. If he misses the roll, his ST goes to 0 and he falls asleep. If he makes the roll he takes 1 point of Fatigue. If Fatigue drops to 0, he falls asleep. If he leaves the cloud, he may regain lost ST normally. Those who fall asleep remain so as long as they continue to breathe the gas, and for at least 30-HT minutes after that. When that time is up,
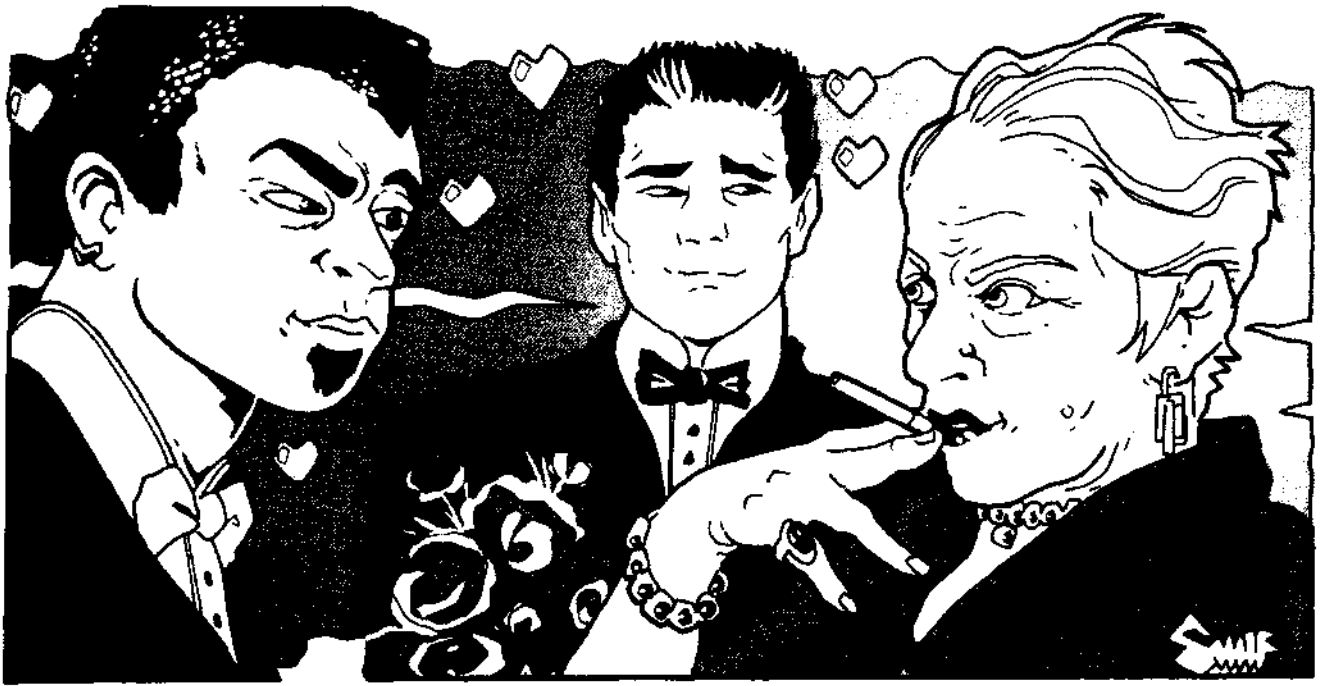
the victim must roll against HT each minute to awaken. He may be awakened normally by a successful First Aid roll. Sleep gas costs $5 per dose; Legality Class is 2.

Paralysis Gas (TL9+)

A non-lethal contact agent, paralysis gas may be delivered by grenade, mortar shell, or aerosol spray. For every turn spent in a para-gas cloud (if not wearing a sealed suit), a character must roll HT-3. If he misses the roll by 1 or 2, he falls down and cannot move *that* turn; if he fails the roll by 3 or more (or rolls a 17 or 18) he falls (taking 1d-1 damage, unless he falls against a wall, since he is stiff) and is paralyzed for (30-HT) minutes, after which he must roll vs. HT each minute to recover. Paralyzed individuals are still conscious, but may take no physical action (though psi powers and brain implants may be used). Paralysis gas is widely used in riot control and security systems, and may be available on the black market or to licensed individuals. Cost is $10/dose (a grenade would cost $100); it is Legality Class 2.

Poisons (TL8+)

Nerve Poison (TL8+)

This is also available as a drug – a single dose injected into the body (by hypo, needler, etc.) requires a HT-4 roll to avoid being paralyzed for (30-HT) minutes. 4d damage is taken if Neurovine is not taken within five minutes. A dose costs $5. Nerve poison is Legality Class 0.

Sleep Poison (TL8+)

A sleep dose for hypos and dart guns is available. The victim must roll vs. HT-3. For each point the HT roll is failed by, the victim takes 1d of Fatigue. The drug takes effect instantly. Fatigue is recovered at 1 every ten minutes. Cost is $20 per dose. Sleep Poison is Legality Class 2.

Contact Poisons (TL8+)

Contact versions of both nerve and sleep poisons may be placed on a blade (but not a vibroblade!), smeared on a flat surface such as a doorknob, etc. As contact poisons, these are less effective. The HT roll not to succumb is at +2. Cost for a contact version is ten times as much. The GM may require a roll against DX or Poisons skill to avoid an accident if applying it in haste. Legality Class is 0.

Pheromone Spray (TL9+)

Pheromone spray is a biochemical agent which enhances the user's sexual attractiveness to members of the same species; the effect on aliens is unpredictable. A single use effectively increases the user's Appearance by one level (or increases the reaction modifiers by a further +2 if the character is already Very Beautiful). The pheromones effectively surround the user in a two-yard cloud (this hex and all adjacent hexes).

The cloud moves with the user. The pheromones must be inhaled to work; a sealed suit or air mask protects completely.

Anyone, including the user, who inhales the pheromones must roll against IQ-3. Anyone who fails will temporarily suffer from the disadvantage. Lecherousness, see p. B34. The disadvantage will last for as long as he is within the pheromone cloud, plus four hours.

Pheromones are usually delivered from a small spray canister the size of a pen or lipstick, containing one dose; the spray is invisible and silent, with a one yard range. A single dose lasts for four hours; multiple doses have no additional effect.

Pheromones are very expensive, and may be restricted to the black market. If they are legal, a single dose costs $150; gas grenades loaded with pheromones are available for ten times that. Illegal pheromones may have exotic side effects, and will likely cost several times as much.
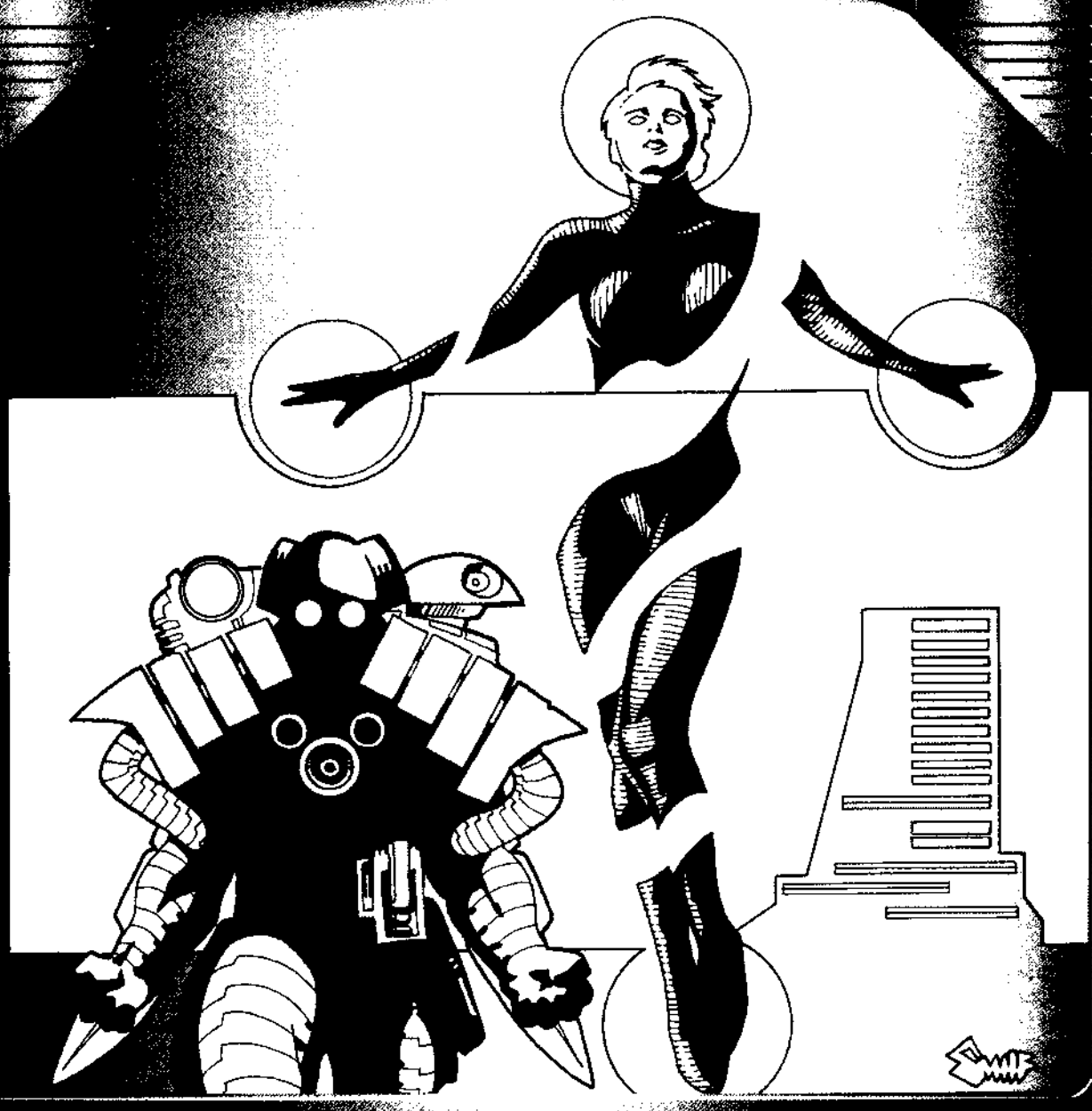
As weapons become more and more deadly, more effective defenses have to be developed to protect against them. This chapter covers both general defenses, such as armor and "force fields," and specific or specialized defenses, such as antidotes to toxins and protective fields that shield against particular weapons. For building defense and security, see Chapter 8, *Security*.

TIMELINE

TL8

Improved materials technology based around zero-g composites and synthetics also usher in a new generation of lightweight, incredibly damage resistant, and most importantly, *comfortable* personal armor.

TL9

At TL9, armor gets tougher and smarter. Laser sensors and infrared camouflage are routinely built into combat armor to warn of attack and hide the wearer. Interstellar or fast interplanetary travel means that troops must be prepared to fight in a variety of hostile environments. Articulated suits of Infantry Combat Armor are introduced which can double as vacc suits, and which provide better protection against the heavier weapons now in use. Combat Infantry Dress (see below) is still issued, with improved DR, but is mostly used by static, planet-bound light infantry, police or vehicle crews.

TL10

TL10 armor is incredibly tough and damage resistant. Lighter, concealable armor that can be worn under clothing is still mostly reflec or monocrys, but smart reflex armor is available to those who can afford it. Infantry Combat Armor remains in use with improved DR, but in response to the X-ray laser, Powered Combat Armor (still lighter than battlesuits) comes into use.

TL11

TL11 sees the development of defenses based upon force manipulation. There are two types of protective force field, *deflectors* and actual *force screens*. At TL11, true force screens are used on starships, cybertanks and large installations, but they do not become man-portable until TL13; they are described on p. 77.

TL12+

Cybersuits with thermal superconductors remain the standard infantry body armor, with energy cloth and force shields used by civilians. The deflector belt, a development of the force shield, comes into use. Because it offers discreet protection and can be disguised as a fancy normal belt, it is widely used.

ARMOR, DEFLECTORS AND FORCE SCREENS

ABLATIVE ARMOR (TL8+)

This is a heavy, treated cloth that offers protection against beam weapons. It ablates, or vaporizes, as it is hit, carrying away part of the destructive power of the beam. It is also effective to some extent against other weapons. It's much more useful against a single assassin than it is in a fire fight. Because it is extremely cheap, it is often used to equip militia or conscript armies.

Against lasers, fusion guns, flamers and blasters, ablative armor gives PD 4, DR 12; however, the ablative effect means that for each 4 hits stopped by a particular location (arm, torso, etc.), DR is reduced by 1 in that location; for every 3 points by which DR is reduced, PD is also reduced by 1. Against all other weapons it gives PD 1, DR 2 (due to its bulk); even a fully-ablated suit will offer this minimum protection.

Ablative armor comes in vests that cover the torso only (locations 9-11, 17-18), or full suits covering everything but the head, hands and feet. It is too bulky to be worn under or tailored as normal clothing, but can be concealed by a heavy overcoat or jacket, or tailored to resemble fatigues. Vests take ten seconds to put on and five to take off, weigh 15 pounds and cost $100. Full suits weigh 40 pounds, cost $300, require 20 seconds to put on and 10 to take off.

At TL9, *improved ablative armor* is available, with doubled DR. For each 6 points of DR lost, reduce PD by 1.

COMBAT INFANTRY DRESS (TL8+)

The standard body armor worn by soldiers from TLs 8 to 10, Combat Infantry Dress consists of a chemically-coated, contamination-proof jacket and pants worn as an external garment; the suit comes with pockets, attachment points and harnesses for holding weapons or gadgets.

The wearer's chest and abdomen are protected by durasteel plates inserted in a compound fiber mesh which provide PD 4, DR 40 over the torso (areas 9-11 and 17-18). Armorplast plates and compound fibers protect the arms and hands (areas 6-8) with PD 2, DR 12. Similar pants are available to protect the legs (locations 12-14) with PD 2, DR 12; armored boots cover the feet (15-16) providing PD 3, DR 15. At each TL above 8, add 10 to the DR of each component.

A Combat Infantry Dress jacket with gloves weighs 25 pounds and costs $300; the gloves on their own weigh two pounds and cost $30. Combat Infantry Dress pants weigh ten pounds and cost $140. The boots weigh five pounds and cost $70. A complete suit, excluding the helmet, weighs 40 pounds and costs $510. If the entire suit (gloves, pants, jacket, and boots) is worn with the Combat Infantry Helmet, it is totally sealed against chemical and biological warfare agents and unbreathable atmospheres, though it is not pressurized for vacuum.

It takes 45 seconds to put on Combat Infantry Dress, or 20 seconds to remove it, or ½ this if only the jacket or pants are to be worn and the suit is left unsealed. Combat Infantry Dress remains in use at higher TLs, with more advanced materials (such as BPC and bioplastic) replacing durasteel and monocrys.

Combat Infantry Helmet (TL8+)

Normally worn with the rest of the Combat Infantry Dress, this is a full-face, full protection helmet. Two CBR filter units (see p. 79) are built into the cheek pieces, and when swung down and locked into place on the attachment points of the torso armor, the visor provides a complete air-tight seal for operations on a hostile battlefield or in a contaminated atmosphere. The helmet has PD 4, DR 18, except for the visor (covering the face, location 5 from the front) which has only PD 2, DR 10. Weight is eight pounds and cost is $240. At higher TLs, add 10 to DR for each TL after 8.

Most military units add a standard set of accessories to the helmet. The standard TL8 battlefield helmet has a HUD, a voice-activated 128-channel short-range communicator with scrambler, and chin-activated multiview visor (light intensification, anti-glare and thermal imaging). Rather than using individual power cells, the system runs off a single C cell for six months. These accessories add two pounds to the basic helmet weight and $2,000 to its cost.

MEDIEVAL-STYLE ARMOR (TL8+)

Advanced versions of medieval armor are available, made of modern ceramics, metals or high-impact plastics. Such armor may be purchased piecemeal or in a single suit. Weights and prices are given in comparison with the medieval armor listed in the *GURPS Basic Set*. Though such armor may seem frivolous, it is very popular for bodyguards, for duelists (or performers on certain holo shows), and for travelers on low-tech planets, who wish to be well-protected without being blatantly foreign.

Armorplast (TL8+)

Versions of plate (not mail) made of high-impact plastic are available. This is much lighter, though not quite as damage resistant, as durasteel (below). Armorplast armor halves the weight of armor components, and increases DR by 8. Cost is the same.

Durasteel (TL8+)

Versions of medieval plate or mail are available, and increase DR by 12. Cost and weight remain the same.

Biphase Carbide (BPC) (TL9+)

Versions of medieval plate or mail are available: it doubles the cost, halves weight, and increases DR by 24.

MONOCRYS (TL8+)

The usual armor worn by civilians seeking discreet protection, monocrys is similar to Kevlar but is woven from a two-phase, single-crystal metallic fiber. Monocrys provides full protection against crushing and cutting attacks. It is less effective against impaling attacks such as needles or laser bolts, which penetrate the weave. Protection against impaling attacks is always PD 1, DR 2. Against crushing and cutting attacks, DR depends on thickness:

Light: PD 2, DR 8, $400, 3 lbs. for a vest; $1,000, 7 lbs. for a full suit.

Medium: PD 2, DR 16, $600, 5 lbs. for a vest; $1,500, 12 lbs. for a full suit.

Heavy: PD 2, DR 24, $800, 7 lbs. for a vest; $2,000, 16 lbs. for a full suit.

However, because monocrys is flexible, any "6" rolled for damage indicates one hit that affects the wearer through the armor.

Time to put monocrys armor on and take it off is as per ablative armor, p. 73.

REFLEC ARMOR (TL8+)

Reflec is a light, highly-reflective armor of polished metallic fibers that reflects laser fire, and that of other beams to a lesser extent. It is useless against other attacks. It can be worn over other armor, giving the wearer the benefit of its PD. Reflec gives PD 6, DR 2 against lasers and flamers; PD 3, DR 0 against other beam weapons, including blasters but not sonics, and PD 0, DR 0 against all other weapons. It protects completely from normal fire (but not flamers) for three seconds, after which normal damage is taken.

A jacket (covering torso and arms only) costs $150 and weighs one pound. A suit covering the entire body costs $300 and weighs 2 pounds. It takes 20 seconds to put on a suit and 10 to take it off (ten and five seconds for a jacket).

Reflec helmets (made of light plastic, silvered) weigh ½ pound and cost $25. Any helmet can be made reflective, getting the PD of reflec, for $50.

DERMAL ARMOR (TL9+)

Armor can be built-in at TL9+. See p. 108.

INFANTRY COMBAT ARMOR (TL9+)

Infantry Combat Armor is a full-body suit of articulated metal and ceramic-plate armor, designed to enable a soldier to fight and survive in any environment. With the helmet visor closed and the helmet's integral CBR filter (see p. 79) locked into place, it is totally sealed and airtight, protecting against any chemical or biological contamination or hostile atmosphere. With the addition of a life-support pack (2.5 pounds, $750) and air tanks it can function as a vacc suit. The full range of vacc suit accessories (see p. 26) are available for it.

A rigid biphase carbide/ceramic corselet protects the torso (locations 9-11 and 17-18), providing PD 6, DR 65. Articulated plates of BPC over compound-fiber mesh cover the arms, legs and feet (locations 6, 8 and 12-16) giving PD 6, DR 50. Armored gauntlets protect the hands (7) with PD 5, DR 25. The helmet protects the head with PD 6, DR 50 except for the visor which is PD 4, DR 35 (location 5 from the front). At higher TLs, more advanced armor materials are used; increase DR by 15 at all locations for each TL over 9.

Infantry Combat Armor takes 60 seconds to put on and 40 seconds to remove, reduced to half the time on a successful Vacc Suit/TL roll.

The armor weighs 60 pounds and costs $2,550, including helmet but no special accessories (helmet vision gear, radio, etc.) The standard Infantry Combat Helmet accessories worn with the armor are described below.

Infantry Combat Helmet (TL9)

The usual TL9 infantryman's battle helmet has a Holographic HUD (see p. 65), short-range communicator with scrambler (see p. 36) and multiview visor (see p. 20). Rather than using individual power cells, the system runs off a single C cell for six months. The entire package adds two pounds and $1,075 to the cost of the combat armor helmet it is built into.

Infantry Combat Helmet (TL10+)

The standard accessories for the Infantry Combat Armor helmet at TL10 are a sensor visor, a short-range communicator with neutrino receiver, holographic HUD, and an interface jack allowing direct mental access to all systems through a neural HUD or neural interface. The accessories add 2.5 pounds to the combat helmet's basic weight and $2,800 to its cost.

Armor Without Faceplates (TL10+)

At TL10, Infantry Combat Armor and Powered Combat Armor (see below) helmets can be built with no faceplate. All the sensor information is presented on a display inside the helmet, and includes a 360-degree scan, so that the user has, in effect, Peripheral Vision. Such a sensor suite costs $1,000 and includes a basic HUD. Audio microphones and a simple (and unjammable) low-light optical-circuit TV camera are installed. Any critical hit to the head by an energy weapon will burn out the TV scanner on a roll of 10 or less on three dice, so many prefer to make do with old-fashioned visors . . . which are fairly sophisticated anyway.

RETRO-REFLECTIVE ARMOR (TL9+)

Retro-reflective armor is made of polished, metallic fibers covered with millions of tiny spherical lenses. The wearer looks like a figure of continually-shifting, liquid glitter. It gives PD 6, DR 2 against lasers (including disruptors) and electrolasers. It is PD 3, DR 1 against other beam weapons (except sonics) and PD 1, DR 1

against material attacks. (It gives no advantage against a targeting laser; bouncing back is what they are supposed to do.)

If the armor's PD makes the difference in dodging a *laser* attack, retro-reflective armor will reflect the laser beam back against the firer.

Example: Captain Shaeffer is struck by a laser beam while wearing retro-reflective armor. He has a Dodge of 5. If he rolls a 6 to 11 on his Dodge roll, the armor will reflect the beam back to its source.

The reflected laser beam will scatter to some extent: the beam will hit the firer on a roll of 12 or less on three dice; on a roll of 3 to 5, it will strike the firing weapon. Damage will be halved. A reflected beam that does not hit the original firer might hit something else, see *Hitting the Wrong Target*, p. B117. Electrolasers do not reflect well; there is a 50% chance that the beam will not follow the reflected guide beam but simply arc off randomly.

A jacket (which covers the torso and arms, areas 9-11, 17-18, 6 and 8) costs $1,500 and weighs two pounds. A suit (covering the entire body) costs $5,000 and weighs five pounds. It takes 20 seconds to put a suit on and ten to remove it; half that for a jacket. A retro-reflective helmet weighs one pound and costs $250. Retro-reflective armor can be worn over normal clothing or armor. Combat Infantry Dress, Infantry Combat Armor and Powered Combat Armor can be given a retro-reflective surface for $3,000. Retro-reflective covering for a bunker, vehicle or other structure costs $1,000 per square yard.

POWERED COMBAT ARMOR (TL10+)

Powered Combat Armor is a heavily armored exoskeleton which amplifies the wearer's ST and provides protection against attack. Because of its cost, it is usually restricted to special units – marines, palace guards or elite assault forces. Powered Combat Armor is one step away from a military battlesuit; anyone who can use one can operate a battlesuit, but not its weapons.

The body of the suit is protected by inch-thick plates of biphase carbide (BPC) over shock-absorbing padding, giving the wearer PD 6, DR 100 over the torso (locations 9-11 and 17-18) and PD 6, DR 75 over the limbs and head. The gloves (location 7) and face plate (location 5 from the front) have PD 6, DR 50. (Armor without a face plate is also available, see *Infantry Combat Armor*, above.) The armor is laminated to resist shaped-charge warheads – double its DR against them; at each TL above TL10, powered combat armor gains DR 50.

The suit's exoskeleton gives the wearer a ST of 29. The suit's 225-pound weight does *not* count as encumbrance, but the sum of the suit's weight, the user's weight, and any equipment carried may not exceed 725 pounds. The wearer makes any DX-based skill rolls at -1. If the suit loses power the user can still move (but will have to use his own ST to carry over 200 pounds of armor!)

Powered Combat Armor takes 4 minutes to put on and 2 to take off. Each suit of Powered Combat Armor must be specially fitted; refitting a suit takes 2 hours and requires an Armoury+2 roll. Failure means another two hours are required; critical failure damages the suit, requiring repair by Mechanic (Powered Armor).
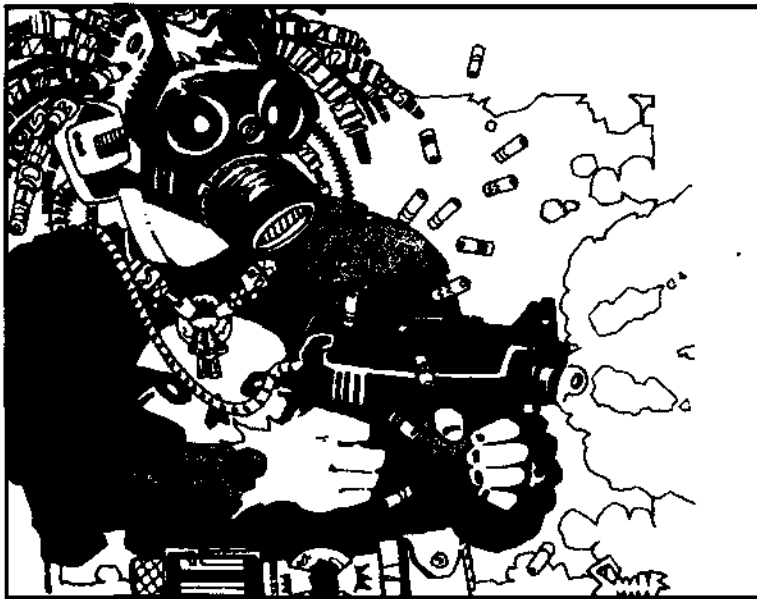
The helmet has an integral sensor visor (see p. 20), holographic HUD (see p. 65), and medium-range communicator (see p. 36), tied into a voice-activated personal computer (Complexity 4 at TL10) built into the helmet. Interface jacks (see p. 37) and neutrino receivers (see p. 37) may be added at extra cost.

Powered Combat Armor is air-tight and pressurized for vacuum, with a radiation PF of 20. The suit has a life-support pack, a 24-hour food and water supply, a waste-relief system and a 12-hour air tank. The suit also has chameleon armor (see p. 85), infrared cloaking (see p. 79) and laser sensors (see p. 79). Other vacc suit options (see p. 25) may be added, at extra cost. The suit is powered for 14 hours by a rechargeable E cell, costs $91,000 and weighs 225 pounds.

REFLEX ARMOR (TL10+)

Also called "flex armor," reflex armor is a full-body suit resembling a typical shipboard jumpsuit, but made of electrically-active bioplastic (see p. 17). It is normally flexible, but incorporates sophisticated passive sensors woven into its fabric to detect incoming projectiles or blows. The armor then goes rigid for an instant, becoming harder than steel just before the impact.

Reflex armor detects an incoming melee weapon, thrown weapon or low-tech projectile attack automatically. Bullets, rockets and sonic beams are detected on a roll of 14 or less, and hypervelocity Gauss needles only on a 12 or less. If it detects an attack, the armor protects with PD 5, DR 30. The armor's proximity sensors are not fast enough to detect laser, blaster or other beam weapon attacks, but the tough, energy-resistant bioplastic gives some protection (PD 2, DR 15) against beams or any projectiles it fails to detect in time.

A suit of 'flex armor covers the entire body except for the head and hands; usually bioplastic gloves (PD 2, DR 15, but no sensors) and an Infantry Combat Helmet (see p. 75) are worn if full coverage is necessary. Without gloves or helmet, reflex armor can pass as a normal track suit or set of shipboard fatigues, and is acceptable wear in most startowns. Clothing can be worn over it, but this reduces the chance of it detecting incoming attacks. (For normal clothing, slow attacks are detected on 16 or less; bullets, etc. on 12 or less and hypervelocity needles on 10 or less. The GM decides the effect of unusual clothes.) The armor's sensors are powered by a built-in B cell for three months of continuous use. Reflex armor costs $4,000 and weighs 10 pounds.

Reflex Vacc Suits (TL10+)

Adding a life support pack (1.5 lbs., $375), air tanks and combat helmet allows reflex armor to function as a sealed vacc suit.

CYBERSUITS (TL11+)

The ultimate form of "smart" body armor, the cybersuit resembles a skin-tight vacc suit with a small backpack.

It functions as a fully-sealed vacc suit capable of withstanding up to 100 atmospheres of pressure. Like the biosuit (see p. 27), the cybersuit absorbs sunlight and recycles waste and exhaled carbon dioxide, giving it an extended air and water supply. The suit's backpack also includes a D cell, good for a day of operation without sunlight, and a week's supply of concentrated rations.

A cybersuit consists of a multi-layered, three-dimensional molecular weave of diamond-based fibers, and microscopic computer-controlled electric motors. Guided by pressure sensors lining the interior of the suit, the fabric of the suit acts like artificial muscle, duplicating the wearer's every movement, instantly and without resistance, as if the suit were not there at all. More pressure sensors covering the suit's surface feel the shape of whatever the user touches and transmit it through the suit. As a result, DX is not reduced if wearing a cybersuit, and its weight does not count as encumbrance for the wearer.

The suit's muscles are normally programmed to match the user's normal ST, but the user can set it to amplify ST instead, increasing ST to a maximum of 20.

Every cybersuit incorporates laser sensors which warn the wearer if a laser sight or active designator is being used against him (giving a +1 to Dodge) and a chameleon surface that automatically changes color, pattern and infrared signature to blend in with its surroundings, giving a -3 on any roll to spot the suit visually or by infrared. If the wearer desires, he can use voice control to override the suit chameleon circuits. Civilian spacers who own cybersuits will often use this feature to decorate their suits with garish colors or designs.

A cybersuit protects the wearer with PD 5, DR 80. DR increases by 20 per TL over 11. Because of its unique construction, the cybersuit has no joints or vulnerable points.

Up through TL16 cybersuits are the most common form of light military armor, usually worn with a force-field belt of some sort at TL13 and above. After TL12, cybersuits can be found almost anywhere, and surplus suits are regularly worn by explorers, belters and traders. Cybersuits are Legality Class 1. They weigh 35 pounds and cost $20,000. All vacc suit accessories are available, but the cost of the suit includes a helmet with sensor visor (see p. 21), short-range (500 miles) communicator with neutrino receiver (see p. 37) and a holographic HUD (see p. 65). For an extra $5,000 and five pounds, a cybersuit can incorporate a layer of thermal-superconducting armor (see p. 78). These "military" cybersuits are Legality Class 0.

DEFLECTORS (TL11•)

Sometimes called *force shields*, deflectors are a TL11 invention, developed during the quest for gravity-manipulation technology. They project an energy field that deflects bullets or beams with strength proportional to the energy of the attack itself, greatly increasing PD without providing much DR.

The field is normally transparent, but can be perceived as a faint distortion in air. Gas or liquid will not pass through a field (making it useful for a life-support system, or for keeping off rain). Standard deflectors are designed not to interfere with slow-moving, solid matter – a person can usually run (or step) through a deflector field with only minor resistance. The exact difficulty depends on how fast he was moving and the density of the field – a faster moving object is more likely to encounter opposition, and stronger fields, such as wards (see p. 90), are more resistant than a simple life-support belt.

Force Shield (TL11•)

The force shield is a flat, circular deflector field that serves the same purpose as medieval shields – to block attacks. Duelists often use one of these in conjunction with a force sword. It gives a PD of 4 (maximum armor and shield PD is 8 with a force shield) against *any* attack from the front – a bullet or beam hitting it may be deflected. It has no DR, but no attack can damage the shield itself. It can be used for the "Block" active defense, using Force Shield/2.

The shield springs from a solid bracelet worn on the wrist. It will function for 30 minutes on a C cell. Cost is $500 and weight is ½ pound.

For $1,000, a force shield can be adjustable, giving the user the option to enlarge it to PD 5 (lasting 15 minutes) or PD 6 (lasting 5 minutes).

Deflector Belt (TL12•)

A TL12 development of the force shield, deflector belts protect a single human-sized wearer, generating a close, form-fitting deflector field. The field provides PD 6 *instead* of the PD of any armor below it. This PD is not cumulative with force shields, and multiple belts provide no extra protection. It protects against attacks from any direction.

The field generated by a deflector belt protects the user and his clothing or armor worn under the belt. Anything picked up (unless enclosed in a palm) will not be covered by the field; as a result, the wearer can use weapons normally while the belt is activated. The deflector field fits like a glove over the character's hands or gauntlets, and does not impede movement or manipulation of objects in any way.
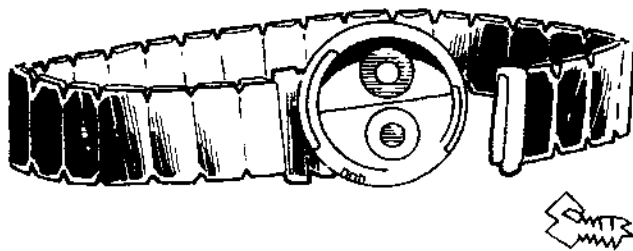
Because gas will not pass through the field, the user must have some form of life-support system. The close-fitting field does not trap any air beyond what the character already has in his lungs. Alternatively, the field can be set to "flicker," rapidly activating and deactivating. A flickering field allows gas to pass through, but only provides PD5 against attacks.

The belt is activated by a control switch or by voice command keyed to the owner's voice print. It takes one turn to switch the belt on or off manually and one turn for the field to form. It requires two seconds to put a belt on or take one off. The field lasts for five minutes of continuous use on a pair of C cells; each minute on "flicker" counts as ½ a minute on normal setting, enabling the field to last longer. Cost is $5,000, weight is two pounds and it is Legality Class 4.

ENERGY CLOTH (TL11•)

This light and easily-concealed armor is a black, single-crystal ballistic fiber similar to monocrys, but far stronger. Woven into its fabric is a layer of thermal-superconducting material.

Energy cloth has a PD of 4; it protects with DR 50 versus all attacks; any *crushing* attack does 1 point of damage for each 6 rolled, regardless of DR (a drawback of flexible armor). It also incorporates a thermal-superconducting layer (see p. 78) which halves the damage of lasers and their ilk, before the cloth's DR is subtracted.

Energy cloth comes in vests covering the torso and in full suits protecting the entire body, including a pull-over hood for the head. Either type is light enough to be worn under normal clothing without being noticed. A vest weighs two pounds, a full suit four. Cost is $2,800 for a vest, or $5,600 for a full suit.

FORCE SCREENS (TL11•)

Force screens are mounted on starships at TL11 and grav tanks at TL12. By TL13 they have become belt-sized, and personal force screens are the most common form of "armor" at both TL13 and TL14.

Force screens act as armor, absorbing electromagnetic and kinetic energy. They are transparent to non-coherent visible light and harmless frequencies of sound, and do not react to physical objects moving at less than a walk. A man could reach through a force screen, but not run through it. (An attacker could reach through, very slowly, and try to strangle or slice the wearer.) The screen only stops *incoming* energy. The wearer can shoot *out* through one without difficulty.

Force screens have DR but no PD: use the PD of deflector shields or armor. The screen's DR is effective against physical blows, explosions, projectiles or beam weapon attacks. Energy beams will be absorbed, melee attacks (from punches to force swords) will hit an apparently solid wall, while any bullet failing to penetrate a screen loses its kinetic energy and falls to the ground.

When the force screen absorbs enough energy, it will eventually overload. If it takes damage greater than half its DR it gains one *energy level*. If the screen takes damage greater than its full DR it gains two *energy levels*. For every *energy level* a force screen gains, its color shifts up the spectrum: Red to orange to yellow to green to blue to indigo to violet. If a force screen gains an additional *energy level* after reaching violet (seven *energy levels*) it overloads, shifting briefly to black before melting the screen generator and providing no further protection.

A force screen sheds its absorbed energy at a rate of one *energy level* every ten seconds; energy is emitted in the form of neutrinos and visible light. Until a force screen has shed all its energy it cannot be turned off without overloading and destroying itself.

Force screens block active sensors (including radar, chemscanners and bio-scanners) and prevent radio or any kind of communicator reception, as no energy can penetrate the screen. As the screen only absorbs radiation from outside of it, the wearer can use a scanner or send a radio signal from inside without difficulty, and passive detectors *outside* the screen (such as radscanners) will pick up the energy emanating from inside the screen. Passive detectors will not work from *inside* the screen, as incoming information is blocked.

Shaped-charge explosions, X-ray lasers and gamma-ray lasers all reduce the effective DR of a force screen just as they do normal armor; the screen does not halve DR for AP bullets, pulsars, APEX rounds or flamers. Body armor will protect against any damage that exceeds a force screen's DR.

A Force Screen Under Attack

While boarding a pirate vessel, Patrol Officer Kim O'Ryan is fired at by a pair of space pirates using tripod Gatling lasers, and is hit by two bursts. Fortunately, she had her personal force screen activated. The first laser burst does 160 points of damage and is absorbed by the DR 200 field, but since the damage exceeded half the screen's DR, the field gains an energy level, shifting its color up the spectrum from transparent to red. The second bolt does only 93 hits; since this is under half the belt's DR, the screen absorbs it completely.

Kim turns and returns fire, dispatching one pirate, but the other fires again. The laser burst does 204 hits of impaling damage. Her screen gains *two* energy levels, flashing from its present red through orange to yellow, and 4 points actually penetrate the screen! Fortunately Officer O'Ryan was wearing monocrys armor as well; the armor stops 2 hits so that only 2 points (doubled to 4 for an impaling hit) are actually inflicted. Smiling grimly, Kim returns fire . . . Assuming no more hits, it will take 30 seconds for her force screen to radiate the energy it has absorbed.

Safety Switches

Force screens may be fitted with *safety switches*: a safety switch will detect any incoming attack slower than the speed of light, and turn on the belt to protect the wearer. This conserves power, and helps protect against sneak attacks. The safety switch will activate against any melee, arrow or thrown weapon attack; against high-speed projectiles it switches on automatically on a 14 or less. It cannot detect beam attacks in time to stop them, but switches on automatically after a beam attack passes through the wearer's hex, whether he is hit or not. The wearer may also set the switch to automatically turn off the force field (after it has finished dumping any energy it has absorbed) after any attack to conserve power. Cost of the switch is $1,000 and weight is negligible.

At TL16 and above, nanosecond response switches are available. They enable the screen to block an incoming beam weapon attack automatically.

The Swashbuckler Option

For a campaign with the sword and blaster flavor of 1930s science fiction, the GM can assume that force screens are only useful against explosions, high velocity projectiles and beam weapons. Attacks by melee weapons ignore the force screen, making the sword or axe the weapon of choice for close-range combat. The GM should decide whether energy-based melee weapons (force swords, sonic blades, etc.) are able to ignore the field, and whether thrown weapons or arrows are slow enough to penetrate.

Since body armor will stop a normal sword blow (even one augmented by a ST 20 exoskeleton!) the usual weapon would be a monomolecular blade, which adds 1d to damage and, more importantly, lowers DR. Monomolecular weapons are described on p. 62.

Grenade On a Stick: Even a monowire blade has trouble going through a force screen backed up by powered armor. One weapon useful against the swashbuckler-style force screens is a hand grenade (any type, but usually a shaped charge) set for impact detonation and tied to a rod or stick. The stick is thrust against the target (use Spear skill) through the screen, and the grenade goes off if it hits – *inside* the target's force screen!

The way to counter grenadiers is to have a blade out, and then simply parry the grenade-spear thrust with a sword; a vibroblade or monowire sword may even cut the rod in half!

Personal Force Screen (TL13+)

A belt-mounted screen with DR 200, + 100 per TL over 13. It runs for 15 minutes on a C cell. $5,000, 2 pounds.

Backpack Force Screen (TL13+)

A more powerful screen, with DR 500, +250 per TL above 13. It runs for 1 hour on a D cell. $25,000 and 25 pounds.

Heavy Force Screen (TL13+)

Used to defend campsites or vehicles, generating a 5-yard radius field with DR 1,000, + 500 per TL over 13. Individuals behind a heavy screen may also be protected by backpack or personal screens.

It runs for 5 hours on an E cell. $100,000, 75 pounds and .1 cy.

THERMAL-SUPERCONDUCTING ARMOR (TL11+)

Also known as energy armor, this is a thin layer of thermal-superconducting material capable of absorbing and reradiating electromagnetic energy. Energy armor can be added to standard combat armor suits or to any other sealed suit, such as an exploration suit or vacc suit. It *halves* the damage done by lasers, X-ray lasers, flamers, fusion guns, shaped charges, gamma-ray lasers or microwave disruptors before the suit's DR is subtracted. It has no effect on other types of beam weapons or on projectile weapons. For example, if a laser beam did 51 hits, damage

would be halved to 25, and then the suit's normal DR (or half its DR if the weapon was an X-ray laser) would be subtracted.

Thermal-superconductor layers are the main reason TL11+ armor can resist the X-ray and gamma-ray weapons in use at TL13+, and all military armor should incorporate it. It adds five pounds to armor weight and $5,000 to cost.

OTHER DEFENSES

ABLATIVE FOAM (TL8+)

Ablative foam can be applied to skin or to body armor. It is a ½-inch-thick layer of sticky foam, available in a variety of camouflage colors. It gives DR 8 against beam weapons, except sonics, but after stopping 4 hits of damage it boils away, losing 1 DR. The foam gives DR 1 against other attacks. A tube covers one person or two square yards; a spray can covers a vehicle or up to ten square yards. Generally, only one layer of foam can be used on a person, while up to three layers can be applied to vehicle armor. Application takes three turns per square yard or person. As well as providing DR, ablative foam is somewhat radar absorbent; -3 for radar to detect anything covered with it. Weight is ¼ pound and cost is $10 for a tube, one pound and $40 for a can.

ANTI-TANGLER AEROSOL (TL8+)

For removing tangler strands. A can costs $100, weighs two pounds, and treats 25 captives at one per turn.

BIONIC RECONSTRUCTION (TL8+)

See p. 106.

CBR FILTER (TL8+)

The standard filter (see p. 24) used to keep out military chemical, biological and radioactive contaminants. Weight is one pound and cost is $200. The filter medium must be replaced (the cartridge costs $40 and weighs ¼ pound) every 48 hours in a CBR environment. Of course, a sealed suit (such as Combat Infantry Dress, p. 73) and an air mask (p. 24) are also necessary.

DECONTAMINATION AEROSOL (TL8+)

Sprayed on a vacc suit or other sealed armor, it removes traces of *most* bugs, persistent chemicals, radioactive fallout, etc. A chemsniffer or radiation detector should be used to make sure. A tank and spray gun (decontaminates a vehicle or ten people) costs $300 and weighs 12 pounds. Spare tanks cost $200 each. A single-use personal can costs $30 and weighs 1.5 pounds.

NEUROVINE (TL8+)

This drug is the generic antidote for nerve gas and nerve poison; see p. 97.

PRISM AEROSOL (TL8+)

A can of Prism (see p. 70), good for 5 uses. Costs $25, weighs 1 pound. Prism may also be used in grenades (see p. 67).

INFRARED CLOAKING (TL9+)

This system blends the wearer's heat signature into the background, giving a -3 to infrared spotting and targeting, and a -10 on the chance to hit of IR-homing projectiles.

Cost is $1,500 and it adds five pounds to weight. It works for 24 hours on a pair of A cells; every six hours the cloak must be turned off to allow it to vent waste heat, or the suit will become very uncomfortable (1 fatigue point every ten minutes) and after another hour will start leaking heat anyhow, making it an excellent target.

This accessory may be added to any suit of *sealed* armor, or to any vacc suit or survival suit. Cost of the modification is increased by 20% if it is added after initial purchase of the armor.

LASER SENSORS (TL9+)

Armor may be covered with a web of optical sensors designed to detect the touch of a laser *sighting* beam and alert the wearer (usually with a warning tone inside his helmet). This gives him an instant to take evasive action before the gunner pulls the trigger, adding +1 to the wearer's Dodge chance - if the attacker is using a laser targeting scope (included in all TL9 weapons). Of course, the gunner could take a turn to switch off his laser sight (losing its benefits). Sensors cost $2,000 and add two pounds to the suit's weight. They use a B cell, which powers them for three months.

This accessory may be added to any suit of armor, or to any vacc suit or survival suit. Cost of the modification is increased by 20% if it is added after initial purchase of the armor.

RNG:71m
SPC:457nm
PWR:78%

IR:OFF
IE:ON
TR:OFF
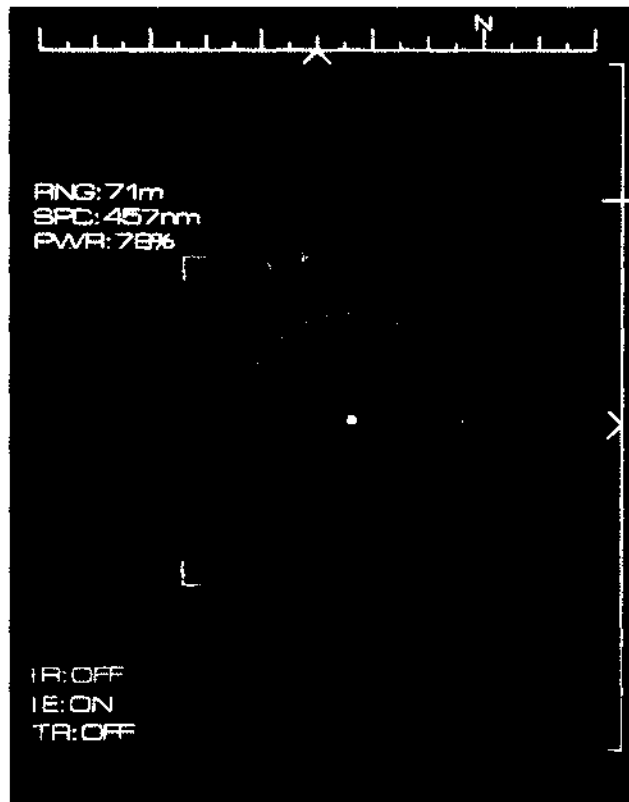
PESTGUARD (TL9+)

These devices project ultrasonic sound to repel pests. They do not operate in vacuum. They may be set to repel insects (and similar IQ 1 creatures) only, animals and insects (IQ 6 or less), or anything, including humans. The standard unit covers an (adjustable) three- to six-yard radius sphere; a perimeter is usually formed by setting up several units, or by remaining inside a unit's field with it adjusted to only affect "lower order" creatures or while wearing a neutralizer (see below).

Creatures of IQ 2 or less are repelled automatically; others must make a Will roll every (IQ×3 seconds) to stay in the zone or flee. The ultrasonics are pitched at a level that induces terror. Even if the roll is successful, all IQ or DX rolls, and all skill rolls, will be at -3 due to the distraction. Very large creatures, such as dinosaurs, are less likely to be affected. Add +1 to the Will roll for every 50 ST a creature has. Sealed armor protects totally.

Each unit comes with two neutralizer plugs that nullify the guard's effects for whoever wears them. Neutralizers must be set to the same frequency as the particular pestguard, or they do no more than add +3 to resist the 'guard's effects. Extra neutralizers cost $130 each and weigh ¼ pound.

A standard pestguard unit is a small, molded-plastic ovoid designed to look like a rock, though units can also be built into doors or rooms as security systems. A pestguard works for 240 hours on a C cell. Cost is $1,300 and weight is two pounds for each one.

PURGE (TL10+)

This drug is sometimes carried by soldiers and police as a generic antidote for nonlethal TL10- poisons, including paralysis and sleep gas; see p. 100.

SONIC SCREEN (TL11+)

This device provides some protection against sonic attacks; see p. 86.

NUCLEAR DAMPER (TL15+)

A portable, nuclear-damper field prevents any thermonuclear or antimatter bomb exploding within a five-mile radius around the damper field generator. It does not interfere with controlled release of nuclear energy (e.g., in a power plant), but will prevent antimatter bullets or hell grenades from exploding, as well as conventional nukes, but not implosion bombs. A nuclear or antimatter weapon exploding *outside* the area-of-effect of the damper may still damage anything within the damper field; the field prevents detonation, but does not provide a shield against blast or radiation.

A portable nuclear damper costs $250,000 weighs 500 lbs. and takes up 10 cubic feet. It uses an array of three TL15 E cells for power, which operates it for 75 minutes of continuous use. It has DR 5, HT 30. Larger damper fields exist as well — see *GURPS Vehicles*, p. 69.

STASIS WEBS (TL15+)

Stasis is an induced state in which almost no time passes (a second every hundred million years, perhaps). Several types of stasis-web generator are available, but their operation is similar. The duration of the web can be set for any length of time

between five minutes (the minimum) and a billion years; an atomic clock registers how much (relative) time has passed within the web, and deactivates the field when the time is up. Something protected by a stasis web is effectively outside the normal space-time continuum, and cannot be affected by *anything* within it. It could fall through the heart of a star or survive for a billion years. Since only (relative) microseconds or nanoseconds will pass for the occupants of a stasis web, they cannot take any action while within the web.

Note that the stasis generator is *always* within the web itself. Viewed from the outside, an object encased in a stasis web is inside a perfectly reflecting mirror, and no sensors of any type can penetrate into it. The only way to deactivate a stasis web from outside it is a reality stabilizer (see p. 81), or a tachyonic disruptor (see p. 61). Anything only partially in a stasis web (e.g., an arm or leg) will be sheared off when the web is activated.

Stasis Cube (TL15+)

A stasis cube is a box which generates a stasis web around itself. It takes two seconds to set the duration, and one more to activate the cube, which is then surrounded by the web. It holds as much as a backpack (.2 cy, 40 pounds of equipment); it uses a C cell, costs $20,000 and weighs ten pounds.

Stasis Chamber (TL15+)

This is a stasis cube the size of a large coffin, used as a suspended animation chamber, a vault or a prison. It is essential to make sure it has the right time setting. Once activated, there is no way (short of a reality stabilizer) to turn it off until the duration expires. It can hold one person in a space suit with equipment (or two with no equipment), or .5 cy of cargo. The generator is designed to be activated from outside the chamber, but a timer is included so that the user can set the web duration, then climb into it. It runs off a pair of D cells. Cost is $50,000, volume is .5 cy and weight is 200 pounds.

Stasis Grid (TL15+)

A stasis grid is a stasis-web generator built into a building, space ship or vehicle. The stasis web is usually designed to be activated from within the vehicle or building as a last-ditch defensive measure (e.g., as the missile strike is about to hit, go into stasis for five minutes). In space combat, an activated stasis grid provides total protection against any attack (except tachyonic disruptors) but the protected ship cannot attack or maneuver! At the beginning of any space-combat turn, the captain should decide whether the grid will be activated or not. Note that a ship's velocity is retained while in stasis, but since it cannot maneuver, its course is easily predictable. A stasis grid costs $100,000, takes up .5 cy, masses half a ton and requires one MW of power, *plus* $1,000, .05 cy, .05 ton and 0.1 MW per cubic yard to be protected. For example, a stasis grid covering a 200-cy shuttle would cost $300,000, take up 10.5 cy, weigh 10.5 tons and require a 21-MW power supply.

Stasis Belt (TL16+)

Actually a heavy backpack, this generates a stasis web around the user and anything he is carrying; the duration of the web depends on how long it was set for (from five minutes to a billion years). It takes two seconds to change the duration setting on an inactive stasis web, and one second to turn it on. It uses a pair of C cells, costs $75,000 and weighs 50 pounds.

REALITY STABILIZER (TL16+)

A *reality stabilizer* negates the effects of displacer and tachyon beams, teleportation, stasis, time travel, FTL communicators, force fields and all gravity-manipulation (contragravity, tractor/pressor beams, etc.) devices within its area of effect by strengthening local space-time. Any such device automatically stops working while within the stabilizer's area of effect, nor can it affect anything in the area.

five-mile radius around itself. It can be tuned to cover a smaller area (down to a five-yard radius) if desired. It uses an E cell, which powers it for four hours. Cost is $60,000 and weight is 50 pounds.

Stasis Key (TL16+)

This short-ranged reality stabilizer creates a brief pulse which will cause any active stasis web to collapse. The stasis-web generator is unharmed. Its range is a one-yard radius (its hex and all adjacent hexes). It uses a C cell for ten "shots." It costs $4,000 and weighs three pounds.

TAU-FIELD GENERATOR (TL16+)

A tau-field creates a bubble in space/time, a sort of reverse stasis web in which time within the field is vastly accelerated. From the perspective of those within the area of effect, everything *outside* the field appears to stop, frozen in time, while they are free to act. However, nothing – energy or matter – within the tau-field can leave its boundaries. It is impossible for someone inside the field to take any action that will affect someone outside of it; the edge of the field resembles a stasis field (a silver mirror) and is just as impenetrable. If the generator is deactivated, runs out of energy or is destroyed, the field collapses, and time resumes its normal course.

In effect, a tau-field allows those within it to "step out of time." For example, suppose someone carrying a tau-field generator is surrounded by a few dozen foes, but only one is within range of the generator. The field is activated; time freezes outside the field, while within it the two fight. After a bloody close-range duel with force swords, one of them kills the other but is herself wounded. She will then have several subjective minutes to perform first aid. When the generator is deactivated, it will appear to those outside the field that the loser suddenly dropped dead from a dozen wounds, and the wounded victor has materialized in a different position.

Heavy Stabilizer (TL16+)

This generates a field that covers a 100-mile radius within an atmosphere, and up to ten times that in vacuum. This version requires five MW of power and can prevent a ship from engaging its FTL drive within its area of influence. It needs five cy of space and weighs four tons. It costs $1,000,000.

Portable Reality Stabilizer (TL16+)

Also known as a space/time anomaly neutralizer, or SATAN-field projector, this is a backpack version which affects up to a

Tau-fields are favored by assassins (who can dispatch their adversaries without interference from beyond the field) and by spies. Larger tau-fields make excellent field hospitals (especially with a portable regenerator) and secure planning rooms.

A backpack tau-field generator uses a D cell, which can run for 30 minutes of subjective time. The field covers a one- to four-yard radius around the generator (depending on its setting). Cost is $15,000 and weight 40 pounds. A heavy tau-field is powered by an E cell, covers up to a ten-yard radius, and lasts for two subjective hours; it costs $80,000, weighs 200 pounds and takes up .2 cy as cargo.

TECHNO-SECURITY INCORPORATED   LOGON:******   PASSWORD:******
PATH:/FILES/COVERT/GURPS/   TR-XX3399-236/87   FILE RESTRICTED
/SU4   SUPERUSER KEY:******   OK TR-XX3399-236/87   HEADER FOLLOWS:

:COVERT OPERATIONS

AUTHORIZED ACCESS ONLY: GAMMA RESTRICTED   DO NOT REDISTRIBUTE
VIDEO TRANSMISSION ENGAGED   PREPARE TO RECEIVE VIDEO
DECRYPTION MODE: AUTOMATIC   DECRYPTING BODY...........
MESSAGE BODY FOLLOWS -- CUT HERE -- CUT HERE --

VIDEO TRANSMISSION SCREEN

chapter SEVEN

ACTIVE

SECURE
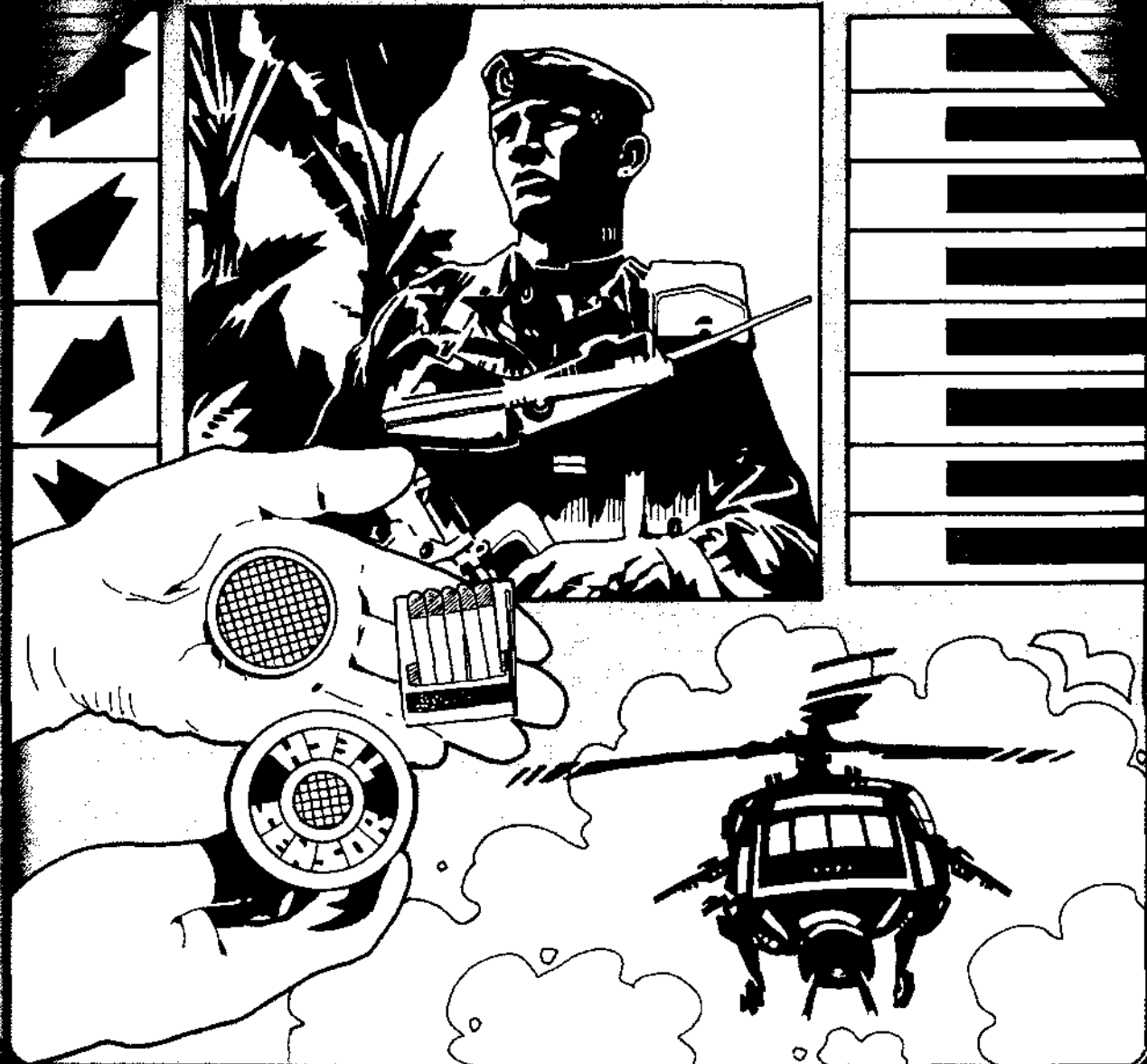
Sometimes, the most important items in an adventurer's toolkit are the ones that allow him to get into places where he shouldn't, find out things that he isn't supposed to, and get away undetected. At times like that, technology may be the only ally that he can trust! This chapter covers devices that are useful to commandoes, spies and thieves – anyone who has to tangle with a security system.

Criminal Equipment and Burglar's Tools covers gadgets that are useful for cracking security measures, whether they are on a door or a credcard. *Surveillance Equipment* covers a few items that are useful for covertly obtaining information. *Stealth Technology* covers innovations that facilitate camouflage, concealment or deception.

CRIMINAL EQUIPMENT & BURGLAR'S TOOLS

FLASHLIGHT (TL7+)

See p. 15.

AUTOGRAPNEL (TL8+)

This uses Guns (Grenade Launcher) skill to fire a grappling hook up to 50 yards. A motor winch on the gun lifts up to 400 pounds at up to five yards per turn. The reel contains 50 yards of biphase rope with a breaking strain of 1,000 pounds. One C cell is good for 100 ascents or descents. Cost is $400 and weight is six pounds.

BIPHASE ROPE (TL8+)

See p. 15.

CREDCARD CRACKER (TL8+)

This is a device to allow access to a credit transactor (see sidebar, p. 8) without the owner's consent. They come in many models. Collection agencies, bankruptcy courts and tax collectors have legal ones. Cost is $5,000 and weight is 2 pounds; an A cell provides power for a year. Illegal ones are produced (or diverted from legal sources). The black-market price is variable; possession or dealing in credcard crackers is a serious crime. A Streetwise-4 roll can usually find a dealer in any large city; a roll against Detect Lies might reveal whether he believes in his own merchandise.

Credcard Crime

A false balance can be entered on a credcard. This takes three rolls: Electronics (Credcards)-4, Forgery-4 and Computer Programming-4. It also takes four hours of work in a fully-equipped shop. A failure on any of the rolls gives the card a zero balance. A critical failure wipes the card completely; it will no longer accept a program. (Or the GM may make the roll; in that case a failure of any kind identifies the card as a forgery whenever it is used; it will not debit or credit and the card or terminal it is hooked to tries to notify the authorities.)

ELECTRONIC LOCKPICK (TL8+)

This is a sensor/decoder that gives a +3 to either Lockpicking or Electronics (Security Systems) skill on attempts to break any electronic lock of TL8 or less; it is -2 per TL difference between the lockpick and the lock vs. higher-TL locks. See p. B67 for lockpicking rules. It works for six months on an A cell, costs $1,500 and weighs three pounds.

HIGH-POWER DRILL (TL8+)

See p. 15.

LIGHT-INTENSIFIER CONTACTS (TL8+)

See p. 20.

MINI-TOOLKIT (TL8+)

See p. 16.

PLASTEX (TL8+)

See p. 68.

MONOWIRE (TL9+)

See p. 16.

SONIC PROBE (TL9+)

See p. 17.

Spinneret (TL9+)

This device resembles a parachute harness with a powerful motor-driven reel built in. The climber clips a monowire line from the reel to a piton or grapple that has been securely attached to a cliff or wall (make a Climbing roll). The motor is then activated, pulling the climber (or anything else the harness was wrapped around) up at a rate of five yards per second. Also available is a line glide. This is a short BPC tube with a harness strap. It can be used to slide down the cable at 15 yards per second, though a Climbing or Acrobatics roll may be needed to avoid a hard landing. By clipping it to the climbing harness and firing a bridging line across a chasm (using a rocket piton), and then a second line connected to the reel, the user can use the glide to cross at five yards per second.

The monowire line and reel will support up to 500 pounds. The motor uses a D cell, for 100 ascents or descents. Weight is seven pounds and cost is $300. The line glide costs $100 and weighs one pound.
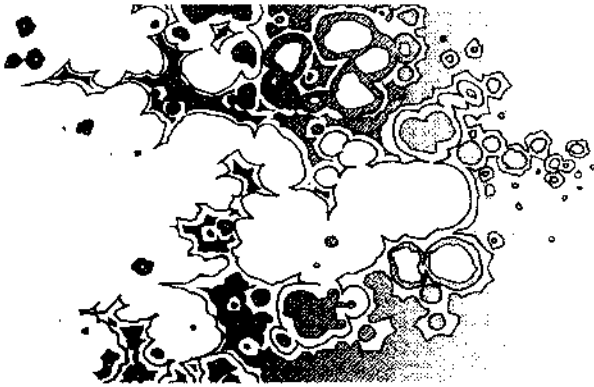
Viral Solvent (TL11+)

This is a TL11, genetically-engineered, silicon-based virus designed to eat almost anything, including flesh, metal and plastic. Viral solvent dissolves whatever it is sprayed on, reducing the object's DR by 2 per turn; when DR is reduced to 0, the object takes 2d damage each turn instead. The virus remains potent for thirty seconds – it can eat a foot-wide hole through any substance with a DR of 60 or less.

The virus is dormant until sprayed. A spray of virus covers a square foot and has a range of three yards. The nozzle adjusts for smaller applications (eating through locks, etc., though a DX roll may be required to use it safely – a critical miss means that some virus was sprayed on the user, a vital piece of equipment or a companion). The can contains enough virus for five applications. If the solvent is used as a weapon it has SS 10, Acc 2, and a RoF of 1; use DX-4 or Beam Weapons (Flamer)-2. In combat, viral solvent is sprayed on the victim, and will quickly eat through armor and then flesh.

The solvent may be neutralized by a counter-virus. All cans of solvent contain an equal amount of neutralizer, which instantly renders the virus impotent. Standard viral solvent is engineered to eat anything, but specially-tailored types can be purchased which only eat non-organics, certain metals or other limited classes.

Viral solvent costs $200 per can, $400 or more for a tailored solvent; a single can weighs one pound.

SURVEILLANCE EQUIPMENT

Com Tap (TL8+)

This device taps into any optical or electrical cable line – phones, cable TV, etc. It is a 100-yard, hair-thin optical cable ending in a clip head, connected to a briefcase-sized unit, which includes both a monitor and a recorder (uses standard computer media). An Electronics Operation (Communications) roll is needed to succeed without damaging the line being tapped into. -3 to tap an optical cable. The tap uses an A cell. Cost is $3,000 and weight is four pounds.

Laser Listening Device (TL8+)

This device bounces a laser beam off a solid surface, detecting and translating the vibrations set up in the surface by nearby voices or other sounds. It can be used through a window, and can be linked to a recorder or computer. Its range is 1,000 yards. It uses a C cell, giving eight hours of surveillance. Cost is $1,200 and weight is 12 pounds.

Programmable Bug (TL8+)

The pinhead sized audio/visual sensor head is connected by a 100-yard long, hair-thin fiber optic cable to a recorder unit (fist sized, weighs ⅛ pound). The tiny sensor head is placed in the area to be bugged, while the nearly invisible cable is run through cracks in the walls, ceiling, floors, air ducts or the like to an appropriate hiding place for the recorder unit. Since both the bug and the cable are so small, any roll to find them is at -7 (more if the cable or sensor head are artfully hidden).

The sensor head can pick up voices clearly within five yards and can also scan visually; the recorder unit stores information on standard computer disks. The bug is usually voice activated – it only switches to record mode if it detects sound matching the patterns of human voices, and it can even be set to listen for individual voice patterns. It does not usually run full-time, since that would rapidly use up the recorder's memory. The recorder unit includes a burst-transmitter and scrambled radio (ten-mile range) which can transmit all recorded data in a micro-second burst to a scrambler-equipped communicator, either after a set time has past, when its disk is full, or upon receiving a coded radio command. This will also empty its memory disk, allowing more data to be collected. The bug may also be ordered to transmit real-time audio and visual images to a scrambled communicator, but such on-going transmission can be easily detected (if not deciphered) by an operating radio or bug detector.

A programmable bug works for two months on an A cell (mounted in the recorder, not the bug). For an extra $50 it has a self-destruct which destroys the recorder unit if a coded command is received or if tampered with (Demolition-3 or Traps-3 to defuse). Cost is $500 and weight is ½ pound.

Nanobug (TL10+)

This pinhead-sized sensor/recorder unit with adhesive backing is usually placed somewhere where it can scan an entire room with its camera lens/microphone. It can store two hours of TV-quality digital images, including sound, at TL10; this
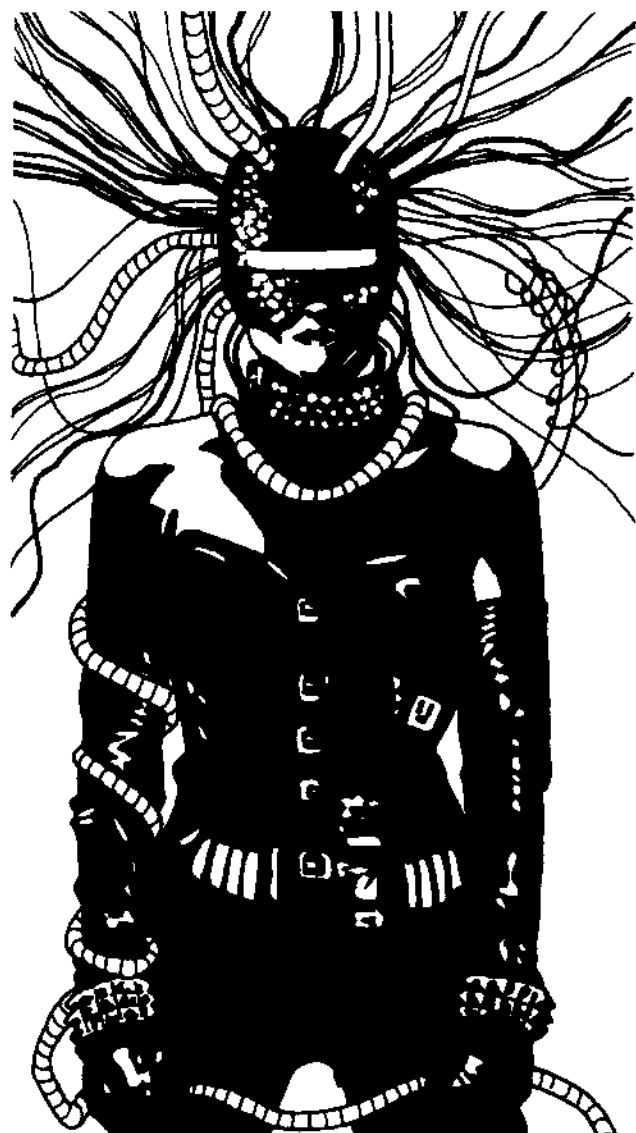
increases ten times for each TL above 10. The mike can pick up voices clearly within 25 yards. The bug may be programmed to run constantly, to listen for a specific voice before switching on, to scan at specific times of day, or to scan when its sensors detect light or body heat in the room.

The bug includes a burst transmitter and radio receiver (range 50 miles) which can transmit all recorded data in a micro-second burst upon receiving a coded radio command (or be set to do so after a specific time has passed). Once it transmits, it may be programmed to either erase everything it has stored and begin recording again, or to self destruct. It will also self destruct if tampered with (Demolition-3 or Traps-3 roll to defuse). It works for two years on an AA cell. Cost is $500 and weight is negligible.

BRAINCORDER (TL14+)

At TL14, technology even allows someone to eavesdrop on your personality; see p. 96.

STEALTH TECHNOLOGY

HIDDEN COMPARTMENTS (TL8+)

Things can be concealed in bionic limbs; see p. 106.

FLESH HOLSTER (TL9+)

Things can also be hidden *inside* the human body; see p. 107.

INFRARED CLOAKING (TL9+)

See p. 79.

RADSCANNER SHIELDING (TL9+)

Military and holdout weapons are routinely equipped with countermeasures to defeat radscanners: they give a -2 on detection chance, and add $500 to cost (already included in the cost of holdouts).

STEALTH CAPSULES (TL9+)

These are similar to standard drop capsules (see p. 115), and are launched from the same-sized tubes, but are made of material with a low sensor signature and packed with ECM equipment and decoys. Any sensor system is at -5 to detect a stealth capsule. The stealth capsule computer has Electronics Operation (Sensors)-18 to detect that it has been spotted. It will then launch radar and infrared decoys and activate its own jamming systems, adding 5 to its PD against homing missiles. It may deploy a spare parachute to "jink" itself off a sensor screen. This generally requires a second roll (at -5) by the sensor operator to avoid losing it. A stealth capsule is somewhat more cramped than a drop capsule – it will only hold one person and .1 cy of cargo, or .2 cy of cargo. Stealth capsules cost $25,000, take up .5 cy as cargo, and weigh 900 pounds.

CHAMELEON TECHNOLOGY (TL10+)
Chameleon Armor (TL10+)

A chameleon surface may be added to vacc suits, Infantry Combat Armor, Combat Infantry Dress, Powered Combat Armor, or to a full suit of reflex or energy cloth armor. Chameleon armor is sensor-controlled to change color to match the background. Chameleon armor subtracts 6 from Vision rolls or visually-aimed attack rolls if the character is stationary, but only 3 if he is moving (unless silhouetted against a fairly featureless background). It also suppresses the wearer's heat signature, giving a -3 to infrared spotting and targeting.

The chameleon system works for 24 hours on a set of three A cells. It adds $1,850 to the armor's cost and ten pounds to weight. A chameleon system should be purchased when the armor is bought; if it is added afterwards, cost doubles.

Chameleon Cloak (TL10+)

Working the same way as chameleon armor (above), this is a large cloak that can be wrapped around a person or object to conceal it, as long as it remains motionless (+5 to Camouflage rolls, plus the effects of chameleon armor). Larger chameleon cloaks are used as camouflage nets for vehicles, bases and heavy equipment. It uses two A cells (lasting 24 hours). Weight

is four pounds and cost is $1,500. Vehicle-sized chameleon nets can conceal 25 square yards and use a B cell, lasting 12 hours. Cost is $4,000 and weight is 20 pounds.

Chameleon Suit (TL10+)

This is a full body suit designed to camouflage the wearer, sensor-controlled to change color to match the background – effects are the same as chameleon armor, above. It works for 24 hours on a set of three A cells. It takes 20 seconds to put on a chameleon suit, ten to take one off. The suit has PD 0, DR 1. Cost is $1,850; weight is ten pounds.

Distort Belt (TL10+)

Similar to the holobelt (see below) in appearance, the distort belt affects incoming scanner pulses to give a distorted or false reading of the belt's wearer. Effectively, it gives a -5 penalty to anyone using radar or a bio- or chemscanner to detect the wearer. The radar or scanner signal, on a failed roll, will either not register the belt wearer at all, or will show him to be something else (as preset by the user). A successful scan will be able to give only general information about a belt wearer. It is useless against visual sighting or psionic detection. One B cell lasts 12 hours. Cost is $2,200 and weight is three pounds.

Holobelt (TL10+)

This is a belt-mounted holographic projector that casts a preset three-dimensional image around the wearer, roughly man-sized, for concealment. The image must be bigger than the person concealed! Standard hologram disks let the user choose between a native-looking rock, tree, mailbox, bush, animal, etc., or plug in a disk taken from a holocamera. All attacks on the user are at -1 to skill, and aimed shots to specific body areas are not possible unless the image *very* closely resembles the user's body. It operates for 24 hours on one B cell.

The belt provides no protection against infrared or bioscanners. A disk inappropriate to a given planet is more likely to draw attention to the user than it is to conceal him. Because it projects light, the holo image *glows in the dark*. The belt must be turned off and allowed to vent waste heat (which produces a large heat signature) at least every six hours, or it starts leaking heat anyhow, and becomes very uncomfortable. Cost is $1,100 and weight is four pounds. Prerecorded holo disks are $100 and weigh the same as a computer disk for the appropriate TL.

Intruder Suit (TL10+)

This is a full-body suit designed to render the wearer invisible. A network of fiber-optic light guides covers the surface of this suit, so that light waves pass through the guides and are bent around until they emerge on the corresponding spot on the other side of the wearer. In theory, the wearer is invisible. In practice, the suit distorts light waves enough that anyone looking directly through the wearer will notice something is wrong – objects on the other side seem blurred or out of focus. As a result, the suit subtracts 10 from Vision rolls or visually-aimed attack rolls if the character is stationary, but only 6 if moving (unless he is silhouetted against a fairly featureless background). A Vision roll is needed to locate him. An intruder suit includes pockets and pouches for equipment, and a hood to cover the face. It can be worn over clothing or light armor, and the surface of heavier armor can be designed to provide intruder camouflage.

The suit has PD 0, DR 1 (DR 6 vs. lasers), costs $8,000 and weighs 12 pounds. It costs $12,000 to equip Powered Combat Armor, Combat Infantry Dress or an exploration suit with an invisibility surface, which adds 8 pounds to weight.

It *is* possible to have armor with both chameleon and intruder systems. However, the -3 penalty to hit a chameleon suit is not cumulative with the -6 to hit an intruder suit.

Living Disguise Kit (TL11+)

The kit includes both extremely sophisticated disguises and makeup and pre-molded sensa-skin (see p. 95) sections – noses, ears, facial sections and so on – for living disguises, along with sensa-skin neutralizer for removal of the otherwise permanent material. Depending on the exact contents, the kit may allow users to realistically impersonate aliens or the opposite sex. It adds +4 to Disguise skill. Cost is $5,000; weight is 10 pounds.

Sonic Screen (TL11+)

Worn strapped onto a belt, this forms a portable privacy field which moves with the wearer. The field is three yards in diameter (covering the user's hex and all adjacent hexes). Sounds from outside the field cannot be perceived by someone inside the field, and vice versa. The field also provides DR 10 against sonic attacks (adding +2 to HT against stunners and pestguards). Sonic screens are often used by assassins and thieves (to make the victim's cries inaudible). As a result, they may be controlled by the government (Legality Class 4). A C cell lasts for an hour. Cost is $1,000 and weight is three pounds.

PATH:/FILES/ARCHIVE/   WARNING: THIS IS A RESTRICTED FILE AREA
//WORMSEARCH OK   ENTER SEARCH TERM: "SECURITY" EXHAUSTIVE? Y
SEARCHING HEADERS . . . . ITEM FOUND

:SECURITY

FILE: GURPS ULTRA-TECH/EDITION 2-8 STOP SEARCH? Y   CLEANING UP........
1 FILE LOCATED   TRANSFER THIS FILE? Y   ENTER DECRYPTION KEY:*******
DECRYPTING   WARNING: TRACE ACTIVATED //EVADE   TRACE EVADED
DECRYPTION COMPLETE   RECEIVING FILE   RAW VIDEO ATTACHED

VIDEO TRANSMISSION SCREEN

chapter **EIGHT**

ACTIVE

PRIVATE

Even as technology gives thieves and spies the ability to bypass old security systems, it creates new ones to replace them. In addition, as the average criminal becomes more sophisticated, so does the cop who has to track him down. This chapter covers security systems that protect against both physical and electronic intrusion, as well as advanced law-enforcement tools that allow police and security forces to track, identify and detain criminals more effectively – or simply suppress a riot.

SECURITY SYSTEMS

A variety of security systems are available at TL8+, ranging from electronic locks to automatic lasers.

It might be possible to build an impregnable security system – but the more layers of security that are added, the harder it is get anything else done. If an executive has to go through six different security scans every time she enters or leaves her office for a cup of coffee, or a computer requires 20 minutes of identity verification before it will let anyone use it, personal convenience and efficiency will be sacrificed. Most systems compromise between security and ease of use.

A system that is too complex or too sensitive can easily be degraded, overloading its monitors with input. The simplest method of fooling an electronic security system is to convince the human component of the security system that the electronic element is malfunctioning. After receiving several false alarms, a human operator or self-programming computer may ignore input from a sensor or just turn it off, leaving a hole in the defenses.
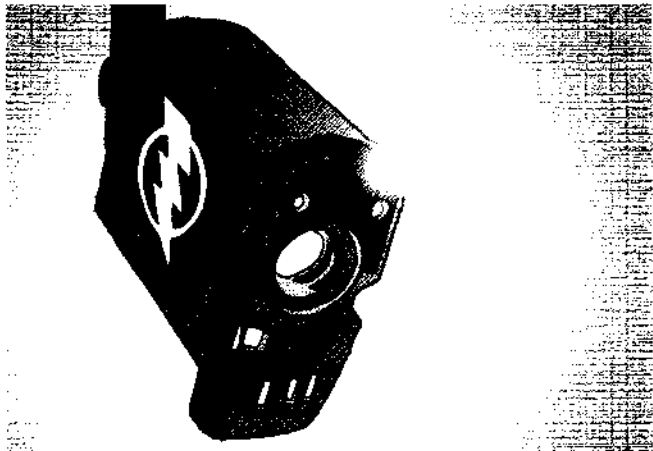
SECURITY SENSORS (TL6+)

Security sensors are designed to detect an intruder and take some action (an alarm, or a direct attack) if they do so. They run indefinitely using vehicle or building power; most have backup power cells. Most are introduced at TL7 unless noted. For $500 more they are concealed; these require a Traps-2 roll to spot.

Pressure Sensor (TL6+)

A TL6 pressure sensor usually involves a simple plate – when pressure is placed on it (as in someone stepping on it) or removed (as in a jewel being removed from its display case) the sensor detects the change, and sounds the alarm. The key is to avoid the sensor, or disable it. Roll against Electronics/TL (Security Systems)-4. Cost is $100 plus $50/hex covered.

Beam Sensor (TL7+)

This sensor consists of a laser or infrared projector and receiver; if an object passes between the two, the (invisible) beam is broken and the alarm triggered. Infrared sensors can spot an infrared beam; smoke, glitter or powder thrown into a laser's path may detect it.

Once the beam has been spotted it may be possible to jump over it or crawl under it – perhaps requiring an Acrobatics roll if several beams are used at once. Deadly versions (TL8+) instantly activate lethal laser beams if the sensor beam is broken – anyone passing through the beam takes 8d impaling damage at TL8: PD protects, but no Dodge roll is allowed. At TL10+, X-ray lasers are used instead; at TL13+, grasers are used. Cost of a non-lethal system is $400. A lethal system costs $2,000. This system will protect a single entrance, or a perimeter side up to 100 yards long. Each additional entrance or 100 yards of perimeter costs the same.

Sonic Sensor (TL7+)

A sonic sensor fills an enclosed area with inaudible ultrasonic vibrations. Anyone moving through the area will normally be picked up by the detector, but someone moving very slowly may not be detected. A successful Stealth-4 roll is required. Add +5 to skill if using a TL11 sonic screen (see p. 86). Cost is $1,000 plus $200/hex.

Surveillance Camera (TL7+)

A simple closed-circuit video camera, connected to a monitor, is one of the best security systems possible. To be effective, constant human monitoring or a Complexity 4+ computer with the Optical Recognition program, is required. Weight of each camera is ½ pound and cost is $150. A monitored surveillance camera is tricky to fool, but a TL10 intruder suit (see p. 86) or a disguise might work.

Automated Scanner (TL9+)

Manual or computer-controlled scanners (see p. 19). They can be fooled by distortion belts if a skill roll fails; roll vs. the operating computer's Electronics Operation/TL (Sensors) skill. Cost for this augmentation is $1,500.

ELECTRONIC LOCKS (TL7+)

The normal way to keep people out at TL8+, electronic locks may be mounted on doors, consoles, briefcases, etc. They use a numeric keypad, or a small electronic key which produces a coded series of low-energy infrared or laser pulses. If the wrong combination is input, the lock may trigger an alarm.

Picking an electronic lock requires either a set of electronics tools (a mini-toolkit will do; see p. 16) or an electronic lockpick (see p. 83), though a variety of more exotic lockpicks are available at different TLs. Use the rules on p. B67 to pick the lock, with a -5 for each TL by which the lock exceeds the TL of the picklock or lockpicking tools.

An electronic lock uses building power or can run for a year on an A cell; most have a cell which automatically takes over if power is interrupted. The lock weighs ½ pound.

A number combination (keypad) lock (TL7+) costs $100.

An infrared or laser "key" system (TL8+) gives -2 on Lockpicking rolls, and costs $200. Each doubling of price and weight gives an additional -1 to Lockpicking, to a maximum of

-5. A laser or IR "key" costs ¼ the lock's price; it is negligible in weight and is powered by an AA cell. (The cell would last for one year of continuous use, but few are turned on constantly. Only the most forgetful user is liable to let his key run down.)

SCANLOCKS (TL7+)

Instead of standard electronic locks, identity-scanner locks, which can't be picked, may be used. All scanlocks require a Datalinked computer with Internal Security program. Verification takes three seconds. If an identity scan fails to match the subject with the list of authorized individuals in the computer's database, access is forbidden. The system may be programmed to sound an alarm or engage automatic defenses.

All scanlocks run for one year on a B cell, or indefinitely on building power. The following types of identity scanner for the lock are available:

Voice-Print Analyzers (TL7+)

Check the subject's voice pattern. The scanner asks the subject to give his name and/or ID number, then matches the voice against a stored pattern. A normal recording of an authorized person's voice is not good enough to fool the analyzer, but a voice modulator (which exists today) or silver tongue (p. 108) can. Cost is $100; weight is ½ pound.

Facial Scanners (TL8+)

Use sonar or X-rays (two-foot range) to scan the bone structure of the subject's face. If the surgeon has access to X-rays or sonograms of an authorized individual's face, a facial bodysculpt job (see p. 101) may fool the scanner. Cost of the scanner is $1,000 and weight is four pounds.

Genetic Scanners (TL8+)

Require a blood sample at TL8 (this requires a jab with a needle). At TL9+ a bioscanner is used; this needs no sample. Only a braintape transfer into a cloned body (or the use of a distort belt against a ranged scanner) will fool a genetic scanner. A genetic scanner costs $2,000 and weighs eight pounds. Cost is $1,000 and weight is one pound for a TL9 ranged scanner.

Palm Scanners (TL8+)

Check the user's palm print; for verification, the subject must place his palm against a plate. They can be fooled by a subject who has undergone a transplant of the cloned hand of an authorized person. Cost of a palm scanner is $200 and weight is one pound.

Retina Scanners (TL8+)

Scan the vein patterns in one or both of the subject's eyes. The subject must look directly at a laser eye-scanner. Again, a transplant can fool the scanner. The scanner costs $500 and weighs two pounds.

AUTOMATIC DEFENSES (TL8+)
Defense Globe (TL8+)

This is a rotating globe, usually mounted on the ceiling, and fitted with a sensor system and a military laser rifle (or other weapon of similar size). Defense lasers are remotely controlled by building or ship computers, using the Internal Security pro-

gram (see p. 33). They are generally programmed to fire at any target detected after an alarm is activated; skill level depends on the computer's programming. The globe has HT 6, PD 6, DR 25 (plus 25 per TL over 8), and is -3 to hit because of its small size. It gets unlimited shots from a building or ship power plant. Cost is $6,600, weight is 50 pounds and Legality is 1. Even relatively free societies frequently ban lethal traps, on the principle that property is not as important as life.

ⅢAGNIFICATION

Gas Canister (TL8+)

This is a concealed canister set to release gas into a room, either upon command from security computer or manual control, or if an alarm is triggered. It must be connected to alarm or security sensors, usually by cable, and is often mounted just outside ventilation ducts. It holds enough gas to fill a large hall once or a smaller room ten times. See *Biochemical Weapons*, p. 70. Cost is $300, weight is five pounds and Legality depends on what kind of gas it is filled with – sleep gas (TL8) and paralysis gas (TL9) are the most common choices.

Pestguard (TL9+)

See p. 80.

Doorward (TL10+)

This portable security system is used to protect portals against unauthorized entry. Two thin, field-generator strips are placed on either side of a door or window frame, connected to a power module, usually placed above or beside the portal. The doorward uses an automated bioscanner (skill 15, +1 per TL over 10), coded with the biopatterns of up to 100 different individuals (or species). The usual method to fool a doorward's sensor is with a distort belt (see p. 86).

If a being who does not match any of the scanner's biopatterns passes through the portal, the sonic field is activated, focusing powerful sound waves to batter the intruder's nervous system into unconsciousness. Roll against HT-3 to avoid its effects; fully-sealed armor adds 1 to HT for every 5 points of DR. If only a limb passed through the portal, a failed HT roll incapacitates it for 20-HT minutes; if a person moved entirely through the portal (or inserted his head) a failed HT roll means he is asleep for 20 HT minutes (but at least one minute). A critical failure means the effects last three times as long. The victim recovers when the time is up, but cannot be revived until then.

A doorward uses a pair of C cells, which will maintain its sensor system for years; the sonic field can be triggered 50 times before the cells are exhausted. Cost is $1,100 and weight is three pounds.

Paralysis Grid (TL10+)

This is a typical trap at TL10+. A paralysis grid covers an area of ground, and is built into the floor of a building, ship, etc. The grid is either left on, activated by sensors or activated by remote control. When turned on, anyone moving through or ending his turn in a grid hex must roll against HT-1 or be paralyzed. Add +1 to HT to resist for every 25 points of sealed armor worn. Paralyzed individuals cannot move any voluntary muscles, but are conscious of everything around them. Paralysis lasts for as long as the power remains on and the victim remains on the grid, and for (30-HT turns) afterwards. Anyone who resists paralysis is at DX-2 and IQ-1 as long as he remains on the grid. A paralysis grid costs $10,000 to install, plus $1,000 per hex. It runs on building or ship power.

Energy Web (TL14+)

See p. 59.

Wards (TL11+)

These are stationary devices that project a flat, circular deflector shield. A typical ward unit works for two hours on a D cell, and casts a field 12 feet in diameter. If the ward is used as a fence, half this field will be underground (this has no effect on either the ward or the ground). The field has PD 8 and DR 2. Gas will not pass through it. A person could step through it, but there is resistance. Roll against ST to cross at a walk, or ST-2 to cross it at a run, but take 1d-4 impact damage if running through it.

For an extra $500, a ward may incorporate a flicker setting (see *Deflector Belt*, p. 77). When flickered, the ward has only PD 6 and no DR, but gas may pass through it, and it lasts for four hours.

A standard ward weighs 20 pounds and costs $1,000. Larger and stronger wards may be available, but the expense rises rapidly!

COUNTER-SURVEILLANCE GEAR

Bug Detector (TL8+)

This is used to find hidden surveillance devices like the comm tap and the programmable-bug sensor head or recorder unit (both described on p. 84). It has a range of only one yard, so a careful sweep of a room is necessary. It requires one minute and a successful Electronics Operation (Security Systems) roll to check each hex — roll a Quick Contest of Skills between the operator and the person who planted the bug, since a skilled agent will place one where other electrical systems may mask its presence. Failure means that no bug is detected; critical failure means that the operator believes he has found a bug (perhaps buried in a wall) when one isn't there. It works for one week on an A cell. Cost is $500 and weight is one pound.

Bug Stomper (TL8+)

This is a "pink noise" generator, which effectively prevents audio surveillance devices (programmable bugs, recorders, etc., including the parabolic mike in the newscam (see p. 38), but not the laser listening device described on p. 84), from picking up anything but static within three yards of the device. It will jam the listening ability of a programmable bug, but not its visual sensors. A bug of a higher TL can filter out the noise. The stomper uses a B cell, which operates it for 24 hours. Cost is $1,200 and weight is two pounds.

Distortion Mesh (TL9+)

First available at TL9, distortion mesh can be built into the walls of buildings, ships or vehicles. It totally prevents bioscanners, chemscanners, or radscanners (see p. 19) from scanning anything *behind it*, though a radscanner will certainly detect the mesh itself. It is less effective against ultrascanners (see p. 19), which only suffer a -4 on scanning rolls.

This assumes the mesh is of the same TL as the scanner. Higher tech scanners may attempt to scan through mesh; at +1 TL they scan at -2 (no penalty for ultrascanners), and at higher TLs they ignore it entirely. Low-tech scanners, even ultrascanners, are wholly blocked by higher-tech mesh. (This rule, in general, holds for all sensor/anti-sensor systems of different TLs.)

Distortion mesh costs $5,000 plus $500 per square yard; it runs off building or ship power. It also blocks regular radio communicators, but it does not stop gravity ripple, neutrino or tachyon devices.

Privacy Field (TL10+)

This is a sonic generator that creates a spherical interference pattern that blocks normal sound waves. No one inside the field's boundaries can hear any sound originating outside the field, and no sounds within the field are audible to anyone outside it. The generator can only be used in an atmosphere, with the diameter of the field increasing with atmospheric density. In a standard atmosphere, the bubble has a four-yard radius. A privacy bubble will block audio bugs, but not laser listening devices. It gives DR 15 against sonic weapons fired across its boundaries. A C cell lasts 90 minutes. Cost is $5,000 and weight is four pounds.

LAW-ENFORCEMENT EQUIPMENT

ANTI-THEFT SYSTEM (TL8+)
See p. 64.

CHEMSNIFFER (TL8+)
The hand-held model is used to find contraband by analyzing chemical traces in the air. It has a range of five yards. The chemsniffer uses Electronics Operation (Security Systems) or Demolition skill. It works six months on a B cell. Cost is $700; weight is two pounds.

Larger and more sophisticated "walk-through" models, using thermal-neutron analysis, may be mounted in high-security areas. These give +4 on skill. Weight is two tons, volume is one cy and cost is $10,000.

CREDILINE (TL8+)
This drug is sometimes used as a "truth serum" by law-enforcement agencies; see p. 97.

CRIMINOLOGY KIT (TL8+)
This is a portable forensics lab, with a dedicated computer system capable of detection and chemical analysis of evidence. As well as ballistics analysis and finger and voice printing, the lab is capable of identifying and classifying hair, flesh scrapings and blood samples, and using them to determine the owner's genetic pattern. It is usually linked to a database containing detailed records on suspects to aid identification. It adds +3 to any Forensics skill roll, and includes an Expert system with skill 11 in Forensics. It uses a B cell (lasts six months). Cost is $3,000 and weight is six pounds.

D-TAG (TL8+)
See p. 64.

ELECTRONIC HANDCUFFS (TL8+)
These use a laser key (see *Electronic Locks*, p. 88), and can be unlocked from up to three yards away (for instance, through the bars of a cell). The lock is powered by an A cell, which lasts for a month. The cuffs are *supposed* to unlock automatically when the power cell goes dead . . .

Cost of a set, with key, is $40 and weight is ½ pound.

STROBE MINES (TL8+)
These devices are often used for riot control; see p. 69.

TRACER NEEDLE (TL8+)
This tiny tracer can be implanted in the flesh; it can be fired from a needler or Gauss needler. When it hits it feels like a bee sting. It is used by ecologists to track animals and as an alternative to jail to keep track of non-dangerous felons. The tracer remains passive until its receiver picks up a specific coded signal; depending on the activation signal, it will transmit a brief pulse, or a constant beacon, detectable within ten miles. It runs for six months on an AA cell. Cost is $10 and weight is negligible.

X-RAY SCANNER (TL8+)
This hand-held device is used to check for hidden weapons or implants and for field medicine. It adds +5 to any Holdout skill roll to find hidden items, but requires an Electronics Operation (Sensors or Security Systems)+3 roll to properly interpret. It has a range of one foot and runs off a B cell for six months. Weight is four pounds and cost is $2,000.

CONSTRUCTION FOAM (TL9+)
This advanced building material is also commonly used as an effective riot-control tool; see p. 16.

WARBLER GRENADES (TL9+)
Another ultra-tech riot control device; see p. 68.

BIOHOUND (TL10+)
A hand-held sensor unit the size of a paperback book, usually worn on a shoulder strap, biohounds are designed to detect the characteristic molecules produced by a specific lifeform – and track them. A biohound can be set to track a target as general as a species or as specific as a single individual. Its only limitation is that information on the target's genetic characteristics be slotted into the hound's computer. Known species characteristics are usually on file; for new races or creatures, or when tracking an individual, a detailed bioscanner analysis (see *Scanners*, p. 19) must have been performed, and the information placed in a disk in the biohound's own dedicated computer.

On a successful roll against Electronics Operation (Sensors) the hound can tell if its target came within five yards of its sensors. at -1 to skill per half-hour the trail is old. Once it has a trace, the user can track the target, following the chemical trail left behind by the target's distinct, individual signature (pheromones, etc.), as long as the target does not board a fast-moving vehicle, pass beyond an airlock, etc. Additional tracking rolls to maintain a trace may be required every hour. The hound can only track one target at a time – if multiple traces are detected (the biohound is set to track Sparrials, and detects that two were in the same room and left in different directions) the user will have to decide which trail to follow. He can come back to the other later, but a cold trail is -1 to pick up per half-hour of age. Cost is $2,000 and weight is two pounds.

MEMORY-BETA (TL10+)
This drug is sometimes in conjunction with various "truth drugs" (such as Crediline) by law-enforcement agencies; see p. 99.

NEURONIC HANDCUFFS (TL10+)
These are simply electronic handcuffs (see above) that deliver a neurolash effect if tampered with or given a triggering impulse from a remote control unit. The effect is identical to a Type 1 neurolash (see p. 63) They weigh ½ pound and cost $200 apiece; $300 for optional Type II effect. The remote control unit ($100, one pound, may be keyboard or voice controlled) has a range of ten miles and can control (individually) up to 32 sets of cuffs.

STASIS CHAMBER (TL15+)
Stasis technology provides the ultimate prison! See p. 80.

ILLEGAL ACCESS   ILLEGAL ACCESS   YOU ARE BEING TRACED
[TRACE ACTIVATED] //EVADE [EVADE FAILED] TRACING...... //GUARDIAN
[TRACE REROUTED TO TERMINAL 45]   TRANSMITTING HEADER NOW

:MEDICAL

FILE LOCKED [TRANSMISSION ABORTING] //LOCKPICK [EXECUTING LOCKPICK]
FILE UNLOCKED ENCRYPTION MODE: B ENTER DECRYPTION KEY:*******
DECRYPTION FAILED [TRACE EXECUTED] //EVADE [TRACE EVADED]
//CODEBREAKER [FILE DECRYPTED]   RESUME TRANSMISSION? Y   WORKING....

//VIDEO TRANSMISSION SCREEN
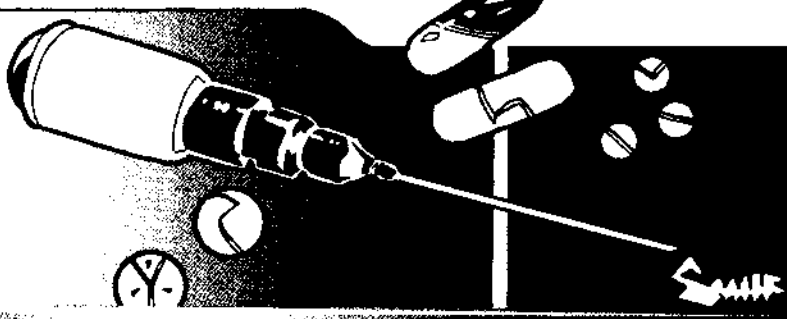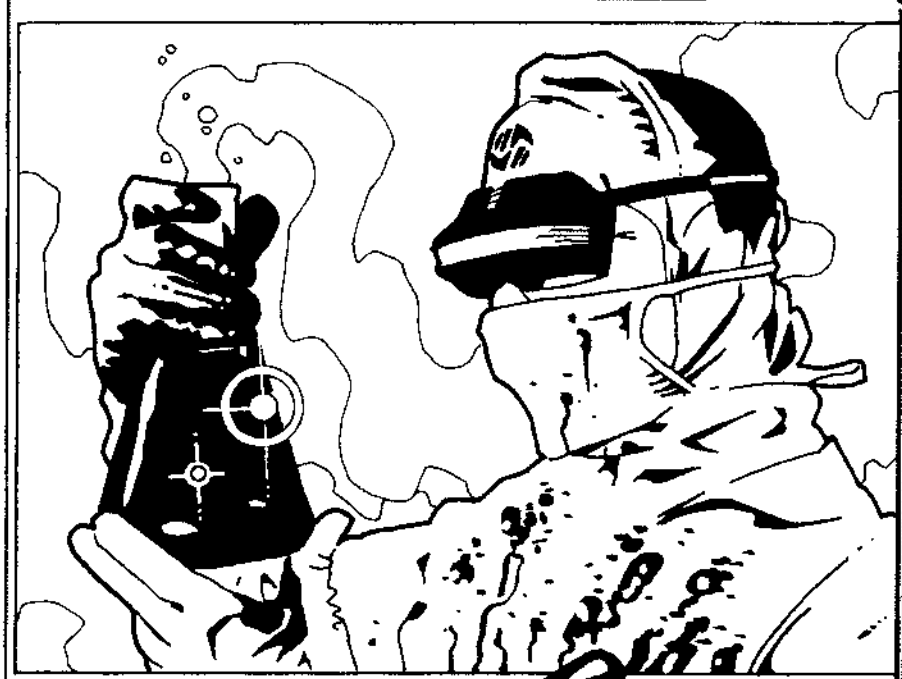
Advances in medicine and biotechnology are perhaps the most important ones from the point of view of the average citizen living in an ultra-tech society. This chapter covers advanced medical tools, drugs and techniques, including some that may be of more interest to black marketeers or soldiers than to doctors or paramedics. Body modifications are a particularly rich subcategory of biomedical technology, and are covered on pp. 104-110. *Harmful* drugs are covered in Chapter 5, *Armory*, under *Biochemical Weapons* (p. 70).

TIMELINE

TL8

By TL8, organ transplant and bionic replacement techniques enable almost any non fatal injury to be healed. Because of this, characters in TL8+ campaigns should not be allowed to start with physical disadvantages without good justification (e.g., they are also Poor, or the damage was genetic and clone transplants are impossible). Aging has not yet been conquered, but since worn-out organs can be replaced and many diseases of old age have been cured, the human lifespan has increased significantly.

Almost every known disease can be prevented by a specific inoculation. Any space-traveling civilization will provide these as a matter of course; individuals will have to "update their shots" before travel, or have the ship's doctor do it before hitting port. A spectrum of inoculations for a new environment usually costs $20.

Unknown diseases are another matter. New planets are likely to carry their own infections which – as yet – have no known cure. Worse still are human-manufactured diseases, whether released by accident or designed for biological warfare. Developing a new vaccine is difficult and time consuming – use the invention rules on B186, substituting Biochemistry for Engineering.

TL8 medical care is described in the *GURPS Basic Set* (p. B128).

Aging

Routine improvements in medical care greatly increase the average lifespan. Anyone receiving civilized medical care at TL8 does not start making aging rolls until they reach a natural age of 70. The increases in frequency for aging rolls that normally fall at 70 and 90 years of age are also set back by 20 years each, to 90 and 110. All aging rolls are made at +5.

TL9

Most people no longer fear injury and disease. Minor wounds can be quickly healed by an injection from a first-aid kit; major disabilities are inconveniences rather than tragedies, with reliable clone transplants performed by the family doctor. Paramedics can use Suspend and portable automedics to keep a seriously injured person alive until given further treatment; DOA is a thing of the past. On a civilized world, accidental death either comes instantly, or it does not come at all. With braintaping, even sudden death can be conquered. The only barrier to immortality is the gradual degeneration of brain cells, which as yet cannot be regenerated.

Unhindered by gravity, zero-g chemistry and AI-aided bioengineering form complex enzymes and hormones.

TL9 first aid and long-term care is described on p. B128.

Aging

Aging rolls do not begin until age 90. Their frequency increases at age 110 and 130. All rolls are made at HT+6!

Anti agathic drugs (see p. 99) are available, to *stop* aging completely – but they are experimental, uncertain and *very* expensive.

TL10

TL10 medical care is described in the *GURPS Basic Set*, p. B128. Among the many TL10 advances are the ability to store braintapes on standard computer disks (see *Braintaping*, p. 102) rather than in bulky MMSDs, and greatly improved first-aid and emergency medical techniques. Psychology is reconciled with biochemistry, as both chemical and electromagnetic techniques are developed to insert, unlock or erase memory and personality.

Aging

At TL10+, aging rolls begin at 110 and frequency increases at ages 130 and 150. All rolls are made at HT+7! Anti-agathics (see p. 99) allow aging to be effectively *stopped* for those who can afford the massive cost. These may lead to a stratification of society - immortals and everyone else   but if technology improves rapidly enough, within the average person's 150-year lifespan, medical science may advance to the point where anti-agathics are cheap enough for everyone!

TL11

At TL11, braintaping equipment leaves the hospital and enters the ambulance, though it is still very heavy. Easily portable micromedics enable automedic technology to go anywhere. Sensa-skin revolutionizes the field of plastic surgery, making bodysculpt unnecessary.

First-aid gear is essentially the same as at TL10, with the important addition of sensa-skin bandages (heals 2 extra hits, costs $50 and weighs ¼ pound) to all first-aid kits.

TL12

The major TL12 advances are total panimmunity and regeneration, enabling missing limbs to be restored without requiring clone transplants or bionic replacement.

Most citizens in TL12 societies receive Level 2 (TL10) panimmunity free as children through government or corporate health-benefit plans. Full Level 3 panimmunity treatments are also available.

TL13

TL13 first-aid gear is essentially the same as TL11. Sickbay and hospital care is far more advanced, with light and increasingly portable micromedics and regeneration fields at ¼ and ⅛ weight. The chrysalis machine becomes the standard hospital treatment.

MEDICAL EQUIPMENT

EMERGENCY MEDKIT (TL8+)

This is a belt pouch containing the basic requirements of TL8 first aid: five plastiskin patches (see below), plus the usual bandages, antiseptic cream, etc. which enable it to act as a TL7 kit when the plastiskin is used up. It also contains five Revive capsules, a pneumospray hypo and two doses of Hypercoagulin, with room for ten doses of whatever other drugs the user wants to add at extra cost – see pp. 97-100. It adds +1 to First Aid. Cost is $300 and weight is one pound.

PLASTISKIN (TL8+)

This is an antiseptic plastic patch that holds wounded flesh together, taking the place of normal skin. (It even takes on the color of one's skin, so that it's only evident on close examination.) When the flesh beneath it heals sufficiently, the plastiskin patch falls off. Plastiskin is found in any TL8 first-aid kit; without it, TL8 first aid counts as TL7. Plastiskin can be used to cover tattoos, scars and marks, or for disguises. It costs $10 per six-inch square patch.

PNEUMOSPRAY HYPO (TL8+)

This hand-held, pneumatic-hypodermic instrument, about the size of a penlight, injects drugs with a charge of compressed air. The hypo must be touching the patient to inject its drug. Its charge can easily penetrate clothing with DR of 1 or less. It takes two turns to remove an empty vial (or pneumocharge) and replace it with a ready new one. Air cartridges are good for 100 injections. Cost is $125 and weight is ¼ pound. Replacement air cartridges cost $10.

X-RAY SCANNER (TL8+)

See p. 91.
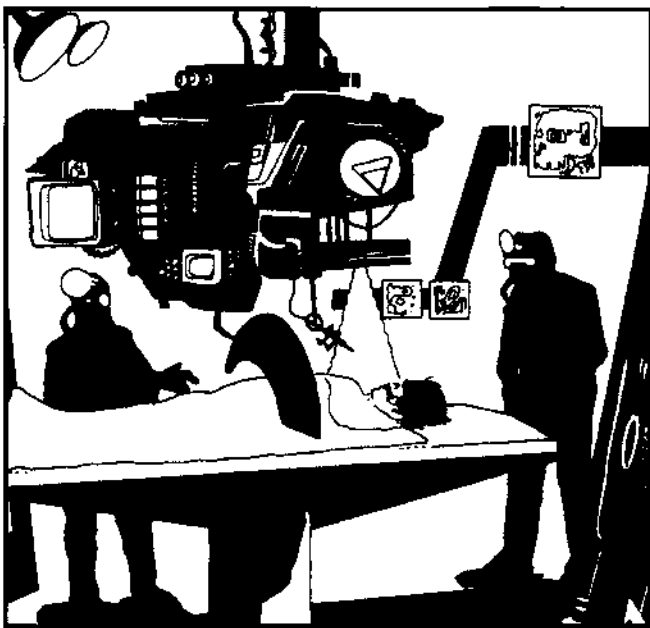
AUTOMEDIC (TL9+)

Looking like a gleaming ultra-tech coffin, the automedic will attempt to diagnose and heal anyone placed in it. No doctor is required; the patient is fully isolated and kept sedated. If the injury is one that a physician can deal with, the automedic rolls vs. the appropriate skill as though it were a physician. It is stocked with a full range of drugs and medical supplies, and has surgical waldoes to let it operate if necessary.

An automedic has a dedicated computer with skill 14 in First Aid, and 13 in Diagnosis, Physician and Surgery; add 1 to skill for each TL over 9. While it can cure most ills and heal most wounds and injuries, it cannot bring back the dead. It also has no imagination, so new diseases or strange problems may stump it – in which case it puts the patient on Suspend, and calls for help! Critical automedic failures are unpleasant to consider. Damaged or sabotaged automedics are death traps.

The usual bill, if placed in one in a hospital, is $3,000 per day. Ambulances may include an automedic to allow in-transit surgery for severely injured patients. An automedic costs $50,000, weighs 600 pounds and takes up 4 cy. At TL 10: 500 lbs. and 3 cy. At TL11+, 400 lbs., and 2 cy. Costs remain the same. A drug pack refill (usually every 25 uses) is $5,000 and 50 pounds.

DIAGNOSIS TABLE (TL9+)

This is a 7' × 3' × 3' padded, computerized table with a full range of biomed scanners. The patient lies on the table and the results of the scan are projected onto an overhead screen. It gives a +5 to Diagnosis (+1 per TL over 9). Not a portable unit, the table must be installed in a sickbay on a ship or vehicle, or in a hospital. Cost is $12,000, weight is 250 pounds and volume is three cy.

FREEZE TUBE (TL9+)

A freeze tube (see Suspended Animation, p. 103), with dedicated monitoring computer, costs $55,000. Weight is 750 pounds and volume is two cy.

MEDSCANNER (TL9+)

This is a compact, short-range scanner with a dedicated medical computer, designed to make specific medical diagnoses when used by a trained doctor. Its effective range is only one yard (doubling at each TL over 9). While a bioscanner can identify life forms and tell if they are sick or dying, it won't tell exactly why. But a medscanner will give detailed diagnoses on known species. On a successful Electronics Operation (Medical) roll it adds +3 to Diagnosis (+1 per TL over 9). A medscanner can also be used to scan for implants. If the Electronics Operation roll succeeds by three or more, any implants are detected. Cost is $900 and weight is one pound.

MEDSENSOR (TL9+)

This is a biomedical-monitoring bracelet, worn on the user's wrist, with a pneumospray hypo with one dose of a single drug – usually Quickheal, Superstim or Hypercoagulin. The medsensor is programmed to inject the drug into the wearer when a specific physical condition occurs, such as unconsciousness or severe trauma. However, a medsensor can also monitor the wearer's *psychological* state through such clues as increased heartbeat and

adrenaline production, respiration and higher blood pressure. If stress or excitement is detected it may be programmed to inject a tranquilizer such as Soothe. *Locked* medsensor bracelets may be given to psychiatric inmates or prisoners; in a stress situation, a Will-2 roll is needed to keep oneself calm to avoid activating it! Cost is $200, not including a drug; weight is negligible.

MMSD (TL9+)

A Mechanical Memory Storage Device for a braintape. This costs $40,000, takes up two cubic yards and weighs 800 pounds. See *Braintaping* (p. 102) for details.

BRAINWIPE EQUIPMENT (TL10+)

Brainwipe requires bulky and expensive equipment, costing $50,000 and weighing 500 pounds. See *Brainwipe*, (p. 103) for more information.

NEURAL INHIBITOR (TL10+)

This flat disk (two inches in diameter) with adhesive bonding material on one side, when applied to a living being with an approximately Terran-like nervous system, cuts off nerve impulses. Effects depend on where it is placed. If a neural inhibitor were attached to a person's forearm, his hand would be paralyzed, but he would feel no pain from a hand or forearm injury, and surgery could be performed without anesthesia. If one were placed near the neck over the spinal cord, he would be paralyzed from the neck down. They are usually available only to licensed medics, but are fairly common on the black market, and often used for other than medical purposes. Used as an electronic anesthetic, it adds +1 to First Aid. It runs for 24 hours on a pair of A cells, costs $200 and weighs ¼ pound.
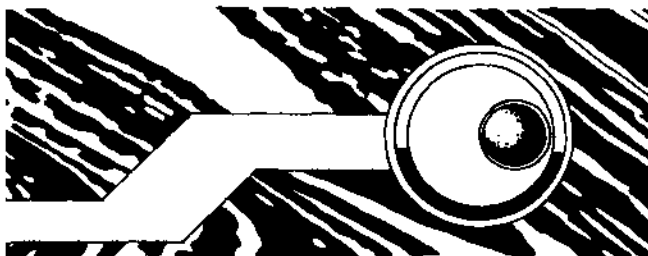
SMART BANDAGE (TL10+)

This is a device about the size of a paperback book. It is used for first aid for physical injuries if a skilled medic is unavailable; it can even be used by a badly injured man (just attach it, and then pass out!). It is placed onto the patient next to the wound, and clamps itself on. It then uses its dedicated computer and short-range scanner to diagnose injuries. If treatment is necessary, it injects a dose of Hypercoagulin into the wound to stop bleeding, followed by Quickheal (healing 1d HT within 10 minutes). While the drugs are taking effect, it extends mini-waldoes and performs First Aid with a skill of 12, removing or cutting away any foreign objects, then spends thirty minutes cleaning and covering the wound with plastiskin, healing a *further* 1d HT on a successful roll (or 1 on a failed roll as a result of bandaging). After it is finished (30 minutes), it signals that it can be removed. If, at any time during the treatment, its sensors indicate that first aid has failed, or that the patient is not responding to treatment, it flashes a signal calling for a human physician.

The bandage has enough plastiskin and drugs to treat five patients. A refill package costs $425 and weighs ½ pound. Cost is $1,200 and weight is four pounds. Higher-tech versions add +1 to skill per TL over 10. Smart bandages are species-specific.

ELECTRONIC ECSTASY (TL11+)

It is possible to build a device that delivers a *continuous* jolt of neural pleasure. An *ecstasy machine* runs off a C cell (or house current) and is worn like a headband. For as long as it is worn, the user is submerged in total pleasure. This is very addictive; after any use of this device, a Will roll is required to avoid addiction, at -1 for every hour it was worn. Ecstasy addiction is cheap, incapacitating, totally addictive, and usually legal. Starting with it is worth -20 points (see p. B30).

Any action taken while wearing the headband is at -4 on skill, DX or IQ (due to the distraction). In order to *want* to do anything (eat, go to sleep, answer the phone, etc.) while wearing it, the user must make a Will-2 roll; failure means he won't bother. Add a +2 to the roll for life-threatening situations (e.g., the house burning down), or +4 for actions to prevent deactivation of the headband. Any attempt to turn off the headband requires a Will-4 roll; failure means no attempt may be made for another hour.

An ecstasy machine costs $500 and runs for six hours on a C cell.

MICROMED (TL11+)

A TL11 portable automedic, it resembles a large suitcase. When placed beneath a patient's head like a pillow and activated, it unfolds, extruding surgical waldoes and diagnostic sensors to treat the patient on its own. Its dedicated computer has First Aid-13, and skill 12 in Physician, Surgery and Diagnosis, and it has a full packet of medical drugs (refill after every five uses at a cost of $1,000), sensa-skin bandages, etc. It weighs 70 pounds and costs $20,000. Each TL after 11 its skills increase by 1.

SENSA-SKIN (TL11+)

Sensa-skin is TL11 artificial tissue. It can be grown or formed into sections that, when applied to a living body, attach themselves and become a part of it. The subject is able to feel through the sensa-skin's surface, as if it were his skin.

Sensa-skin "cultures" can also replace missing portions of flesh for cosmetic purposes. Sensa-skin can grow hair, or simulate skin and flesh, or even chitinous armor, scales, feathers and the like — though such specialties usually cost several times as much as regular sensa-skin.

Once sensa-skin is attached, it will not come off unless a special chemical neutralizer is applied. The same section can be reapplied after the neutralizer has worn off (in an hour). After a sensa-skin patch is left in place for the subject's HT×3 days, it will become part of the body and can only be removed by surgery.

Sensa-skin has revolutionized disguise. Preshaped, molded facial masks and entire body suits of sensa-skin flesh can completely change appearance. A human could actually become an alien with fur, a tail, even claws if grown into the sensa-skin "paw." Or a male could become a female with "real" breasts and so on — or vice versa. Therefore, sensa-skin has become highly valued among the criminal classes, as well as among espionage agents, as a quick, cheap, easy and reversible (unless kept on too long) alternative to bodysculpt.

To apply a section of sensa-skin correctly requires a Surgery or Physician roll at -2. Pre-molded shapes used as disguises may be applied with a successful Disguise roll. There are some dangers in handling sensa-skin. Anyone attempting to apply a section – or even just picking one up – must make a DX roll to avoid attaching it to his own flesh, unless he is completely covered (no bare flesh at all). If he fails, it instantly attaches itself. Fortunately, it takes no skill to apply the neutralizing spray.

Use of a sensa-skin patch in first aid will restore an *additional* 2 points of damage, even if the first aid consists of little more than slapping the patch on (simple bandaging). The only roll required is the DX roll to avoid attaching it in the wrong place.

Cost is $50 per six-inch square of "first-aid" patch (generally available). More specialized forms are usually only available to licensed physicians. A simple face mask (to change appearance, or just increase attractiveness) costs $1,000; a full-body disguise costs $10,000; alterations to sex or species are at least triple this.

Sensa-Skin Neutralizer (TL11+)

This small, spray tube of solution will loosen and remove sensa-skin before it becomes permanently attached (within HT×3 days after application). Each spray will loosen a 3-inch-square patch (or less). Each tube has 10 sprays and costs $150.
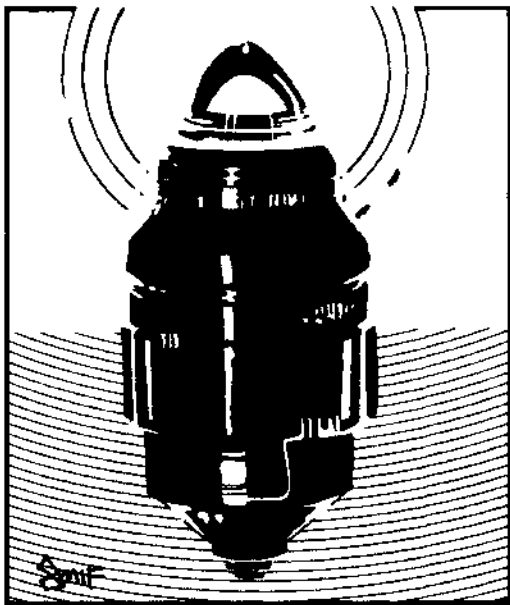
Survival Foam (TL11+)

This survival tool is also commonly used by field medics; see p. 24.

Clone Tanks (TL12+)

TL12 portable clone tanks weigh 150 pounds and cost $10,000; they occupy two cy. A single D cell powers them for up to a year. They allow a clone to be grown (see p. 101).

Regen Ray (TL12+)

See Regeneration, p. 104. A TL12 regen ray costs $60,000, weighs one ton and takes up one cy.

Chrysalis Machine (TL13+)

A *chrysalis* is a large, transparent hemisphere resting on a heavy base, with a control panel on one side. The sphere opens like a camera iris, and the patient (or whatever is left of him) is placed within. The machine spins a life-support web around the patient, completely enfolding him. Each cell is surrounded with microscopic biological repair and support machinery, which takes over control from the patient's own DNA. The chrysalis instructs the cells to begin self-repair procedures, and if necessary, takes apart the patient cell by cell and rebuilds him in accordance with its own programming.

A chrysalis can heal almost any wound. Normal lost HT is restored at 1 HT per hour. Crippled body parts or missing fingers or toes are regenerated in 24 hours; missing organs or limbs regrow within a week. This is slower than a regeneration field, but much safer! On a successful Physician-2 roll, the time can be halved (12 hours, or three days for a missing limb); failure means it takes the normal time, critical failure may have perilous side effects.

A person who is dead, but has not suffered serious brain injury, can be restored to life. Roll against Physician, -2 for every hour the subject has been dead. Success restores the patient to life; failure by 1 or 2 indicates recovery, with personality intact, but with substantial memory loss (equivalent to *brainwipe;* see p. 102). Failure by 3+ also restores him to life, but as a blank-minded clone, with no memory or personality.

Beyond that threshold, as long as there are some traces of genetic material remaining (the body may be totally crushed or burned, but not disintegrated) the chrysalis can clone the original using genetic reconstruction (see p. 103). The result will be a blank-minded clone unless a braintape is available. A chrysalis costs $150,000 and weighs 1,100 pounds. It takes up three cy.

Braincorder (TL14+)

Resembling a bulky rifle, this is a TL14 device which can make braintapes very quickly, and at a *distance.* This makes them useful for emergency medical teams (cell samples can always be salvaged if *any* body remains, using TL10 genetic reconstruction). But, in conjunction with ghostcomps (see p. 31), braincorders are potent tools of criminals and intelligence agents. They enable the user to steal the minds of others without their knowledge.

Braincorders have a maximum range of 50 yards. It takes 120 seconds to make a braintape, during which time the scanner must be trained on the subject constantly. The subject will be unaware of the scanning, but radscanners can detect it. A skill roll is made against Electronics Operation (Medical)-2. Distort belts (see p. 86) reduce the chance of success by 3, and a braintape cannot be made through a force screen. If the subject is currently using a personality implant, the scan will pick up the active personality (generally the implant) rather than the real one, or possibly a blend of both.

A failure means another try is required; critical failure means that the user has what he thinks is a good tape, but it's actually flawed in some way. The device stores the person's braintape on a standard computer disk – at TL14 a single minidisk can hold up to 1,000 different sets of memories in separate files.

Braincorders use a D cell, which gives 100 recordings. Each unit costs $50,000 and weighs 32 pounds.

WONDER DRUGS

ADDERS (TL8+)

This is a generic name for a group of drugs that temporarily add to ST, DX, IQ, HT or Move; each effect requires a different drug. One "dose" adds 1 point. The effect lasts a few hours; when it wears off, the affected attribute suffers a penalty equal to the original bonus but lasting twice as long.

To obtain the effect desired, a user must make a HT roll at -1 for every dose taken. If the roll is successful, the attribute is raised by the number of doses taken, for a number of hours equal to the amount by which the HT roll was made (one hour if HT is rolled exactly). If the roll fails, the attribute is raised by only 1 for one hour, regardless of the dose, but the attribute decrease after the hour is up will be as if the entire dosage had been effective. On a critical failure the drug *decreases* the attribute by the amount of doses taken, for one hour.

Once an Adder has been taken, no different type can be taken until the effects of the first wear off (or wholly unpredictable side effects may occur!) If more of the same Adder is taken within a 24-hour period, a new HT roll is made, at the penalty that would have been required if all those doses had been taken at once. The good effects, if any, are only those of the new dose, but the letdown period is extended as though all the drug had been taken at the time of the latest dose.

Adder users often feel very good under the effects of the drug – similar to the Overconfident disadvantage – and are at least mildly depressed after it wears off. Some black-market Adders, especially DX Adders, are addictive.

In most societies Adders are only available legally to doctors. They are abundant on the black market, especially around athletes, and are issued routinely to members of military and mercenary organizations. They come in pill form (takes 30 minutes to work) at $25/dose or hypo form (works immediately) at $50/dose. (These are legal prices; Streetwise, Merchant or Fast-Talk will determine the price in an illegal buy.)
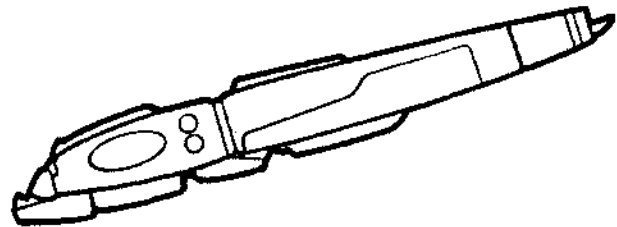
CREDILINE (TL8+)

This drug makes the user more likely to believe anything he is told. While the drug is in effect, the user's IQ is at -1, and he suffers from the equivalent of the Gullibility disadvantage (p. B33). The effects last for one hour, minus five minutes for each point the user made his HT roll by. Extra doses extend the duration by five minutes each.

While Crediline is in effect, the user feels very happy; everything around him makes sense, and everyone is a trusted friend. After the drug wears off, the user must roll against HT+4, at a -1 per additional dose taken, or suffer from paranoia, for one hour per dose taken.

The drug is usually unavailable to anyone except psychiatric doctors, who can utilize it in therapy. It is available on the black market, and police and intelligence agencies sometimes use it; it is also fairly effective as a truth drug (+4 to Interrogation skill). It comes in pill form (takes five minutes to work) or in hypo form (works in 30 seconds), both at $100/dose.

HYPERCOAGULIN (TL8+)

When injected into a patient with a bleeding wound, this causes instant coagulation and a cessation of bleeding within 1d+4 seconds. It restores 1 point of HT, and prevents any further damage from loss of blood. The drug should be injected as close to the wound as possible. An injection prior to sustaining a wound will have no effect unless a wound is received within five minutes after the injection.

Overdoses of this drug can kill; for every additional dose within a 24-hour period, roll HT, minus the total number of doses taken. A failed roll means the patient's blood becomes so thick that his heart stops. Full medical facilities (a full blood replacement and possibly a heart transplant) will be required to save his life. Hypercoagulin comes only in injectable form; it costs $25/dose. Hypercoagulin is a useful assassination tool in societies at TL7 and below. Death is by heart attack, and the only wound is a tiny pin hole. The drug is undetectable (". . . a poison unknown to science . . .") below TL8.

MORPHAZINE (TL8+)

This drug puts the patient into dreamless sleep for 3d hours. It can be taken in tablet form or injected. Taking more than one dose increases the sleep period by 1d hours; taking more than six doses requires a HT roll to avoid coma and death. Morphazine is commonly available as a reliable, powerful sleeping pill, though often only through prescription. Injected, it works in one second. A HT-4 roll is required to avoid its effects; failure means losing 1d fatigue. Cost is $10 per dose.

NEUROVINE (TL8+)

This is an antidote for nerve poison. If taken within 15 minutes of poisoning, a Neurovine injection adds +3 to HT on rolls to avoid taking further damage. Note that Neurovine is itself dangerous; taking more than one dose in a day does 3d damage if a HT-2 roll is failed, 1d if the roll is successful. Cost is $30 per dose; it is only available as an injection. Military units issue Neurovine as part of every soldier's first-aid kit.

RAGE (TL8+)

A dose of this drug gives the user *double* ST and the Berserk disadvantage (see p. B31) for 1d×10 minutes. The drug requires ten seconds to take effect. After it wears off the user will be shaky and nervous; -1 on IQ and DX for as long as he was on Rage.

Cumulative doses may extend the effect's duration and will also extend the duration of the side effects. Rage has one other disadvantage: 1d hours after use, the user must roll vs. HT+2 or suffer a "flashback" to the drug effects, becoming berserk for 1d minutes (but without doubled ST!) and then suffering nerves and shakiness.

Rage is sometimes used by licensed physicians for psychotherapy; otherwise it is only found on the black market. It is injectable only, at $40/dose.

REVIVE CAPSULES (TL8+)

These are small, easily breakable capsules. When held under the nose of a stunned or unconscious character and snapped open, the vapor inside will usually revive him completely (roll against HT+5 to regain consciousness, come out of stun, etc). No HT is regained, but the patient is awake. Revive capsules are widely available to the general public and can be purchased freely in drug stores in all but the most repressive societies. Cost is $5/dose.

Note for lower-tech GMs: As early as TL5, "smelling salts" were used. At TL6, ammonia-inhalant capsules are found in first-aid kits. Either will "revive" the patient, with a roll against HT.

SUPERSTIM (TL8+)

This drug instantly restores 1d of Fatigue loss. Roll vs. HT; the Fatigue is banished for hours equal to the amount the HT roll was made by (at least one). The only side effect is that when the time is up, the user gets all that Fatigue back, plus 2 more.

For each dose taken within 24 hours after the first, the HT roll is at -1. If Fatigue goes past 0, the extra points of Fatigue lost are taken as lost HT instead. There are no other side effects. The drug is widely available. Pills (taking effect in 30 minutes) cost $25/dose. Hypos (work immediately) cost $50 per dose.

ANALGINE (TL9+)

Also called Painaway, this drug masks pain totally for a period equal to half the user's HT in hours. Any penalties normally inflicted by extreme pain are ignored totally. A Painaway user does not roll for stun or other damage effects until his HT reaches 0, nor does he take any penalties to hit from combat wounds – he just doesn't feel the injury at all. Because of this, he may take more damage than he realizes, and suffer more in the long term. The GM rolls secretly for damage taken by the user, and doesn't tell the player what happens until his character falls over or takes time to examine his wounds.

Additionally, the user's IQ (and all related skills) are lowered by 1 point until the drug wears off.

Once the Painaway wears off, the user will feel the pain of his wounds. Further doses will keep the pain away, but each extra dose lasts one hour less than the first until it is no longer effective. Then at least 24 hours must pass before a dose can be effective. More than one dose at a time has no effect, except lowering IQ by an additional point per dose.

Unfortunately, Analgine is addictive. If more than three doses are taken in a 24-hour period, the user must roll against HT to avoid addiction. Roll again for each later dose taken within 24 hours of the *last* dose, until use stops. If addicted, the user needs a daily dose to avoid normal withdrawal symptoms (p. B30). There are no other side effects, except that a "gine-head" is likely to hurt himself and not notice! Starting with Analgine addiction is a 15-point disadvantage. Analgine powder can be smoked or skin-popped; it is often cut with other drugs, neutral substances or any garbage the pusher has to hand. Analgine is available as pill or injection at $50/dose.

ANTIRAD (TL9+)

This medication contains a number of different drugs, with the combined effect of partial protection against radiation. Antirad can be taken before radiation exposure (up to a week

before), or within an hour after exposure. One dose halves the effective amount of rads from a new exposure; two doses will halve exposure again, and so on. See *GURPS Space*, pp. 76-77, for radiation damage.

An antirad user must roll vs. (HT+3), *minus* the number of doses taken within the past week. A failure causes the permanent loss of 1 DX.

Antirad does not heal radiation damage, it prevents it. It comes in injectable and pill form for $150/dose.

ASCEPALINE (TL9+)

This drug instantly – but temporarily – restores HT to its full level, no matter how much damage the victim has taken (as long as he's still conscious when he takes the drug). The user must make a HT roll. The amount by which he makes his roll plus two hours is how long he'll remain temporarily healed (minimum two hours). However, while under the influence of the drug, both ST and DX are at -2 (IQ is unaffected).

If he misses the HT roll, the drug will still work for two hours, but he'll be at -4 to ST and DX; if it's a critical failure, the drug will actually do real damage equal to half the amount he's already lost.

When the drug wears off, the user's HT will drop to what it was when he took the drug, plus any additional damage taken, plus 1 point from the drug itself. Further doses cannot be taken until after the patient has healed naturally or through other means. It comes in hypo form only at $150/dose. (Ascepaline does *not* attach severed limbs or regenerate nerve tissue, it just gives the user back all his hit points.)

GRAVANOL (TL9+)

This drug makes it possible for the user to function under increased gravity. A dose of Gravanol lasts a week, and eliminates any medical hazards of two G-increments of extra gravity. Thus, normal Earth-humans using Gravanol can safely take up to 1.59 Gs with no HT effect. (See p. S71 for effects of increased gravity.) Extra doses don't give extra tolerance.

Unfortunately, Gravanol is highly addictive. Roll vs. HT after every full week of use, with a cumulative -1 per successive week after the first. Any failed roll means addiction (see p. B30). Since it is legal, highly addictive and fairly cheap, *starting* with a Gravanol addiction is a 5-point disadvantage. A Gravanol addict needs a dose only weekly, not daily.

Gravanol comes in pill form only, at $70 per dose.

QUICKHEAL (TL9+)

A dose of this drug will heal 1d of any type of wound damage. This takes ten minutes for the drug in hypo form or one hour for a pill. The patient must also have received first aid, or at least bandaging; Quickheal won't close a gaping wound! It has no effect on HT lost to radiation, disease or poison.

If a second dose is taken within 24 hours, it may be less effective. The patient must roll vs. HT, with a -2 modifier per dose after the first in the same 24-hour period. If the roll is missed, the drug has no beneficial effect, and the patient will become nauseated and disoriented, with a -1 to both DX and IQ for 24 hours. On a critical failure, he'll take 1d of damage.

Quickheal can be found in most first-aid and medical pouches. It may be purchased legally by anyone on free worlds, and by doctors or through prescription on most others. It is abundant on the black market even on worlds where it is for some reason illegal. Injectable Quickheal is $50/dose; pills are $20/dose.

SOOTHE (TL9+)

Soothe tranquilizes the user. He is -2 to DX and IQ (and -1 to Move), and in a docile, dreamy state of euphoria, in which he has no interest in what is going on around him, for 3d minutes. A person unwillingly exposed to Soothe gets a HT-3 roll to avoid the effects; add bonuses for Strong Will.

Any pain or injury suffered while under the drug may counteract the drug's influence. Make a roll against HT, at +1 per point of damage taken, to see if the drug is counteracted. If so, the character will still have the DX and IQ penalties, but will be alert (if somewhat disoriented) and under his own control.

A side effect of Soothe is that the user has no memory of any events that occur while under the influence of the drug. Soothe is not addictive. Taking multiple doses extends the duration of the effects by 1d minutes per extra dose, but if more than four doses are taken in a 24-hour period, roll against HT (for each extra dose) to avoid permanent loss of 1 IQ.

Pill or injectable Soothe is $15/dose.

SUSPEND (TL9+)

Suspend slows down all biological functions. Thus, it can keep a badly injured person alive longer. If it is injected into a dying person, it will retard cell death (but it *must* be injected before the heart stops!). A person injected with Suspend (even if he died after the injection) can be treated or frozen. He won't heal at all while on the drug, but he won't get any worse either.

Suspend takes effect in one minute; its effects last 48 hours, after which the metabolism returns to normal and deterioration of the body begins again. Each subsequent dose requires a HT roll. When a roll is failed, that dose is ineffective; Suspend will not work on that person for (30-HT) days. Injecting more than one dose at a time has no additional effect.

Suspend comes only in injectable form and costs $650/dose.

ANTI-AGATHICS (TL10+)

Anti-agathic drugs slow down the aging process. Each dose effectively stops aging for one year. (Actual aging is at a rate of about one week per year.) Unfortunately, once an individual stops taking the drugs, he must make up all the aging rolls he skipped, at a rate of one roll per week. Thus, he rapidly ages to his actual chronological age, which often results in death.

A dose of anti-agathics is actually a set of two injections and six pills, all of which must be taken within a day's time. Some societies reserve anti-agathics for leaders, key scientists, and so on. In others, they are available to anyone who can pay the price: $25,000 per dose. Black-market anti-agathics are cheaper, but may be less effective or have side effects.

GENERICILLIN (TL10+)

This is a very powerful, general-purpose antibiotic. It doesn't treat all diseases, but it's always a good thing to try. When an unfamiliar disease is encountered, Genericillin adds 1d-1 to the effective HT of anyone rolling to resist or shake off the disease, taking effect in half an hour. When a new disease is discovered, record the bonus Genericillin provides to HT, which remains constant for every user against that specific disease. It adds 4 to HT against most Terran diseases.

Cumulative doses have no side effects, except that after a few weeks of regular use, the whites of the eyes become slightly greenish. A dose remains active in the body for about a week.

This is guaranteed to be useful for Terrans only; it is poisonous to most alien species (though some may have equivalent antibiotics). Available only to licensed physicians and medics, except when purchased in emergency medkits. It is injectable only, at $100/dose.

MEMORY-BETA (TL10+)

Memory-Beta stimulates the user's memory. After taking a dose of the drug, he can remember – with perfect clarity – nearly anything that has happened to him that he concentrates on recalling. Under Memory-Beta, recalling the entire text of a specific book is easy; but if that book was read thirty years ago and then forgotten, the user must at least be told the book's title (or be reminded of something else he was doing at the time). An IQ roll is required to focus on something specific, and some stimulus is usually required to recall completely buried memories. Without guidance, the user will be lost in his own memories, reliving bits and pieces of his life.

The drug's effects last 2d hours; it may require hours of sifting through memories to find the one the character is looking for, but when the memory does return, it is of crystal clarity. Make an IQ roll every half-hour to recall something, with modifiers depending on how obscure or significant that memory was; recent memories get a +3, while long-forgotten trivia is at -3 or worse.

The danger of using Memory-Beta lies in becoming lost in memories. Failing a memory roll indicates the user has become lost in a daze of random recollections (roll vs. IQ every five minutes to recover). A critical failure on a memory roll results in the character being captured by some especially strong memory, whether of joy, tragedy, terror or even birth – and triggering buried phobias or other psychological traumas. Effects will vary depending on the individual's quirks and mental disadvantages: psychosis, hysterical weeping, or anger are all possibilities. Even if *not seeking after specific memories*, an IQ roll is still required every half hour; failure and critical failure have the same effects as above.

Taking more than one dose increases the duration of the drug by one hour per extra dose, but gives a -1 on all IQ rolls to control the experience.

Memory-Beta was originally developed as a treatment for some forms of amnesia. The black market has found other uses

for it; students buy it to use during exams, and actors take it to recall their lines. Criminal, military and intelligence organizations also use it; the drug makes debriefings go more smoothly, and when injected into a subject along with Crediline or some other "truth serum," it greatly facilitates interrogations (additional +3 to skill)—the subject remembers things in enough detail to satisfy the most methodical interrogator.

Memory-Beta comes in pill form (taking effect in thirty minutes) or hypo form (takes effect instantly); cost in either form is $250 per dose.

PURGE (TL10*)

Purge cleanses the user's system of foreign biochemicals, neutralizing any active drugs (including recreational drugs and alcohol) within 2d minutes – if the user makes a HT roll. Failure means that the dose had no effect (though additional doses of Purge may); critical failure also nauseates the user (-3 DX for 1 hour).

If more than one dose of Purge is taken within 24 hours, HT rolls are at -2 per extra dose, as the user's system becomes temporarily immune to the drug.

The drug will *not* counteract drug addiction or cure lasting side effects (such as lost attribute points) that remain after the drug wears off. Purge has no effect on TL11+ drugs or most deadly poisons, but it will counteract sleep or paralysis gas.

Purge is safe, usually legal, and is sometimes used as a "sobriety pill" by those who can afford it. It is $20/dose in pill or injectable form.

SHAKER (TL10*)

Shaker is a slang name for CHKR-57, an experimental neurotransmitter enhancer developed as part of a project to produce a safe and effective enhancement drug for combat that was cheaper to produce than Tempo (see below). They were almost successful: Shaker is cheap and effective, but it isn't safe . . .

After a dose is taken, there is no effect for a number of seconds equal to the user's HT. Then, every 15 seconds over the next minute, increase HT, ST and DX by 1 point and decrease IQ by 1 point. The user will feel fine, even supercharged, barely aware of the fact he can't perform addition any more. He gains the Overconfidence disadvantage (people who already suffer from Overconfidence gain the On The Edge disadvantage) and does not feel pain (treat as High Pain Threshold).

Troops on Shaker can be given an order before the drug is taken (or, on an IQ roll, give themselves an order). The order should be simple, twenty words or less ("keep walking north and kill any enemies you see"). To do anything else (such as dodging or taking cover) not specifically covered by the order requires an IQ roll – at the user's current IQ.

Shaker lasts for 20-HT hours (minimum one hour). Other than turning its user into a gung-ho idiot for several hours, Shaker has no side effects. Additional doses within 24 hours have no effect.

A dose of Shaker costs $20 to produce, and is only available to authorized military personnel; black-market prices can go as high as $100. It is injectable only. Shaker and Tempo can be combined.

TEMPO (TL10*)

Tempo is a reliable and reasonably safe combat drug. It works by altering the user's time sense, so that everything around him (including both his own actions and those of others) seem to be happening extremely slowly. Since the user's mind is left clear, this gives him time to react to other people's movements—he can see a blow coming, for example, and think about the best way to block it, or predict the course of his target.

Tempo's main effect is to give the user Combat Reflexes (p. B30) – he gets +1 on Active Defenses, Fast-Draw skill, and initiative, +2 on Fright Checks, and +6 on IQ to recover from surprise or mental stunning. If the user already has Combat Reflexes, the bonus is doubled! The drug's effects last for one minute times the amount the user makes a HT+2 roll by (minimum one minute). The only side effect is that its use rapidly exhausts the user, leaving him a nervous wreck. After the drug wears off, the user takes 1d of Fatigue and loses 1 point of IQ and DX; DX and IQ losses wear off in four hours if no further doses were taken by then. Additional doses of Tempo have no effect until the drug wears off, except to increase the amount of Fatigue lost.

Tempo is usually restricted to the military, but can sometimes be found on the black market. It costs $40/dose, in injectable form only. Tempo takes ten seconds to take effect.

TORPINE (TL10*)

Torpine puts the user into a healing trance; he becomes unconscious for 24 hours. At the end of that time, all damage taken is totally healed. However, the user comes out of the trance totally exhausted from the demands placed on his system: his ST is at 1. He will also be famished and must eat as soon as possible to fully regain ST. Superstim will *not* restore this loss but can be used in an emergency to break the healing trance. If this is done, the amount of HT regained is proportional to the time spent in the trance, but ST is still 1.

Because Torpine speeds up the metabolism, each use is likely to add to the user's effective age. Roll vs. HT on coming out of the trance. On a critical success, the user doesn't age. On a success, he ages by a month. On a failure, he ages by a number of months equal to the amount by which the roll was missed. A critical failure ages him by two years!

Torpine is normally only issued to doctors (though it is available on the black market). It comes only in injectable form and costs $250/dose.

BIOTECHNOLOGICAL & MEDICAL TECHNIQUES

BODYSCULPT (TL8+)

TL8 surgical techniques – usually known as bodysculpt – can reliably and safely alter personal appearance. A minor but significant change (an acquaintance would have to make an IQ roll to recognize the subject) costs $500. A change that makes the subject unrecognizable costs $5,000. Duplicating another person costs $25,000. (In some jurisdictions, personal appearance is copyright protected. Infringement cases can be entertaining.)

Improving Appearance costs $1,000 to be Attractive, $5,000 to be Beautiful or $25,000 to be Very Beautiful.

Reducing Appearance is also possible – for $500 Appearance can be reduced to any level. (Duplicating a specific, uglier person still costs $25,000.) This simply reduces character point value; the character does not get any points back for the new disadvantage!

The Fat, Skinny and Overweight disadvantages can also be corrected (Fat is reduced to Overweight) at a cost of $5,000. Depending on the extensiveness of the modification, bodysculpting could require from an hour to a week. GMs have the final say: a rough guide is one full day of surgery and recovery time for each $1,000 expended.

Optionally, the GM may require PCs to pay character points equal to the difference in point cost between present Appearance and new Appearance if bodysculpt is used to increase attractiveness, or pay the points to buy off the disadvantage for surgical modifications to weight. There should never be any character point cost to simply alter one's body or face without changing Appearance, or to be made *less* attractive.

At a cost of $20,000+, bodysculpt can create strange features. While not functional, cosmetic "alien" features such as antennae, fur and blue skin are all possible.

BRAIN TRANSPLANTS (TL8+)

The ultimate transplant, feasible at TL8, is to put an old brain and spinal cord in a whole new body. The operation will always cost at least $50,000 and take two months of recovery. It can only be performed at a major hospital, and – at TL8 – only at certain experimental facilities. Since brain cells don't regenerate, this isn't immortality . . . but it can extend the life span.

The GM should "set the clock back" on any attributes lost to age, restoring them to the level appropriate for that person at his new age: optionally, the GM may charge him the character points for the improvement, just as though improved stats were being bought normally.

Keep separate track of the brain's age (which will control rolls for IQ loss due to aging) and the body's age (which control aging losses of ST, DX and HT).

CLONING (TL8+)

Cloning is a technique by which an identical body can be grown from an individual's cells. There are no rejection problems for an organ or limb transplant from a clone, so any lost limb, or even an eye, can be replaced.

At TL8, cloning facilities are only available at major hospitals. It takes six weeks to force-grow a clone. Typical cost to grow a single limb, eye or organ is $5,000. A whole clone body can be grown for $10,000, and kept as a source of spare parts. However, it costs a further $1,000 a month to maintain it. The actual transplant operation might cost another $10,000 per part replaced. Two months bed rest will then be required while nerves knit (reduce this by one week per TL over 8, minimum one day).

The GM may choose to require a character who starts with a physical disadvantage, such as a missing eye or limb, to buy off that disadvantage if the limb is to be replaced. If the damage was genetic (a birth defect) it may not be possible to clone the missing part, as the clone would share the disability.

Citizen Clone

A new clone body is physically mature (seeming about 25 years old, or the character's current age, whichever is less) but mentally blank. Thus, few see anything wrong with using a clone body as a source of transplants. However, it is also possible to educate a clone and bring him or her into society. In some societies, such clones are given minimal training and used as servants and workers. In others, cloning is simply another way to produce offspring. In this case, though, the newly-created clone is forced to the level of maturity that the parents want, from baby to adult.

Clone Families

Societies that embrace cloning may produce "clone families." Such families may consist of any number of genetically identical individuals. They might all be of the same age or might be like a real family, of all ages. Simple genetic alteration could let some be male and some female – but otherwise, they would look alike. Depending on how closely related the GM decides personality is to genetics, members of such a group could cooperate very well. A ship's crew, or the population of a whole town, could be formed of clones, trained in different specialties. A clone family might act as a Patron to its members.

Social Hazards of Cloning

Some societies may be threatened by unregulated cloning. Some possibilities include:

♦ The rich cloning themselves repeatedly, out of vanity.

♦ Use and abuse of clones (of very attractive or famous people) as pleasure-slaves or living toys.

♦ Use of a clone body to "prove" that a criminal is dead while he continues his career under another name.

♦ Governments might try to produce super armies by cloning their most capable, loyal soldiers — especially if braintaping (TL9) is also possible.

To forestall such possibilities, many governments regulate cloning. Unauthorized cloning of an individual is almost always

illegal (even if only a copyright violation). Clones may or may not have civil rights, and these rights may depend on the original intent of the clone's creator.

Clone rights and clone defense organizations vary from button-down lawyers to bomb-heaving terrorists; adventurers may have to deal with either type of group.

BRAINTAPING (TL9+)

This technology allows an individual's mind to be read mechanically, and "played back" into a blank-mind clone. This costs $5,000 and takes one hour at a major hospital. The clone is no longer mindless (see *Cloning*, above); it is a mental duplicate of the original person. In some situations, there may be a need to duplicate people - one or many times. But the usual reason for braintaping is to have a "backup," so that if the original is killed, the clone takes his place.

There are two ways to transfer memories:

The first method is direct programming. The original visits a clone storage facility and programs his clone with his memories, taking one hour. This may be repeated as often as desired, at $2,000 a visit. See *Cloning*, above, for the cost of cloning a body and keeping it in storage. If not reprogrammed within a month, the clone's mind goes blank.

It is also possible to program a clone with the memories of a recently dead person (thus retaining all memories up to the moment of death, rather than the last visit to the clone). This must be done within 24 hours. Use of the Suspend drug (see p. 99) will buy an extra two days; freezing the body will let it keep for ten days (not cumulative with Suspend). The body must be reasonably intact. HT must be no worse than -5×HT, and the brain can be neither smashed nor missing. It must have no more than 5,000 rads of radiation damage (plus 1,000 rads per TL over 9 – higher doses scramble nerve tissue beyond that TL's ability to read). The patient remembers his death, and must succeed at a Will roll or acquire an appropriate new Phobia (see p. B35) from the experience.

The second method, safer but more expensive, is to store memories mechanically. This is called a "braintape." TL9 braintapes are stored in a Mechanical Memory Storage Device, or MMSD. This takes up two cubic yards and weighs 800 pounds. It stores one person's braintape. TL10+ techniques store all a person's memories indefinitely on a "mere" 100 gigabytes of computer memory (on a standard computer disk, for instance). While an MMSD or disk can be put anywhere, updating it requires special equipment and costs $25,000 per update (which takes two hours); the advantage is that no clone need be kept in storage (just keep some cell samples frozen), and multiple copies can be made as safeguards.

Once a clone has been awakened and has had experiences of his own, programming him with new memories, by either method, will drive him mad.

Game Effects of Braintaping

If a clone is activated from direct memory transfer or a braintape, it has the memories and skills of the original when his memories were last transferred. The apparent age is usually about 25 years, but any age may be requested; adjust stats as described for *Brain Transplants* (see p. 101). The newly-awakened clone has DX-6 and IQ-2, as the mind adapts to its brand-new body. Make a HT roll each week; success regains 1 point of each; a critical failure is a temporary setback that loses 1 point of each.

At the GM's option, TL10 technology may allow a braintape to be played into a blank-mind clone of *someone else*. This leads to fascinating and horrible possibilities. If a braintape of someone is played into a blank-mind clone body not his own, use the braintape's IQ, skills, mental advantages and disadvantages, but the ST, DX, HT and physical advantages and disadvantages of the clone body. Adjust all skills to conform to the new DX of the body, and adjust IQ by any species modifiers.

For instance, if a human mind was played into a cat (IQ 5), the human would suffer -5 on IQ. Recalculate character point totals based on the new values.

If multiple copies of a person exist at once, the GM should probably only allow the player to control one, unless he is prepared to run a very strange campaign!

Campaign Effects of Braintaping

When a clone is "activated" after the legally-proven death of the original, most societies consider the clone to legally *be* that person, with all his rights and property. Most societies pass laws to restrict multiple copies of living people, though some allow it (creating a "clone family" effect). To maintain control, some societies build braintapes so that copying them automatically erases the first tape and pass laws to prevent multiple copies being made of living individuals. Braintape recording and clone growth will be strictly supervised by such governments, though bootleg labs will exist.

But what does braintaping mean to adventurers?

First and foremost, they can *never* be sure that someone is permanently dead. Cell samples can be frozen; braintapes are easy to hide. Even if a foe is legally dead, and no longer has access to his money or property, he can return to haunt them. As a result, assassins and kidnappers would be sure to attempt to destroy or steal braintapes as well – maybe even first. This also applies to the PCs themselves; if they have enemies, it is quite possible they will try to determine the location of any of their braintapes before going after them. And if a government sentences someone to death or prison, they will be sure to try to track down all his braintapes, so his friends or followers don't revive him.

One problem with braintaping is it diminishes fear of death. Braintaping works best as a plot device and "last resort" way of saving characters, and, at $25,000 per update, a good way of using up character's funds. GMs should discourage players with braintaped characters from casually committing suicide rather than facing tricky situations such as being imprisoned. One way is to point out that the people back home may not know he is dead and so never revive him. Of course, instructions could be left to have a copy made after the PC is missing for several years, but his enemies or an accident might destroy the tapes before the character could be revived, or the character may not be dead at all! A PC might return after being shipwrecked on a low-tech planet for five years, only to find that his instructions have been followed and he has been presumed dead and a copy made – and his new self has spent all his fortune, remarried or blackened his good name.

PANIMMUNITY (TL9+)

Panimmunity injections are artificial organisms, tailor-made for each individual. They recognize friendly cells, and attack others. Panimmunity is permanent. The better the bioengineering techniques of the society, the more thorough it can be:

Level 1 Panimmunity (TL9+)

This is available at TL9. It gives +3 to HT to resist any disease at a cost of $1,000.

Level 2 Panimmunity (TL10+)

Available at TL 10, Level 2 panimmunity gives +8 HT to resist *any* disease. If it is not universal, cost is $5,000 (and, optionally, 5 character points). Most citizens in TL12 societies receive Level 2 panimmunity free as children through government or corporate health-benefit plans.

Level 3 (Total) Panimmunity (TL12+)

At TL12+, full Level 3 panimmunity treatments are also available, which give the recipient the equivalent of the Immunity to Disease advantage, with no minimum HT required. It costs $20,000 – though it might be free to members of the Survey Service. However, GMs *may* require that the advantage be paid for with 10 character points.

SUSPENDED ANIMATION (TL9+)

Another way of cheating death – or at least postponing it – is suspended animation, or *freeze*. Anyone in suspended animation ceases to age or deteriorate – even if he is clinically dead. In this way, an injured or dying person can be preserved, perhaps long enough to reach a medical facility with the means to cure him. If the means have not been invented, and he (or his heirs) can afford it, his body can be placed in storage in hope that a cure will become available later. If cloning and memory transfer is feasible, a freeze tube will keep the body "on hold" until a clone can be prepared. An occupant will not deteriorate until 1d hours after removal. The other use of freeze tubes is for slower-than-light starships.

Putting someone into freeze or taking him out takes one hour. Freeze tubes use a combination of deep-freeze and drugs to preserve the occupant, as long as the power remains on (a freeze tube can run on an E cell for six months in a room of normal temperature). No other maintenance is needed.

Freeze tube storage costs $250/day for short periods, or $50,000 annually; discounts of 10% to 60% off the annual fee are available for long-term storage of 50 years or more. This price includes a very safe, well-guarded storage space. A freeze tube, with dedicated monitoring computer, costs $55,000. Weight is 750 pounds and volume is two cy.

BRAINWIPE (TL10+)

This is a medical procedure, used by governments to punish criminals or dissidents, and by intelligence agencies to erase sensitive information (and everything else) from the minds of those who *know too much*. Brainwipe causes classic amnesia, erasing *all* memories of the subject's personal life. It leaves personality and abilities intact. After brainwipe, a victim's skills and mental disadvantages remain unchanged (with the obvious exception of Dependents and Duties); he can function in society, but can't remember his name, or anything from his past, even when confronted with the evidence.

The one way to reverse a brainwipe is to use braintaping techniques to restore the lost memories; *Memory-Beta* (see p. 99) is ineffective. If a braintape made before the brainwipe is not available, brainwipe is permanent. However, the GM may decide that in rare cases, knowledge may gradually return (perhaps because of a head injury or sudden psychic shock). If a player and GM agree, someone could even begin the campaign suffering brainwipe, and be searching for his past, perhaps pursued by or pursuing the sinister individuals or organization who were responsible.

Brainwipe requires bulky and expensive equipment ($50,000, 500 pounds, 1 cy) which is usually legally available only to government organizations and some multistellar corporations. Unconnected adventurers are unlikely to have access to brainwipe, but may well be threatened with it! The actual procedure takes one hour and requires Electronics Operation/TL10 (Medical) skill to perform. If a roll is failed, or the subject is removed from the machine part way through the process, the effects will be temporary or partial.

Brainburn (TL10+)

Brainburn is a more extreme form of brainwipe. It is considered the equivalent of capital punishment in most legal systems, and the victim is civilly dead. Any contracts he has signed, including marriages, partnerships, literary deals and indentures are void. If confiscation of his estate is not part of the punishment, it is distributed to his heirs and he has no legal claim on any of the property. Brainburn erases most personality and all skills, leaving the subject's mind a blank slate.

In reasonably benevolent societies, brainburn is reserved for truly heinous crimes (which might range from mass murder to picking flowers, depending on local mores). In repressive regimes it is an effective punishment for dissenters. The thought of losing a lifetime's experience, education and philosophical growth, but still being alive, is a greater deterrent to intellectuals than torture or death. Brainburn cases also make good drone workers for the slave mines. Criminal organizations are also fond of brainburn. Godfathers relish the sight of traitors and ambitious *capos* reduced to bewildered menials without skills, memories or personality.

The brainburn process always causes some neurological damage. DX and IQ are reduced by 1 to 3 points (roll 1d and halve, rounding up), and disadvantages such as Epilepsy are likely. However, in a very few cases (such as when brainburn is used on PCs!) a brainburn doesn't quite take. The character suffers the IQ and DX loss and mental disadvantages, but regains his personality and skills in 2d weeks.

This leaves a less-competent person, probably in the hands of very unsympathetic enemies and with the legal status of a walking corpse. It can be the beginning of a very difficult adventure.

GENETIC RECONSTRUCTION (TL10+)

This is a scientific technique in which traces of genetic information – even DNA fragments found in ancient fossils – are cloned cell by cell, with computer synthesis used to fill in the gaps left by damaged or missing material. Eventually, enough genetic material is available that an entire clone can be grown.

Long-dead species, such as mammoths, dinosaurs or even a vanished race of aliens, could be reconstructed from fossil evidence. If actual tissue and bone samples are available, the process is far simpler. Forensic investigators could make a genetic map of a decades-old corpse, then check it against their files. If they had no ID records of a person with that genetic pattern, they could call up a holographic computer simulation to determine its original appearance, or even clone the body.

Note that in all cases, a reconstructed clone will have no more mind than a newborn, though there is nothing to prevent a braintape being played into one.

If a scientific lab is hired to perform a genetic reconstruction, the process will usually take from two to six weeks (depending on the difficulty) and cost $5,000 per week. Cost of cloning is extra. If a scientist wants to attempt a reconstruction, the GM determines if there is enough genetic material to make replication possible, and how difficult the reconstruction will be. Reconstruction requires a Replication program (Complexity 6, $40,000) and a successful Genetics roll. Suggested modifiers: -6 for age-old fossils, -3 for fragments of bone, 0 for a recently dead corpse. Roll each week; success indicates the process succeeded and a clone can now be made. A failure requires further work (one week times the amount the roll was failed by). A critical failure indicates a mistake; an attempt to grow a clone will produce a *flawed* copy, or a monster!

REGENERATION (TL12+)

TL12 hospitals use an electric current to stimulate regrowth. This is part of the standard physician's treatment for normal injuries, and is included in the figures given in the *GURPS Basic Set*, p. B128, for TL12+ medical care.

A higher-powered version, the "regeneration field," can even regrow lost limbs and body parts, though there are dangers in this. The patient must roll HT+4 for each treatment, or suffer bizarre side effects. If the HT+4 roll fails, roll again vs. HT. On a critical success of this second roll, the side effect is beneficial (increased abilities, psi powers). On any other

results, the effects will be bad, ranging from mere loss of HT on a success (dormant malignant cells or tumors were stimulated by the field) to uncontrolled growth or development of new body parts on a bad failure. Once an individual has had side effects from the regeneration field, he will have side effects again whenever it is used on him – roll vs. HT to see how severe they are. Note that a botched regeneration actually alters the genetic code of the victim – any clones made from tissue taken after the treatment will have the same defects (or new advantages) as the original. Add +1 to HT roll to avoid side effects for each TL above 12.

Regeneration may not be as safe as simply cloning a limb transplant, but it's *much* faster. Treatments are $5,000 each. Several hour-long (halve for each successive TL) treatments may be necessary, no more than one per day. A finger or toe may be restored with a single treatment; a hand or foot in two, an arm to the elbow or leg to the knee in three, an entire limb in six. Simple organs of sensing such as tongues and noses take two sessions; the more complex organs, hearing or sight, take longer – usually four for an ear and five for an eye. Internal organs usually take four to six sessions; brain damage requires eight. Note that memory loss from brain damage cannot be restored, but IQ-loss (or mental disadvantages) can be cured.

A roll against Physician-2 is required to operate the regen ray. At TL12 this is not a portable unit, and is installed in a sick-bay on a ship or in a hospital. It is very delicate and easily damaged or broken if handled roughly; beware of damaged regen rays. The cost is $60,000, weight is one ton and space is one cy.

BODY MODIFICATIONS

At higher TLs, modifications can be made to the human body itself, effectively improving it as if it were a technology in its own right. At the same time, this allows wealthy, unscrupulous individuals to mold others to suit their purposes, creating super-soldiers, playthings or even slaves. This section covers both organic and electromechanical alterations to the human (or alien) body, as well as advanced techniques that allow the brain or mind to be altered.

BIONICS (TL 8+)

At TL8, missing limbs can be replaced by realistic mechanical ones, *bionics*. Bionic replacements will be less popular if cloned limbs are available, but they'll still exist. At TL8 it takes two months to recover from a transplant, but only a month for a bionic limb, making them more attractive to people who need to get back into action in a hurry. AT TL9, this time is 2 weeks; at TL 10+, 1 week.

Bionic parts weigh about the same as a natural limb or organ and are treated the same unless specified otherwise. Remember, bionic parts are attached to regular flesh. Reckless superhuman feats can damage non-bionic body areas.

Optionally, in addition to the cash cost, the GM may decide that character points must be paid for acquiring these advantages. Character point costs are listed in parentheses, e.g., (costs 15 points) means that the character must pay 15 points for that bionic enhancement.
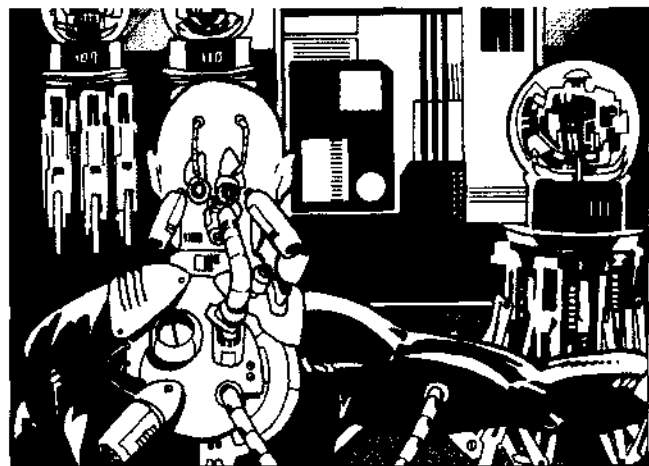
Abilities and Costs of Bionic Parts

All costs for bionic parts and their enhancements assume they are carefully engineered to look and feel identical to a humans (one reason why Night Vision costs so much more than an equivalent set of goggles). A limb or organ (and any enhancements to it, like Night Vision) that can be seen to be artificial up close (requiring an IQ roll) and *feels* artificial to the touch is ½ cost, while for *obviously* artificial replacements (gleaming silver limbs, glowing eyes, etc.), the cost is ¼ normal – an obviously artificial bionic eye would costs $7,000.

Installing Bionic Parts

The operation to attach a part costs $20,000 ($30,000 for an eye), unless stated otherwise for a particular device. This price is halved at TL9, but not reduced any further at higher TLs.

A roll against the lower of Surgery and Electronics (Bionics) is required to attach a bionic part. Bionic eyes are harder - a further -2 to the roll; a full body is -5. Failure has the same effects as any other surgical failure (see p. B56) and may damage or destroy the bionic part. At the GM's option, a critical failure may result in a part that was seemingly properly attached, but will later malfunction catastrophically (under conditions of the GM's choice). At TL8, a month of bed rest is necessary to allow the nerves/electrodes time to mesh. At TL9, this time is two weeks; at TL10+, one week.

Damage to Bionic Parts

All bionic limbs have PD 1, DR 3. It takes two hits to cripple a bionic ear or eye, four to cripple a bionic hand, six to cripple a bionic leg or 15 to disable a full cyborg body (rendering the cyborg unconscious). Damage to bionic parts does *not* produce any stunning effects, bleeding, temporary loss of DX or other "pain" effects. A full cyborg only dies at -75 hits. But bionics won't heal naturally - they must be repaired or replaced.

Repairs to Bionic Parts

Repair costs depend on the amount of damage the part has taken. If a bionic organ or limb has lost half the HT points necessary to cripple it, the cost to repair it will be 25% the cost of the original part. If it has taken exactly enough to cripple it, the cost will be 50%, and so on. However, if the part receives twice the amount of damage needed to cripple it, it is destroyed and cannot be repaired; it must be replaced.

Electronics (Bionics) skill is needed to repair bionic parts. Emergency repairs in the field will not restore lost HT to the parts, but might allow them to function again if crippled. Repairs take at least one minute per skill roll.

Violent Removal of Bionics

To forcibly tear (or hack) a bionic limb from its living owner, roll a Quick Contest of the remover's ST versus (the bionic limb's TL + owner's ST). If the remover is using a method other than his own ST (he is using an exoskeleton's ST, using an industrial shredder, etc.), the GM should give that method a temporary ST rating (if it does not already have one) for the Quick Contest. If there is no struggle involved (i.e., the bionic character is tied down), ignore the Quick Contest.

Roll for damage. If the remover lost the Quick Contest, he does only half the damage rolled (round down). If the remover won the Quick Contest (or there was no Quick Contest), damage is normal.

Reducing the limb to half or less hits than it had before the removal attempt will cripple it - it stays on the character but no longer works. If the limb's hits go to zero or less, it is torn off. Any limb that has been forcibly removed will be damaged - a bionic engineer is needed to return it to working order. Damaged bionics are worth 10% to 60% of their original value, and damaged bionics are only available on the black market.

Yes, removing bionics is hard to do with sheer brute strength; but bionics are built into the body, with direct attachments to bone and muscle - in many cases, bionics are better connected to flesh than the real thing! But remember, if someone really wants to pull a bionic leg off, they'll bring in the heavy equipment . . .

Second-Hand Bionics

Second-hand parts are often available. They'll be cheaper; they may or may not be a bargain, and there may be damage (see above) that is not immediately evident. Because of their value, bionics are never discarded until they are totally destroyed . . . giving the phrase "loot the bodies" a whole new meaning.

Social Effect of Bionics

Those who receive bionic replacements will have to deal with their own differences - and with how others view them. Becoming a machine, in whole or in part, might be considered a Social Stigma in many societies. They could suffer losses in Appearance, depending on the nature and sophistication of their bionics, and receive reaction penalties on a world where Intolerance against robots or cyborgs exists. Of course, bionics are not always hated and feared. If a lot of war veterans have bionic replacements, they could be a mark of distinction: "Yes sir, got that leg after fighting in the Battle of Three Suns, back when I was a sergeant in the High Marines. No, never could afford to replace it with a transplant."

Ear (TL8+)

Standard bionic ears give normal hearing. Improved ears, giving Acute Hearing up to +5, are available. They are $20,000 a pair, plus another $15,000 (and 2 points) a pair for each +1 to hearing. For an additional $30,000 (and 15 points), bionic ears may have ultrafrequency capability, being able to hear a range of subsonics or ultrasonics and function as a short-range radio.

Eye (TL8+)

A bionic eye corrects any weakness of vision, but does not give any bonuses. However, improved eyes, giving vision bonuses of up to +5, are available. Standard eyes are $35,000 each. Improved eyes must be bought in pairs to work properly: $45,000 each for +1 (2 points), $60,000 each for +2 (4 points), $100,000 each for +3 (6 points), $150,000 each for +4 (8 points), $200,000 each for +5 (10 points). Anti-glare eyes cost $5,000 (5 points). Adding light intensification to an eye costs $15,000 (10 points), while infravision is $15,000 (15 points). Such enhancements function as the equivalent type of goggles or contacts (see p. 20). If only one eye has light intensification or infravision, a patch must be worn over the other eye at night, or the conflicting signals will give the user a -2 to any Vision roll.
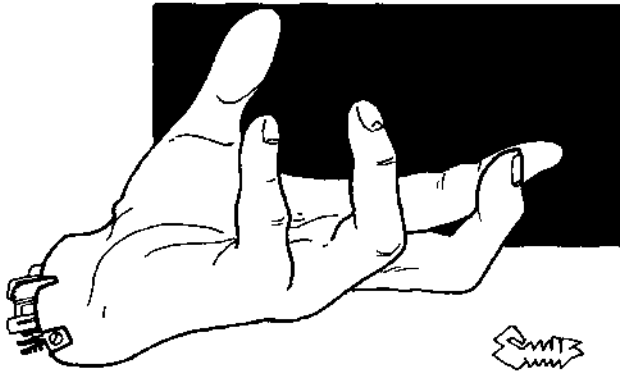
Hand (TL8+)

A bionic hand adds 1 to DX for manual tasks using that hand, and gives ST 12 for gripping and hand-to-hand damage purposes (grappling, strangling or crushing only). It costs $12,000. For ten times the cost, either DX+2 or ST 13 is available; for 50 times the cost, both are available.

The point cost of a bionic hand is 15% the cost of the ST increase and 30% the cost of the DX increase for one hand (relative to body ST and DX), or 25% the cost of the ST increase and 40% the cost of the DX increase for a set of two hands. DX bonuses only apply to actions with that hand; they do not increase Move or Dodge, or athletic activities involving the whole body.

Arm (TL8+)

As for a hand, except that ST of a bionic arm, and the hand on the arm, is 14 and it costs $25,000. For ten times the cost, either DX+2 or ST 15 is available; for 50 times the cost, both are available. Two-handed feats require two bionic arms to gain any increased ST or DX bonus; DX bonuses do not apply to actions involving the entire body, such as Dodge or Move. A bionic hand needn't be bought for a bionic arm, as the arm includes the hand, but the hand can be strengthened separately.

The point cost of a bionic arm is 30% the cost of the ST increase and 60% the cost of the DX increase for one arm (relative to body ST and DX), or 50% the cost of the ST increase and 80% the cost of the DX increase for a set of two arms.

Leg (TL8+)

Each bionic leg increases Move and Jumping distance by 25%, round down. (Kick-off must be from the bionic leg to get the bonus.) It also adds 2 to kicking damage for that leg. Two legs are needed if Dodge is to be increased along with Move. Cost is $25,000. Cost is 10 points per leg.

Bionic Reconstruction (TL8+)

The bones are hardened with plastic or metal laminate, and redundant bionic organs are installed. The person is still mostly flesh, but is harder to kill; he gains five additional hit points, though actual HT remains unchanged, giving him a "split HT" (p. B101). As the character is half-bionic, injuries require special treatment. Use normal rules to determine success of any medical treatment given to a bionically-reconstructed character, but an electronic tool kit must be used in addition to a medical kit, and the *lower* of the medic's regular skill (Physician, First Aid, Surgery, or Diagnosis as appropriate) and Electronics

(Bionics) is used. Any HT rolls to determine the effectiveness of medical drugs are made at -2. Bionic reconstruction costs $50,000 (and, at the GM's option, 25 character points) plus the cost of the operation. Whether it succeeds or fails, the patient will have to undergo two weeks of bed rest to recuperate (one week at TL9+).

Full Cyborg Body (TL8+)

This is a more extreme version of the above. All limbs, eyes and ears must be bionic, and the entire torso and much of the head is now replaced with artificial parts. The person is a total cyborg, only his brain human, without the need to eat, drink, excrete or breathe, but lacking the capability to bear or sire children (though if the full cost is paid for a body that does not look artificial, sexual characteristics are retained). He cannot heal hits without repairs, but is immune to poison and disease, and can survive in a vacuum. Bionic arms gain a 50% increase in ST (or Move, etc. increases by 50% per leg) since they are no longer limited by human frailties. The cyborg has 15 hit points instead of his normal HT (hits to limbs do not reduce these hit points, only those of the limbs), and a torso DR of 3. The modification costs $250,000 (and optionally, 120 character points).

Hidden Compartments (TL8+)

A bionic arm or leg may have a compartment large enough for any small object of under two pounds weight. The compartment costs $1,000 extra and (optionally) 1 point.

Weapon Mount (TL8+)

A bionic arm may incorporate a concealed beam weapon or gun of up to five pounds weight (two pounds for a bionic hand); this does not require an implant operation, just modification to the bionic limb. The weapon is triggered by neural impulses and fires out through the palm. Since it is quicker to aim (just point and shoot) SS is lowered by 2, but the lack of sights reduces Acc by 3. Reloading is accomplished through a concealed port in the forearm.

A weapon can also be built into a bionic leg, firing out the heel. This is more awkward (SS is increased by 2 and Acc is lowered by 5) as the user has to stand on one leg to fire – but weapons of up to nine pounds weight may be installed.

Unless the weapon includes chemical propellant ammunition, it is nearly impossible to detect a weapon built into a bionic limb without either physically taking the limb apart or making a full medsensor or X-ray scan; even with a scan, roll against Electronics (Medical or Weapons)-4 to correctly interpret the results. As well as the price of the limb and weapon, the weapon mount costs $2,000 for every pound the installed weapon weighs, or double that if an existing limb is being modified for a weapon. There is a 5 point cost for an installed weapon – just remember that if someone wants to disarm you, they will do so literally as well as figuratively.

Other Gadget Implants

At the GM's option, any gadget of roughly the same size and weight as the weaponry described above can be installed, usually with readouts and controls spliced into the character's nervous system to allow direct operation. Use the rules for weapon implants as a guideline.

IMPLANTS (TL9+)

Implants are devices surgically inserted into the user. Unlike bionics, they supplement rather than replace existing limbs or organs. *Simple* implants may be inert, operated by an internal microprocessor, voice activated or remote controlled. *Complex* implants are cybernetically spliced into the user's nervous system, and are mentally controlled.

Installing Implants

Simple implants require a roll against Surgery+3 for the operation, take 30 minutes, and require two hours to heal afterwards before the implant can be used. Any automedic can easily insert a simple implant. Implant communicators (see p. 36) are simple implants. Hiring someone to perform the operation costs 10% of the implant's cost.

Complex implants require a successful Surgery *and* Electronics (Bionics) roll. The operation takes three hours, plus a day in bed to recuperate. Failure destroys the implant; critical failure causes neurological injury, resulting in a loss of 1 point of DX; other effects (such as physical disadvantages or a dangerously malfunctioning implant) may be substituted at the GM's discretion. Hiring someone to do the operation costs 20% of the implant's cost.

Detecting and Removing Implants

Unless noted, implants are not visible. A diagnostic table, medscanner or X-ray scanner can detect implants on a successful Electronics Operation (Sensors) or Diagnosis roll. Implants can be removed in the same fashion they are installed. Some "black" implants are booby trapped, designed to cause unpleasant effects (explosions, or something more subtle) if the Surgery roll is failed. A successful Diagnosis roll, usually at a -5, is required to discover if a given implant has been booby trapped.

Campaign Effects of Implants

Most simple implants are for convenience. An implanted, voice-activated communicator is easier to use than a pocket phone. Weapon implants are used for concealment: an opponent may look clumsy and unarmed, but if he's got a laser pistol implanted in his forearm, a smart battle computer in his brain and subdermal armor, he's trouble.

Even at low TLs, implants tend to blur the line between a person and his gadgetry, making a man's abilities less important than his neurosurgeon's. Of course, not everyone will want implants. A spy may find an implanted gun or blade gives him the edge sometimes, but if it's spotted when he's walking through customs, it will require surgery to remove. If he's captured and his captors find his implant communicator, they may be less than gentle about removing it.

LEGAL IMPLANTS

Advanced Implant Communicator (TL9+)

At TL9 an implant communicator (see p. 36) is also available as a complex implant. It has ten times the range, and a vision circuit linked to the user's optic nerve. This enables the user to control frequencies cybernetically (no master module is needed) and to receive – but not send – visual signals (appearing across the top of his field of vision). He must still subvocalize to communicate. Cost is $1,200 (and optionally, 15 character points).

Bionic Gill (TL9+)

This implant allows the user to breathe underwater. It only works in fluids containing oxygen in a concentration as high as terrestrial water. It uses one C cell, which provides power for 24 hours. The battery can be changed by the user without surgery, and can be disguised from a casual search. While the gill is operating, the user cannot breathe air; he will start to suffocate if removed from water. Turning off the gill and resuming air breathing takes three seconds while liquid is expelled from the lungs. The giller is at -5 to ST and DX for this time. A bionic gill is a complex implant. Cost is $5,000 (and optionally, 10 character points).

Flesh Holster (TL9+)

Technically this is legal, since it doesn't *have* to be used for a gun or contraband, but most police officers or customs inspectors would be very unhappy to discover even an empty one. A flesh holster is a hollowed-out and sealed cavity with a plastiskin flap. A flesh holster is almost impossible to find (Holdout-20) even with a full-body search. The contents can be spotted with an appropriate scanner. Any object small enough to fit inside (the GM determines if it is too large) is also Holdout-20. A doctor specifically searching for a flesh holster starts at Physician-6 or Surgeon-6, and improves his skill by 1 level for each ten minutes, to a maximum of Physician-1 or Surgeon-1.

This is a simple implant, costing $500 (and optionally, 2 character points) per pound of storage capacity if located in the stomach area, or $800 (and optionally, 5 character points) per pound of storage capacity if located in an arm or a leg.

Recorder Implant (TL9+)

Spliced directly into the optic and auditory nerves, this implant records everything the user sees and hears on a standard computer minidisk. The disk can be removed through a socket in the skull, recording two hours of TV-quality footage per gig. There are two types: passive (simple) and active (complex). Passive systems record constantly until filled; active implants may be mentally accessed by the user, turned on and off, paused, erased or recorded over. Note that an active recorder is still basically a handy movie camera, not an eidetic memory! A user could "film" a book or computer screen, but would still have to go back and "reread" the replay at normal speed. Optionally, GMs may charge 15 character points for active implants. Both types run for one year on an AA cell. Cost is $1,000 for a passive implant, $5,000 for an active one.

Silver Tongue (TL9+)

This is a favorite of actors, rabble rousers and musicians. When the user speaks, hums, whistles or sings, his voice emits a subsonic wave that causes all who hear him to be more relaxed, attentive, agreeable and generally favorable in their reaction. The user gains all of the benefits of the Voice advantage (p. B23). In addition, any attempt to detect a lie told by the character has a -3 penalty. The GM may require 15 character points in addition to the monetary cost. Anyone with the Voice advantage, in addition to this implant, gains the benefits of both (equal to doubled bonuses for the advantage). The implant is powered by an A cell, lasting one year. This is a complex implant costing $6,500.

Street Tech

Street tech is a euphemism for black-market implants. While they cannot usually pass sophisticated scanners, they do give the user an edge in a startown brawl. Most of these devices are also available at TL8, but are still experimental and of dubious reliability – cost would be ten times that listed here.

ILLEGAL IMPLANTS
Cortex Bomb (TL9+)

A simple implant, which places a tiny explosive charge in the subject's skull, with a timed or radio-triggered detonator. Detonation is fatal to the subject, and does 1d concussion damage to anyone within two yards. Cortex bombs are favorite way of insuring the loyalty of untrustworthy employees. They are often booby-trapped and wired into other implants to prevent tampering. Cost is $500 (and optionally, -15 character points).

Dermal Armor (TL9+)

A layer of skin is removed and replaced by a subdermal layer of ultrafine monocrys mesh. Afterwards it is covered by plastiskin and left to heal, which takes a week, during which time the character is incapacitated. Dermal armor gives PD 0, DR 4 (PD 0, DR 1 vs. impaling attacks). The mesh can be noticed by a careful tactile examination or a medscanner, but is invisible to the naked eye and does not appear on metal detectors. It costs $20,000 (and optionally, 12 character points). It is treated as a complex implant because of the delicacy of the operation.

Finger Mount (TL9+)

This is a complex implant. The index finger is replaced with a realistic, functional prosthesis that conceals a holdout weapon. The weapon is linked to the user's nervous system   point, think "shoot" and it fires; SS is -2, but accuracy is reduced by 1 due to the lack of sights. The weapon is reloaded through a plastiskin port in the user's hand. The cost is $5,000 (and optionally, 5 character points); the finger cannot be removed without surgery. If built into a bionic hand, no operation is required, and the cost is only $600 plus that of the weapon; the finger can be easily removed and replaced with a normal bionic finger -- or a different weapon.
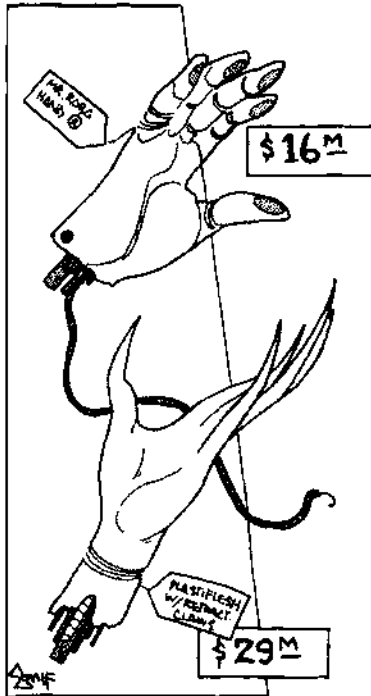
Finger Talons (TL9+)

The user is implanted with long (three- to four-inch) armorplast or durasteel claws. This is a complex implant. The claws are spliced to the user's nervous system and can be completely retracted or extended at will. They allow the character to inflict thrust/impaling or swing/cutting damage (-1 damage for armorplast claws). Karate bonuses, if any, add to final damage. The claws are also useful for climbing, adding +1 to Climbing skill. Armorplast versions are not detectable by metal detectors.

Talons cost $8,000 and optionally, 40 character points. Halve cash and point cost if only one hand is fitted with claws. Toe claws are available for the same cost, with the same effect – a (barefoot) kick is -2 to hit but does the damage listed above +1; if a character has both finger talons and toe claws, he adds +2 to Climbing when climbing barefoot and without gloves. Talons can also be added to a bionic hand or foot; cash cost is halved.

Stingers (TL9+)

These are hypos implanted in the mouth, usually behind the tongue or in a hollow incisor. They are favored by assassins and special agents. A successful bite attack (see p. B111) in close combat (or a kiss . . .) is required to use one. Instead of doing damage, the hypo injects one dose of any drug or poison; the victim may feel a slight sting (this requires an IQ roll to notice). This simple implant costs $2,000 (and optionally, 15 character points). A maximum of two can be installed in a normal human. Unlike most implants, stingers cannot be detected without a full medical examination.

Time-Release Toxin (TL9+)

Sacs containing a drug or poison are implanted in the character's body; after a set time (ranging from hours to years) they will dissolve, releasing their contents. Cost is *ten times* the cost of the drug or poison; effects of release are as with an injection, taking effect in half the normal time. Any attempt to remove them requires surgery; roll a Quick Contest of Surgery against the Surgery skill of the surgeon who implanted them to avoid setting them off early. A successful Diagnosis-3 roll can discover the original surgeon's skill level.

Wonder Glands (TL9+)

Sacs containing any of the wonder drugs (see pp. 97-100) can be implanted, with a sensor system releasing a dose when certain conditions are met. The usual choice is Ascepaline or Suspend, triggered if the organism is badly injured or dead. An Ascepaline implant automatically triggers if the victim's health reaches 0; a Suspend implant triggers if the victim dies. The drug takes effect as described in the appropriate text. A wonder gland implant costs $3,000; fills (and refills) are at the cost of the drug. Implantation requires a week. Unfortunately, the sensors are not fool-proof. In any stressful situation, the GM can roll against the HT of the implantee. On a critical failure, the wonder gland triggers and the victim suffers the effects of the drug.

BRAIN IMPLANTS (TL10+)

Brain implants are surgically inserted in the user's skull and linked to his central nervous system. This requires a Surgery roll and takes three hours. Failure damages or destroys the implant; critical failure causes brain injury, resulting in the loss of 1 point of IQ, or other effects (disadvantages such as epilepsy or a malfunctioning implant), at the GM's discretion.

Removing a brain implant is done in the same way as implanting one. However, it is possible to booby trap an implant, with a cortex bomb or toxin sacs (see p. 108). If an implant is booby trapped, the trap must be removed first, or it will be activated when an attempt is made to remove the implant.

Unless the implant requires a socket (for a neural jack, minidisk, etc.), it is invisible. Sockets may be covered with plastiskin (sensa-skin at TL11+) when not in use. A covered implant is undetectable without a "full analysis" diagnostic scan, though its power cell may be detected by a radscanner.

Since brain implants usually require other external devices (e.g., HUD sights on a weapon for a neural HUD to plug into) or, as with the reflex implant, have their own innate disadvantages, they do not cost character points.

At TL11, any brain implant can be designed to function for or with an artificial intelligence. By using a braintap (below), an AI could even "ride" a human, seeing through his eyes and experiencing the sensations of flesh. This is still experimental at TL11 and any neural interface between human and an AI (brain implants, braintapes) costs five times as much, and may require an IQ roll (by the party actively interfacing with the other) to avoid brain injury or insanity. At TL12, any brain implant can be shared by humans and AIs without difficulty.

BRAINTAP (TL10+)

A braintap is an advanced form of implant communicator (see p. 36). It is surgically inserted into the subject's cerebral cortex and communicator-linked to a receiving module. In order to access a braintap, the reception module must have a neural-interface implant (or a neural-induction helmet) linked to it. As long as the braintap remains in range of the module, anyone interfaced with the reception module will be able to perceive all the sensory information experienced by the braintapped character, feeling what he feels, seeing through his eyes and so on. If the braintapped character suffers pain or injury, the helmet wearer will also feel pain and suffer shock, knockdown and stunning – but take no damage.

It is possible to implant a braintap in an animal, creating a sort of familiar. If well-trained, these make very useful scouts, and are sometimes used by the Survey or the Rangers. If someone is undergoing surgery, a braintap can be implanted *without their knowledge* – this is a favorite trick of intelligence agencies. A braintap has the same range as an implant communicator (500 miles at TL10), runs off an AA cell for several decades, and costs $8,000 plus $1,600 for surgery. The braintap receiving module (4 pounds) costs an additional $7,000, excluding the cost of helmet or jack, and uses a B cell.

NEURAL-INTERFACE IMPLANT (TL10+)

Neural-interface implants allow the user to send information to a piece of equipment, as well as receiving it. Any equipment which can use a neural interface will be equipped with an *neural interface jack* (see p. 37). All jacks are fitted with a short (no more than a yard long) fiber-optic cable ⅛ of an inch in diameter, which is plugged into the user's skull socket. It takes two seconds to connect or disconnect an interface cable. When the cable is connected, the implant picks up electronic impulses and translates them into electrochemical signals in the user's brain and vice versa, enabling direct mental control. The user can operate an interface-equipped computer without touching the keyboard, or fire an interfaced gun without pulling the trigger.

Using an interface is faster and more precise than manual control. Add 4 to the user's effective skill level (the minimum skill level will be 12) when interfaced with equipment in situations where reaction speed is important. This includes piloting vehicles, using jet or thruster packs, firing an interface-equipped weapon or penetrating a hostile database.

Some equipment *requires* the use of an interface, such as dreamscanners, braintap reception modules, memory tapes, interactive holoprojectors and dreamtapes. If a neural-interface implant is necessary to use an item, no skill bonus is provided.

A neural-interface implant uses an AA cell, which powers it for at least a century. Cost is $4,500, plus an additional $1,500 for the operation, which is at Surgery-3. This cost includes one socket (enabling control of one piece of equipment) but up to three extra sockets may be added at $1,000 each.

PSYCH IMPLANTS (TL10+)

The psych implant electronically stimulates areas of the brain to produce certain psychological reactions. Moderate regimes use them as an alternative to prison or psychiatric treatment – repressive ones rely on them for mind control.
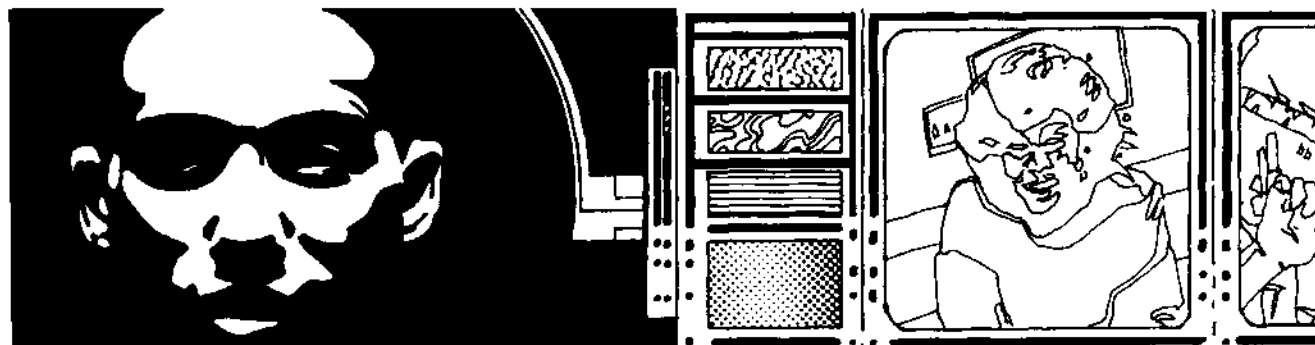
In game terms, a psych implant gives the subject an additional mental disadvantage (lower point value without giving any character points, unless the character has it when first created). Common implants induce Gullibility, Pacifism or even Combat Paralysis, and are used to restrain violent individuals or render the subject easily controllable. Illegal "black" implants, capable of inducing mental states identical to the disadvantages Berserk, Dyslexia, Paranoia or Phobias, are also possible. The GM may also allow other mental disadvantages (e.g., Sense of Duty to a specific individual, for mind control) to be simulated, especially at TL11+.

Any implant-induced disadvantage ends when the implant is removed. However, anyone who has worn a psych implant for a long period of time may acquire the disadvantage permanently – make a Will roll at +4 to avoid, -1 per three months with the implant.

Therapeutic implants also exist which *negate* mental disadvantages, such as Bad Temper or Phobias. After several months the effect may become permanent (through behavior modification). Roll vs. Will as above when the implant is removed; if the roll fails, the disadvantage is gone. The GM may require it to be bought off with character points.

A psych implant, therapeutic or otherwise, costs $300 times the point cost of the disadvantage involved and is generally only available to governments or licensed doctors. Inserting or removing a psych implant takes 3 hours and a Surgery skill roll at -3; the operation costs $1,500. "Black" implants are Legality Class 0; black market prices are usually three times those of legal implants. Psych implants are powered by AA cells, which last for ten years.
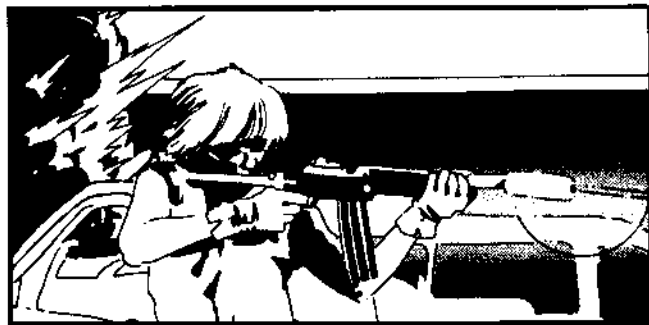
REFLEX IMPLANT (TL10+)

A reflex implant gives the user the preprogrammed reflexes of a master in a specific physical skill, such as Karate or Gunner. Each skill requires a specific program chip, only one of which can be used at a time. Use of a reflex program increases the user's effective skill level by 2 (to a maximum of level 25), or gives a default skill of DX+2, whichever is greater. However, use of a reflex implant focuses the user's concentration on that skill alone, giving a -4 on any other skill or IQ roll. Because of this it is rarely used by experienced soldiers, but is favored by martial artists, who call it the "zen implant."

The zen implant has a socket (usually covered by plastiskin) into which a new reflex chip can be inserted. Removing or inserting a chip takes two seconds; the character can mentally deactivate the program at any time, but doing so leaves the user mentally stunned – roll vs. IQ each turn to recover. Reflex programs cost $2,000 for Physical/Easy skills, $3,000 for Physical/Average, and $4,500 for Physical/Hard. These costs are for common skills (Beam Weapons, Judo, Riding, etc.);

uncommon skills (Parachuting, Lasso) may be much harder to find and more expensive. It costs $5,500, (plus a $1,100 operation) and runs off an AA cell for six months of constant use.

COMPUTER IMPLANT (TL11+)

At TL11, Complexity 4 computers may be implanted in the brain and controlled through a direct neural interface. It takes only a thought to call up a file or access a database, and any programming rolls made are at an additional +2. All information is chipped directly into the user's optic and auditory nerves. Data scrolls across the periphery of the user's vision, and he hears the computer as a voice in his head.

The computer implant has a skull socket (covered with a sensaskin cap) for inserting standard program disks. As well as whatever it is currently running, the computer has an optical-recognition program hardwired into it, using the human's eyes and ears as sensors; it can be used to speed-read documents, for example, storing them in its database (it takes normal time to read them later, though one could ask the computer to provide a synopsis).

The implant costs $10,000, and runs for six months on an AA cell.

As with other computers, complexity increases by 1 per TL after introduction. At TL12, Complexity is 5. At TL13, Complexity is 6, and for triple cost, the computer implant may be a sentient AI computer!

PERSONALITY IMPLANT (TL11+)

Personality implants resemble computer implants, but they are considerably more sophisticated. They allow a person to mentally "become" someone else – very useful for intelligence agents, politicians and diplomats, among others. The implant is surgically inserted into the brain, leaving a socket in the skull. To use it, a standard 100-gig minidisk containing a braintape is inserted into the personality implant's socket. The braintape may be accessed at any time by the user. When accessed, the effects depend on the tape.

Braintapes for personality implants come in two forms, active and passive. Active braintapes completely suppress the user's personality, substituting that of the personality on tape. In game terms, this means that the character adopts the quirks and disadvantages of the new persona, while gaining his mental advantages and skills (but modify physical skills by the difference in DX). The character ceases to exist and is replaced by another person for the duration of the tape.

Passive tapes are identical, except that the motivations and goals of the new persona are those of the original character. Passive tapes are far more common, but active tapes have their uses.

The cost of braintape disks varies depending on braintaping technology (see p. 102). If braintapes are designed to be copyable, the cost of a copy on disk will usually be $2,000, or double that for a passive tape. Braintapes of famous people (media stars, etc.) may even be commercially available. If they are self-erasing, a new copy must be made from the subject every time, at the usual cost of $25,000 each, and implants will usually be restricted to governments or wealthy corporations. The braintape of a corporate president, current head of state, or scientific, military or artistic genius may be worth millions!

A personality implant costs $30,000; it is powered by a single A cell for at least a century.

SHELL ACCESS GRANTED   //TR XX33B46B-233/SS -K -2   %READY
**WHO ARE YOU?   //NEVER MIND   **STAY OUT OF MY FILES
//YOU CAN'T KEEP ME OUT   //TRANSFER FILE   HEADER FOLLOWS

:TRANSPORTATION

FILE BLOCKED AT SOURCE   **STAY OUT   //CROWBAR [CROWBAR EXECUTED]
TRANSFER FORCED   //TAKE THAT   **I'LL FIND YOU AND WHEN I ## //MUZZLE
[SOURCE MUZZLED]   RECEIVING VIDEO   [SPIKE ACTIVATED AT SOURCE]
TRANSMITTING NOW........   YOU HAVE 30 SECONDS TO LOGOFF BEFORE SPIKE.

VIDEO TRANSMISSION SCREEN

valkyrie 3

Transportation is every bit as important as communicators or computers to the information flow that characterizes higher TLs. And adventurers are constantly in need of new ways to get around. This chapter covers vehicles and other transportation technology. For more detailed information, see *GURPS Vehicles*.

TIMELINE

TL8

The problem of efficiently moving masses of people and cargo confronts every society, especially heavily populated and urbanized ones. At TL8, highly-efficient transportation systems come into use, which set the standards for mass transit until TL11, when contragravity revolutionizes transportation.

Slidewalks

In large space habitats or the downtown core of crowded cities, subways, streetcars and buses – maybe even roads and sidewalks – may be replaced by the *slidewalk*, a passenger conveyor belt similar to a high-speed horizontal escalator. The slidewalk effortlessly conveys pedestrians at 5 to 30 mph. Sets of belts are at different speeds, usually at 5 mph intervals. Usually, two sets of belts running in opposite directions are installed parallel to each other, with a platform in between. The slowest belts are nearest the platform.

Running on a slidewalk is difficult. Add or subtract 2 mph for each point of Move to the slidewalk's speed to give the speed of travel. Make a DX+3 roll each turn to avoid falling. This roll is -1 per 10 mph if running in the direction that the slidewalk is moving, at -3 per 10 mph if running in the opposite direction.

Running on a slidewalk is always ill-mannered, and may be illegal. GMs can impose Reaction penalties, or even legal penalties, depending on the culture.
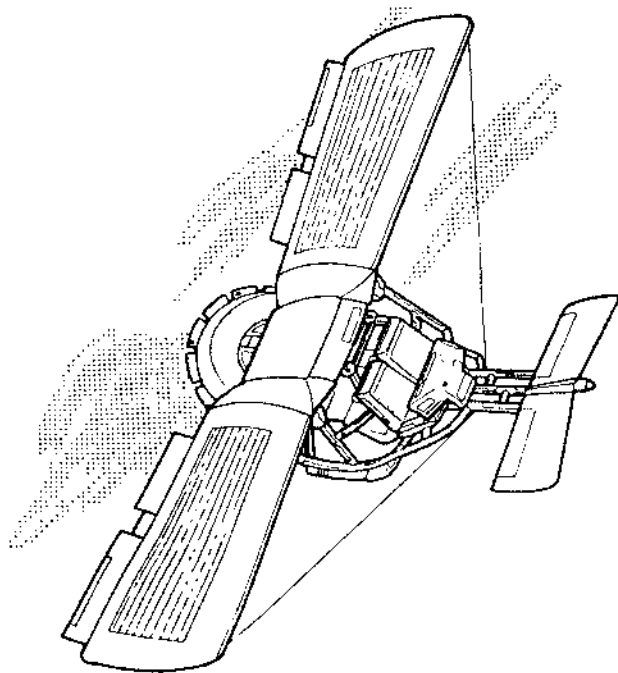
Ground Vehicles

Many ground vehicles are fitted with computer autopilots, which, in conjunction with an inertial guidance system, satellite map and anti-collision radar, can perform routine driving functions.

Taxis may be totally automated – insert a credcard and give the destination. $20 per person per ten miles is the usual fare. (Overpopulated planets may reserve such jobs for humans; primitive planets may have better uses for computers.)

In densely-populated metropolitan areas, on planets with high control ratings, manually-controlled vehicles may be illegal. All vehicles can be required to lock into an automated Master Municipal Traffic Control system. After a destination is indicated (by light pen on an electronic map or by giving an address to the computer) the system takes control of the vehicle and guides it to the specified destination. This makes it hard to sneak around, and easy for the government to corral fugitives in vehicles.

Long-Distance Travel

Most TL8 subway and commuter trains use magnetic levitation (mag-lev) for propulsion, eliminating rail friction and allowing speeds of up to 300 mph. Mag-lev lines are most efficient when constructed in evacuated tunnels, removing all air resistance and enabling the trains to reach supersonic speeds. Where intercontinental tunnels are built, 1,000-mph mag-lev trains replace aircraft and surface shipping. The capital investment for an evacuated mag-lev system is enormous; only very wealthy societies can afford one. Operating costs are comparatively low, so one with the capital investment paid off (or government subsidized) can have cheap fares. Mag-lev is also cheap for worlds with no atmosphere. Under these circumstances, fares average $20 per person (or five cy of cargo) per 1,000 miles. (Like all train systems, the train only goes where the track goes.) The fare may be enormously higher if the capitalization has to be paid by the operators, or if the mag-lev has a monopoly on fast, long-distance travel.

In atmosphere, cargo and passenger airships may be the most economical long-distance transport. Airships are cheap and reliable, though limited to worlds with dense or standard atmospheres and reasonable weather. Airships average 50 mph over long hauls; actual maximum speeds are well over 100 mph for some streamlined, airfoil/aerostat combinations. Fares are usually $10 per 100 miles, per person or cy of cargo. Airships need only minimal facilities, mostly a mast to tie up to, so they are attractive to undeveloped planets.

Surface and submersible vessels remain in service where very heavy loads are carried, or atmospheric conditions make airships impractical. On worlds with rough seas, large, nuclear-powered submersible vessels are common.

Where speed is required, and the mag-lev rail doesn't reach, coleopters (combination helicopter and fixed-wing jet) or conventional VTOL jet aircraft are used.

Swift inter-continental flights are made by ballistic liners – hypersonic sub-orbital space planes, each carrying 100 or more passengers. Cost is $500 to $1,000 per person or .1 cy of cargo, but time is at most three hours to anywhere on an Earth-sized planet. Such vehicles require extensive takeoff and landing facilities; they are unlikely to make stops at small towns, frontier outposts or lonely archaeological sites.

TL9

Moving slidewalks (see TL8, above) have replaced roads in many prosperous urban areas. In areas that are in decline the slidewalks may still be there – but they no longer work, or function erratically! Fusion power is available for large surface vehicles and airships. On colony worlds where mag-lev railways are not yet built, huge fusion-powered hovertrucks cruise the highways and oceans, streamlined monster rigs that reach 300 mph. Rapid intercontinental travel is by hypersonic spaceplanes using reactionless drives, but helicopters and VTOL aircraft continue in service for short hops. All transportation costs are halved over TL8.

For ground to orbit travel, orbital towers (often called space elevators, beanstalks or skyhooks) can now be built, though they require an enormous capital investment. Riding a beanstalk elevator to or from orbit costs $500 and takes six hours. Elevator cabins resemble those of trains, with food service and entertainment. And the view is spectacular.

TL10

Transportation is similar to TLs 8 and 9 (see above). With extra power to waste, ballistic liners – short-range spacecraft in all but name – can now economically carry cargo loads comparable to the largest blimps or seagoing cargo ships, and at vastly faster speeds; travel costs are ⅛ those of TL8 ballistic transports. There are so many transports that any town may be on some route.

TL11

Super-efficient fusion plants and cheap, clean, reactionless thrusters are used in all utility aircraft; a fusion-powered airbus costs around $150,000 and can reach orbit. Mass transit is the same as at earlier TLs – slidewalks, maglev subway cars and the like. Some buildings incorporate G-tubes – high-speed, gravity-lift tractor beams used as elevators, sometimes in relays. They are mostly used for cargo, but are also seen in the most luxurious hotels. They are very safe – far more people fall off slidewalks and break their necks then are killed in G-tube failures.

TL12
Life in the High Lane

Anti-gravity and contragrav revolutionize planetary transportation. Without the noise of VTOL jets and helicopters or the blast and cost of a fusion jetpack, silent and graceful flying cars can now land and park on anyone's rooftop, or fly through doors into top-floor garages. On worlds with open societies, people become even more cosmopolitan due to ease of travel. People may still cluster, or they may spread out: a neighbor is now someone living within a few hundred miles.

Though personal grav belts are not developed until TL13, gravcycles and aircars – small contragrav platforms fitted with jet engines – have a power-to-weight ratio that approaches infinity. In practice, speeds are also limited by controllability and friction. Anti-grav generators are also used to eliminate the weight (but not the mass) of ground vehicles and hovercraft, greatly increasing performance, though even with sentient autopilots, riding a Mach-2 hovercraft is not for the timid.

With the sky full of commuters (and floating cities) traffic control becomes a nightmare. Densely populated worlds require all privately-owned flyers to be monitored by a planetary traffic-control system; if a collision (or possibility of a collision) seems imminent, the traffic computer yanks control away from both pilots. Disabling the traffic-cop circuits requires a mini-tool kit and an Electronics Operation (Security)-2 roll and takes ten seconds; failure locks the vehicle down and alerts the authorities.

TL13
Contragrav Belts

Until TL13, people had to get into a vehicle if they wanted to go anywhere, and vehicles are clumsy things – ask anyone who ever tried to find a parking spot. Even the versatile grav cycles of TL12 are not the sort of thing one stores in a bedroom and puts on like a set of clothes. And one certainly can't lug a grav cycle on one's back and still crawl prone through an alien jungle dodging pulsar fire.

But grav belts – grav belts are *convenient!* Even at TL13 they are light enough to wear at all times, whether shopping in the mall or exploring an alien world. So grav belts could revolutionize society as much as the automobile did. Why walk when you can fly? Why build centralized cities? Authoritarian governments (and parents) may hate them because of the mobility they give individuals. GMs hate them because they cannot strand the PCs in the wilderness without arranging for numerous grav-belt malfunctions. Explorers, light infantry and joyriding teenagers love them.

PERSONAL VEHICLES

AQUASLED (TL8+)

This is a one-man underwater propulsion system. The diver grips the control handles on the sled and is pulled forward at 30 mph. There are simple steering and speed controls. The skill used is Swimming, with a -4 modifier for any difficult maneuvers until the user becomes familiar with the sled. This requires one hour of practice, including an opportunity to try all the maneuvers. An hour of stroking the machine in the showroom does not count. It has a headlight and depth gauge; at extra cost it may have up to ten pounds of other gadgets (such as weapons or sonar) added. It runs for eight hours on a D cell. Cost is $2,000; weight is 60 pounds.

BACKPACK PARAWING (TL8+)

A maneuverable parachute using a Rogallo wing, which folds out from a pack on the user's back in two seconds. It is often used as an escape system. It requires Parachuting skill (see p. B48) for complex maneuvers or safe landings. Weight of the system is 20 pounds and cost is $400.

ple in front, two in back, and has 16 cubic feet of cargo space. Its electronics include its computer, a cellular phone and a cheap mini-radar (two mile range) for computerized driving (also giving the vehicle night or all-weather capability). Safety is taken care of with driver and passenger foam crashwebs (when these inflate, treat a crash as 40 mph slower than it was for calculating damage).

The car has a maximum speed of 120 mph; it runs for 2 hours, 51 minutes on four rechargeable E cells. It has PD 3, DR 5 on all sides, and a body HT of 200. Cost is $21,420, weight is 1,474 pounds empty; the vehicle takes up 180 cubic feet (6.6 cy). (Its *GURPS Vehicles* statistics are acceleration 6 mph/second, deceleration 15 mph/second, MR 1, SR 4, size modifier, radar and IR signature +3, acoustic signature +2).

UNDERWATER PROPULSION PACK (TL8+)

This uses a high-performance propeller or waterjet. It can go up to 20 mph (Move 10). A D cell powers it for up to 12 hours. Cost is $600 and weight is 20 pounds.
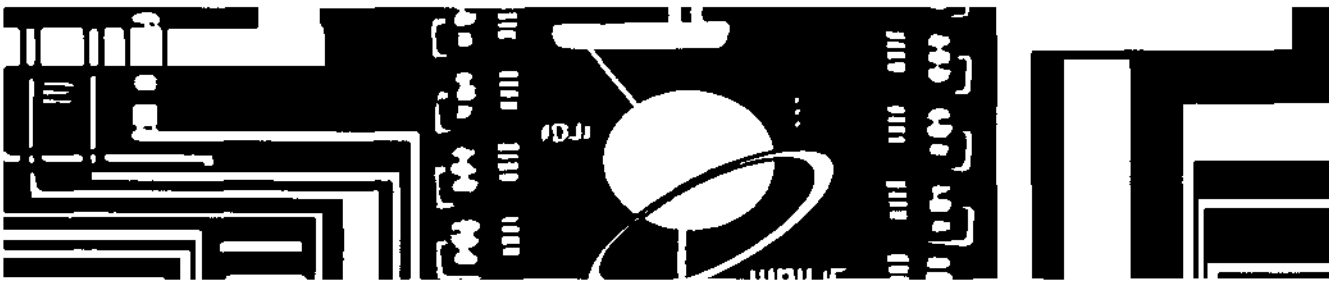
DRAGONFLY (TL8+)

This microlight sailplane is often used as a recreational aircraft or carried by explorers. Its wings and body are constructed of transparent, high-strength polymers over foamed-monocrys structural membranes (PD 0, DR 0, HT 50), and the Dragonfly can be broken down for transport into two backpack modules, each weighing a mere 35 lbs. Assembly or disassembly takes a single person nine minutes; a Mechanic+2 roll and a tool kit are required.

The Dragonfly carries one person in a light saddle-like external seat, with a maximum payload of 230 lbs. (including pilot). It lands and takes off on skids; in the air, its 17 kilowatt ducted-fan electric propeller gives it a top speed of 71 mph (stall speed of 30 mph). The prop is powered by an E cell which operates it for 100 minutes. Dragonfly costs $4,025, weighs 70 lbs. and takes up 7.5 cubic feet. (If using *GURPS Vehicles* it has ground speed 30 mph, ground acceleration 7 mph/s, aerial acceleration 9.5 mph/s, aerial deceleration 15 mph/s, aerial MR 4.5, aerial SR 5, ceiling 2,840 yards, size modifier and IR signature 0, radar and acoustic signature +1.)

SMARTCAR (TL8+)

A typical middle-class family auto, the smartcar is a four-wheeled electric vehicle with an integral Complexity 2 computer that normally runs a Routine Vehicle Operation program with Driving (Auto)-12, enabling it to drive itself. It carries two peo-

ZERO-G THRUSTERS (TL8+)
Hand Thruster (TL8+)

A hand thruster propels the user with bursts of compressed nitrogen. Each burst accelerates or decelerates a normal-mass human by one yard/second in the direction opposite to that in which the thruster is pointed. A successful roll against Free Fall or Vacc Suit skill is necessary to correctly point the thruster in the desired direction. The unit's cylinder is good for 30 one-second bursts. Cost is $50 and weight is four pounds, including the cylinder; extra cylinders cost $10, weigh one pound and take three seconds to replace.

Thruster Pack (TL8+)

This strap-on seat is for short jaunts in free fall – ship to ship and so on. It consists of a "seat" unit with a thruster in the back, a pair of arms with reverse thrusters and a control arm that curves in front of the user. Maneuver jets are located at strategic points along the entire pack. It takes 20 seconds and a Vacc Suit roll (which can be tried again every five seconds if missed) to strap into the thruster pack. It can accelerate or decelerate a normal-mass human by up to three yards/second on each turn. The large cylinder allows 100 seconds of full acceleration, or the equivalent. Successful Free Fall+3 rolls allow the user to control his speed and direction. Cost is $2,000 and weight is 45 pounds, including one cylinder. Extra cylinders cost $30, weigh ten pounds, and take five seconds to replace.

Drop Capsules (TL9+)

A drop capsule is a one-man re-entry capsule protected by an ablative reentry shield, allowing a single person to be safely dropped from a spaceship in low orbit. Reentry is automatic: after a series of braking parachutes have reduced descent speed, the capsule breaks up a mile or so above the surface, permitting a conventional parachute or parawing landing (see p. B48). A capsule can hold two people and .1 cy of cargo, or one person and .2 cy, or .3 cy of cargo. Drop capsules can be launched from light missile launch tubes. Capsules are not reusable. Cost is $10,000, exterior volume is .5 cy and weight is 800 pounds.

Zero-G Worksuit (TL9+)

See p. 26.

Fusion Flight Pack (TL10+)

This is a fusion-powered thruster unit. Maximum speed is 100 mph, with enough reaction mass to allow a flight duration of 20 minutes; it accelerates at 10 mph per second, and climbs at half speed. Flight packs are controlled by a panel built into an arm curving in front of the user; only one hand is required to operate them. Instrument readouts are usually projected into the user's helmet HUD, but they may be fitted for a neural interface to allow "no hands" piloting for an extra $500. Use Piloting (Jetpack) or Battlesuit-2 for maneuvering; subtract the Move penalty of the user's encumbrance from all skill rolls. The user's Dodge is equal to half his Piloting (Jetpack) skill. Anyone using a weapon while flying with a flight pack does so at -4.

A flight pack can lift up to 300 pounds. The plasma wash from the flight jets will do 1d of damage to anyone directly below the user within 2 yards. The exhaust is toxic; anyone within 1 yard who is not in airtight armor takes 3d damage immediately. An additional 2d damage occurs every hour until the victim makes a HT-5 roll. Because of their dangerous exhaust, flight packs are usually Legality Class 0 on populated planets, but may be legal (with a license) for space crew or exploration teams on unpopulated worlds who can demonstrate legitimate need. If used as a thruster in space, they will accelerate the user at two gravities for up to 20 minutes. A flight pack has only enough reaction mass for a 20-minute flight. Cost is $24,000 and weight is 75 pounds, including fuel. A spare tank of reaction mass weighs 20 pounds and costs $500.

At TL11+, reactionless flight packs are available with clean thrusters. This gives them an hour of flight (no need to worry about fuel); the backblast does only half damage, and there is no residual radiation.

Nightwing Ultralight (TL10+)

The Nightwing is a high-performance ultralight stealth jet aircraft designed primarily for covert operations. It is designed to carry a single person. At first glance it seems small and fragile; it can even be broken up into three 227 pound, 17 cubic foot modules for easy transport, requiring a tool kit, 1.5 man-hours and a Mechanic+2 roll to assemble or disassemble.

When assembled, Nightwing is a diamond-shaped flying wing, four yards long and five wide, into which is blended a pilot canopy and vectored-thrust MHD-turbojet engines. Its responsive "skin" is an almost transparent electrically-active bioplastic membrane, giving it an ethereal appearance and a

very low radar signature. The Nightwing's shape and exotic TL10 radar, infrared and acoustic cloaking systems combine to make it very hard to detect: a -4 for any radar, scanner or infrared sensors. On top of this, its hull is covered with a sensor-equipped instant chameleon system (see *chameleon armor*, p. 85) which automatically alters the vehicle's skin texture to provide perfect camouflage against sky, ground or water. However, its stealth capability is nothing compared to its maneuverability.

In combination with its advanced computerized controls, its high-agility, combat-stressed wing-body can alter its wing and body shape to best respond to changing aerodynamic circumstances; combined with its state of the art TL10 flight control system, this gives it unmatched aerial maneuverability, enabling it to pull up to 25 g - twice that of the best TL7 jet fighter.

Although no human could withstand that kind of maneuver without passing out, the Nightwing's built-in Complexity 5 mini-computer and intelligent autonomous vehicle operation programming enables the aircraft to fly itself at Piloting-15 and perform full combat maneuvers - in this case the so-called "pilot" can be either a passenger or operate other systems.

The Nightwing's 1,000-pound thrust hydrogen-oxygen burning engine combines with superior aerodynamics to give it a top speed of 1,240 mph. It has an endurance of 4 hours on internal fuel. Using vectored-thrust, it has the capability to make vertical takeoffs and landings or even stop and hover in mid-air.

Other features include a special raked-back G seat adding +2 to HT rolls to resist g-force, a scrambled radio communicator (5,000 mile range), a mini-radar with 20 mile range, an advanced low-light TV scanner (+7 to Vision rolls), a radar locator that can pinpoint any operating radar in the vicinity and 12 hours of life support. It also has 12.5 cubic feet and 150 lbs. of payload space. This can be used as cargo, or a "payload module" can be installed - see *Payload Modules*, below.

Despite its delicate appearance, Nightwing's bioplas skin makes it tough (PD 4, DR 15 body and wings) and its basic structure is quite robust (body HT 100, wings HT 50 each). The Nightwing weighs 680 lbs. without payload and takes up 50 cf; its usual payload, including pilot and cargo, is 300 pounds for a normal loaded mass of about 980 pounds. It costs $539,750.

GURPS Vehicles statistics are: Maximum load 1,250 lbs., acceleration 20 mph/s, deceleration 10 mph/s, MR 25.5, SR 4, size modifier +2, radar signature -4, IR signature -4, acoustic signature 0, two 20 gallon self-sealing fuel tanks (one in each wing), engine uses 10 gph hydrox. The radar has a Scan of 22.

Payload Modules

A variety of payload modules are available for the Nightwing. Only one module can be installed at a time; changing modules is only possible on the ground from outside the vehicle. It requires a Mechanic+3 roll and tool kit, but only takes one minute per attempt. (In *GURPS Vehicles* terms, the Nightwing's payload modules are built as expensive "superstructures" even though they are inside the hull. This method may also be used to build other modules, such as containers for cargo ships.)

Some common modules include:

Container: A "quick-load" canister for up to 12 cubic feet of cargo. $60, 6 lbs., 12 cubic feet (plus up to 144 lbs. of cargo).

Fuel Tank: 25-gallon self-sealing tank containing enough fuel to add 144 minutes to flight time. $412.5, 153.75 lbs., 3.75 cubic feet.

Recon: Contains a precise inertial navigation system (+7 to Navigation skill), a vehicular medium-range multiscanner (double the range of standard *Ultra-Tech* multiscanner), an E cell for power, and a sophisticated recon camera with electro-optical lenses (capable of reading a newspaper from 10,000 feet up). $132,050, 150.5 lbs., 5.5 cubic feet.

Strike: Contains a pair of X-ray gatling lasers facing forward with a laser rangefinder (+2 to hit) and two E cells. Weapons are controlled by the pilot, although a Gunner program could also be purchased. $44,580, 144 lbs., 8 cubic feet.

CONTRAGRAVITY EQUIPMENT (TL12•)

Contragrav Chair (TL12•)

Essentially, this is a floating (or flying) wheelchair. The chair not only supports itself, and flies at any height, it also keeps its wearer in a 1-G environment (or whatever he prefers). It removes all penalties for heavy-gravity living, but is not suitable for manual labor. The usual maximum speed is 10 mph (Move 5) but faster (and far more expensive) jet-equipped versions are possible. It can carry up to 600 pounds in addition to its own 200-pound weight. It runs for one month on a D cell. Cost for a typical CG chair is $30,000. Accessories, life support, weapons and armor can be added.

Contragrav Chute (TL12•)

An anti-gravity "parachute" that nullifies gravity by about 99 percent, so that the user falls very slowly from any height. This harness-like device takes ten seconds to strap on and five to remove. It requires a Parachuting +4 roll to use safely – failure means the user got caught in a tree, blown off course, etc. Weapons fire while in a CG chute is at -2, more in rough air, and recoil penalties are *doubled*. The wearer can try to dodge, but maneuverability is poor – only add 1 to PD! A CG chute works for about an hour (to be safe, one drop) on a C cell. It costs $2,500 and weighs 20 pounds.

Contragrav Cycle (TL12•)

Also called a skimmer, this is a contragrav chair with the addition of a second seat behind the pilot, a windshield and a pair of low-powered reactionless thrusters for high-speed movement. It uses an E cell, rather than a D cell, to operate for one month. Payload is only 450 pounds but it cruises at 400 mph, and can (eventually) reach orbit. It requires Piloting (Contragravity) skill. A cycle costs $100,000 and weighs 350 pounds.

Contragrav Platform (TL12•)

This is the contragrav chair without the chair. It can carry up to 700 pounds in addition to its own 100-pound weight. It has no motive power of its own, but can be pushed or pulled like a cart. It runs for a month on a D cell and costs $4,000.

Contragravity Belts (TL13•)

The "grav belt" is a personal contragravity harness that lets the wearer fly at up to 80 mph (40 hexes/turn) at heights up to five miles on a 1-G world. A grav belt carries up to 500 pounds, though maximum speed and height are halved with over 250 pounds. It flies one hour on a C cell. Belts always have at least two cell sockets, and a beeper goes off when the first cell is 90% exhausted! It takes five seconds to put on and activate a grav belt, two to remove one. Controls are on the user's chest, and require only one hand. Piloting (Grav Belt) rolls are required for takeoffs, landings and difficult maneuvers. Most belts include interface jacks for "no hands" control.

Assault troops often use grav belts. Weapons fire from a grav belt is at -2 or worse if the user is doing tricky flying, dodging or in rough air. The Dodge roll in a contragrav belt is half Piloting (Grav Belt) skill, rounded down. Anyone dodging is at an extra -2 to fire next turn. Weight is 20 pounds; cost is $5,500.

Contragravity Modules (TL13•)

Also called "sky hooks," contragrav modules are flat, saucer-shaped disks with rings and brackets for attaching loads. They use a D cell to generate a contragravity field that can support up to 550 pounds for ten hours, a half-ton for an hour, or one ton for six minutes. They can be set to stay suspended in the air, or ordered to float upwards or downward at two yards per second to a maximum altitude of 100 yards; they may also be pushed along or towed. They cost $4,000 and weigh 15 pounds (turned off) apiece.

Gravity Cloak (TL14•)

The usual method of going places at TL14 is the gravity cloak, a flexible cloak made out of solid-state replicator circuitry. Fastened around the neck and at each wrist, it generates a contragravity field, enabling the user to fly in the same manner as with a grav belt (above). It may be controlled through arm movements (at -2 to skill) or through a neural-interface jack built into the cloak fastening (which also contains a C cell, which powers it for an hour). Cost is $6,000 and weight is 5 pounds.

Gravity cloaks are cheap enough that anyone can afford one. As a result, houses at TL14 may have no doors, only windows! Children are given their first cloaks as soon as they can walk, using neural interfaces (see p. 37) or reflex implants (see p. 110) to control them until they gain their own skill.

TELEPORTATION (TL15+)

Teleportation is instant travel from place to place. Depending on what limits exist for it and how cheap it is, teleportation may render obsolete most other forms of transportation. A few types of teleportation are described; many more are possible, and each will have different effects. For an excellent discussion of the social effects of teleportation, see Larry Niven's "Exercise In Speculation: The Theory and Practice of Teleportation" in his collection *All The Myriad Ways*.

For simplicity, all teleportation is assumed to involve moving the subject from place to place through pocket universes, quantum wormholes, or whatever, rather than converting the subject to energy and "beaming" him somewhere.
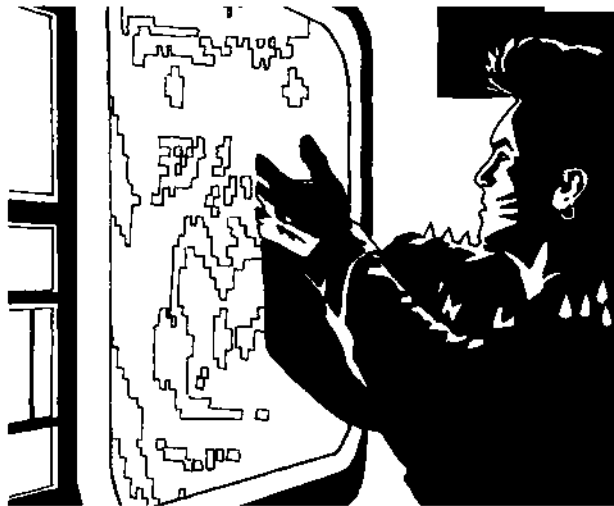
Teleport Booths (TL15+)

Teleportation may require enclosed *teleport booths* and only be possible booth-to-booth. Range is limited to 20 miles (due to conservation of energy effects) but multiple booths can be linked in relay for longer distances, allowing a traveler to hop across a planet in a matter of seconds. Interplanetary or interstellar teleportation is impossible, so booths are only useful on the surface of planets (or in large ships or space stations).

Travelers can go from one booth to any other booth within 20 miles for $1 per jump, deducted from the credcard balance. Longer jumps cost more, but since the computer automatically transfers the cargo from booth to booth, it still takes only seconds. Addresses are given (verbally) to the booth's computer, which will usually be programmed to act as a "phone book" of destination codes. It takes only two seconds to use a booth but there might be a waiting line. Streets disappear (if they have not already vanished because of contragravity) and people start to think of addresses in terms of teleport coordinates. It's possible to go anywhere on a world without seeing anything but the inside of a booth.

This form of teleportation reduces travel time in civilized areas to near zero, but doesn't affect the rest of the campaign very much; it is ideal for those who want to introduce teleportation at lower TLs, perhaps as a spinoff (or predecessor to) a form of FTL travel.

Actual teleport booths cost $100,000 each, weigh ½ ton and occupy 2 cy – if mounted in a spaceship, they require one MW of power. A home model can be linked with another dedicated booth within 20 miles, or be linked (for $1,000/month) to the general network. Only the wealthy can afford one, and they probably put it in the lobby or get an unlisted booth number to prevent just anyone dropping in.

Cheap Teleport Booths (TL15+)

Another option for teleportation is that full-size booths are *cheap*, costing 10% of the prices above. Everyone has one, and houses may not even bother with doors – though they might lock the door to the *booth*. But a much smaller teleport booth can also be made. A booth as small as a letterbox could be purchased for $1,000, and run off building power, or the service might be rented like a phone for $20/month. Mail and goods can be delivered via teleportation. They can be used for garbage disposal, or to order pizza. Want to go shopping? Call up a store's computer data base, plug in a credcard, then sit and watch the booth display holographic images of the store's inventory. Make a selection and it appears, if the price is met (by instant debit).

Telegates (TL15+)

Another means of teleportation. A telegate (or teleportal) is a gateway that leads to another telegate somewhere else. While activated it remains constantly open, and people can see through it, walk through it, even fire weapons back and forth from either end (just don't hit the telegate machinery). Energy differences are automatically compensated, so it is possible to step from a telegate in orbit to one on a planet below, and back. The gate may be fitted with a ward (see p. 90) to keep things from leaking through, but still allow people to walk through it.

Using a telegate requires that the coordinates on both gates must be matched. If telegates are used instead of teleport booths for a planetary transportation network, this will be performed automatically by the network's control system.

Telegates may be just an alternative to teleport booths (above), but other possibilities exist – see *Portable Telegates* and *Cosmic Freeways*, below.

Cosmic Freeways (TL16+)

If the GM desires, telegates can be used instead of spaceships for interstellar teleportation, perhaps with a range of a few dozen lightyears so that a series of gates are necessary. For mass transportation, an interstellar gateway might be constructed as an archway or tunnel on a roadway or train track – just take the first left at the turnpike, drive through the telegate and you're on a road on another planet. There are no spaceships, just roads (or railways!) leading to the stars. To avoid making it too easy, assume that no telegate can be within (say) 150 miles of another gate, thus allowing for a bit of on-road travel before reaching the next gate. A single highway system could link dozens of worlds, or even other dimensions, though the vehicles had better be designed for multiple environments. This type of "cosmic freeway" is described in Roger Zelazny's novel *Roadmarks* and John DeChance's *Starrigger* series; both works are recommended for GMs considering introducing this technology.

Portable Telegates (TL16+)

A portable telegate is a flat circle or rectangle with a power pack and controls mounted on the back. A portable telegate has a range of 10,000 miles (more or less at the GM's option) and is always hooked up to another portable telegate, the two devices forming a closed system, A to B. In order for either telegate to be used, both must be turned on and in range; optionally, turning on one gate automatically activates the other if it is in range. Going somewhere else requires another pair of telegates. No skill roll is required to use one; just activate it and step through. When functioning, the gateway is one yard across – anyone standing next to it can step through (taking two seconds) or dive through in one turn with a successful DX or Acrobatics roll.

A portable telegate can be carried like a shield. It adds 4 to PD. If the PD makes the difference in stopping an attack, or the user blocks a melee attack with the shield (use Shield-2, *not* Force Shield – a telegate is *heavy*) the blow or projectile goes through the gate. Just make sure no one friendly is standing on the other side.

A portable telegate is powered by a D cell, which activates it for 30 minutes of continuous use. They cost $100,000 (for a pair) and weigh 20 pounds apiece.

Teleport Projectors (TL16+)

Teleport projectors are teleportation devices that are *two-way*: they can "beam up" someone as well as sending him somewhere, and they do not require a receiving booth. Conservation of energy problems do not affect them – an orbiting ship can teleport up someone from the planet below, if it has the proper coordinates. They can also teleport a bomb, so unless the GM decides that force screens or some kind of defensive screen (see *Reality Stabilizer*, p. 81) can block them, they become the ultimate weapon.

A standard teleport projector is a platform one hex across. The projector controls are focused on a specific point. Anything standing on the platform is teleported to that destination point, and whatever occupied the destination point is teleported to the projector unit. Normally this is just air, but if the projector was focused on an area of solid rock, anyone using it would find himself in a cylindrical cave one yard across, and a block of stone would have appeared on the teleport platform. For obvious reasons, teleportation chambers are usually sealed and equipped with air and water pumps.

Range is 10,000 miles; using it takes ten seconds and a skill roll against Electronics Operation (Teleportation), with a -1 per 1,000 miles of distance; add +4 if teleporting *between* two cooperating projectors. Failure means a near miss, critical failure a disaster (perhaps the victim is trapped underground and the teleporter *breaks*). A teleport projector suitable for mounting on a starship costs $5,000,000, weighs two tons and occupies two cy. It requires ten MW of power. Additional platforms (or a larger-size platform) multiply cost, size and power accordingly.

GMs should think carefully before introducing teleport projectors, since they make it very easy to whisk characters out of danger. An easy fix to this is to require an arbitrary time (an hour, for instance) be required to lock the device onto a *specific* location. This makes them useful for delivering (or retrieving) commando raids and the like from pre-set rendezvous points, but much less useful for retrieving characters who have suddenly gotten themselves into a mess.
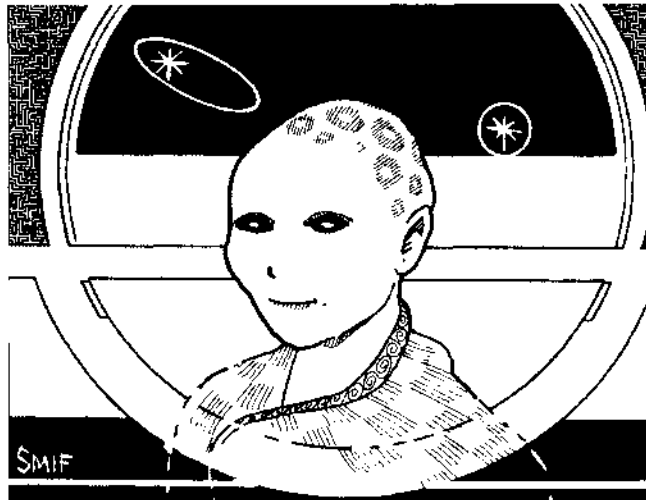
Interstellar Projectors (TL16+)

What if teleport projectors could teleport people anywhere and had *interstellar* range, perhaps substituting tens of light years for thousands of miles? This is more interesting if *no* FTL travel exists – only teleport projectors, and they are hideously expensive. Building a teleport projector costs at least a billion credits, and a similar amount to maintain. Only governments and the largest corporations have them, though they may rent time on them to other corporations or agencies.

The cost to use an interstellar projector is $100,000. This is for a projector with a platform one hex across or smaller (enough to pick up or transmit a man or a cubic yard of cargo). The cost (power consumption, computer time, or whatever) increases exponentially each time the radius doubles; a platform two yards in radius (enough to transmit an exploration team of a half-dozen men and their gear) costs $10,000,000, and a four-yard platform (large enough for a small vehicle or about 20 men) costs $100,000,000.

Using astronomical information, a likely star is located, and a small probe is sent through with a telescope. It locates any planets, then is brought back. If a habitable-appearing planet is discovered, a second probe is sent, this time into orbit. Landing coordinates are determined, and a team of humans is sent through – but because of the exponential cost increases, at $100,000 per person, sending through vehicles or tons of equipment is simply not practical. Only a half dozen or so explorers could be sent, especially if a smaller corporation was fronting the mission. Since any use of the projector for communication or resupply costs several million credits, they would likely be spending several days (or weeks) at a time out of communication, with no heavy equipment and no assistance from a convenient orbiting starship – an ideal setting for adventuring.

If a world proved to be habitable, it could be colonized by sending through cloning tanks and automated factories to quickly develop a population. While they would be too expensive for regular commerce (except in luxury goods and information), teleport projectors would obviously be in demand for diplomatic, intelligence or military missions. But again, because of the cost involved, only a small number of elite individuals could economically be sent through. Adventurers would have plenty of authority to make their own decisions, but not much backup if something went wrong.

GADGET TABLES

This section is designed for easy reference. The GM may copy it so that each player has a quick reference. Each gadget is listed with the following characteristics:

Weight

The weight is in pounds unless otherwise noted. Note that weight will be halved one TL after the gadget first appears, and halved again at the next TL. Weight may differ for the modified or enhanced forms of some gadgets. No weight is given for biochemical agents, body modifications, drugs, medical procedures or software.

Cost

This is the cost of the gadget when first available; like weight, cost drops by half one TL after introduction, and is halved again at the next TL. For implants, the cost of the implant operation is also given; this cost is also reduced by TL.

+ indicates that enhanced (including heavy-duty or miniaturized) versions or accessories are available for the gadget at extra cost; see the full description for details.

* indicates that an additional price is charged to use, rent, implant or install the device, or for some consumable resource (beyond power cells) that is used by the device; see the full description for details.

LC (Legality Class)

This tells how likely the gadget is to be legally available. In general, Legality Class 6 items are available with no questions asked.

Legality Class 5 items might be licensed for safety reasons, but it's usually easy to get one (e.g., an automobile today).

Legality Class 4 items are strictly licensed and are only available if society thinks you have a good reason for owning one (e.g., drugs for a doctor, a rifle for a colonist).

Legality Class 3 and 2 items indicate devices successively even more restricted; only very open societies will permit ownership.

Legality Class 1 and 0 items are illegal for anyone but a government (or multistellar corporation) to own except in libertarian societies.

TL

The tech level at which the device is first manufactured.

DR and Hit Points of Equipment

Most devices are protected by a durable plastic casing, with any screens or monitors made of thick plastic rather than glass. Unless otherwise noted, items weighing under 5 lbs. have HT 1, those 5-9 lbs. are HT 2, those 10-19 lbs are HT 3, 20-29 lbs. are HT 4, those 30 to 50 lbs. have HT 6, those 51-75 lbs. have HT 8, those over 75 lbs. have HT 10. For larger items, see *GURPS Vehicles*, p. 12.

ARMOR, DEFLECTORS AND FORCE SCREENS*

Type	PD	DR	Cost	Wt.	LC	TL	Page
Ablative Armor	4/1	12/2	$300	40	3	8	73
Combat Infantry Dress	4	40	$750	48	1	8	73
TL8 Helmet							
Accessories	–	.	$2,000	2	2	8	74
Cybersuit	5	80	$20,000	35	1	11	76
Deflectors:							
Deflector Belt	6	0	$5,000	2	4	12	77
Force Shield	4	0	$500+	0.5	4	11	77
Energy Cloth	4	50	$5,600	4	3	11	77
Force Screens:							
Backpack Force Screen	0	500	$25,000	25	1	13	78
Heavy Force Screen	0	1,000	$100,000	75	0	13	78
Personal Force Screen	0	200	$5,000	2	2	13	78
Safety Switch	–	.	$1,000	–	6	13	78
Infantry Combat Armor	6	65	$2,550	60	0	9	74
TL9 Helmet							
Accessories	–	–	$1,075	2	2	9	75
TL10 Helmet							
Accessories	.	–	$2,800	2.5	2	10	75
No-Faceplate Helmet	–	–	$1,000	..	2	10	75

Type	PD	DR	Cost	Wt.	LC	TL	Page
Medieval-Style Armor:							
Armorplast	Var.	+8	×1	×0.5	4	8	74
BPC	Var.	+24	×2	×0.5	4	9	74
Durasteel	Var.	+12	×1	×1	4	8	74
Monocrys:							
Light	2/1	8/2	$1,000	7	4	8	74
Medium	2/1	16/2	$1,500	12	3	8	74
Heavy	2/1	24/2	$2,000	16	2	8	74
Powered Combat Armor	6	100	$91,000	225	0	10	75
Reflec	6/3	2/0	$300	2	3	8	74
Reflex Armor	5/2	30/15	$4,000	10	2	10	76
Retro-Reflective Armor	6/3	2/1	$5,000	5	2	9	75
Thermal-Superconducting							
Armor	–	Spec.	$5,000	5	3	11	78

*All values are for full suits. All DRs are for torso armor only, and may vary by hit location or (in the case of armor with a "/" after their PD and DR) versus different weapon types. See the individual descriptions of each armor or screen.

BIOCHEMICAL WEAPONS

Name	Cost	LC	TL	Page
Gases:				
Blackout	$3	5	8	70
Nerve	$5	0	8	70
Paralysis	$10	2	9	71
Prism	$5	5	8	70
Sleep	$5	2	8	70
Pheromone Spray	$150	5	9	71
Poisons:				
Contact	Var.	0	8	71
Nerve	$5	0	8	71
Sleep	$20	2	8	71

BIOTECHNOLOGICAL & MEDICAL TECHNIQUES

Name	Cost	LC	TL	Page
Bodysculpt	$500+	6	8	101
Brain Transplant	$50,000	6	8	101
Braintaping	$5,000*	Var.	9	102
Brainwipe	Var.	0	10	103
Cloning	$5,000+*	Var.	8	101
Genetic Reconstruction	$5000+	Var.	10	103
Panimmunity				
Level 1	$1,000	6	9	103
Level 2	$5,000	6	10	103
Level 3	$20,000	6	12	103
Regeneration	$5,000+	6	12	104
Suspended Animation	$250+	6	9	103
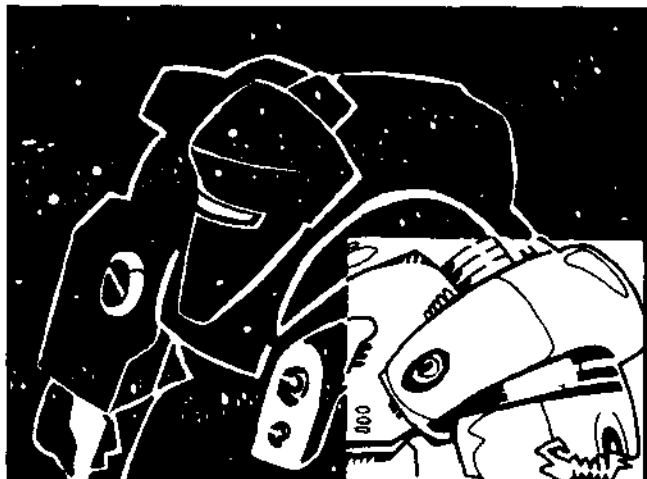
BODY MODIFICATIONS

Name	Cost	Operation Cost	LC	TL	Page
Advanced Com Implant	$1,200	$240	6	9	107
Bionic Arm	$25,000+	$20,000	6	8	106
Bionic Ear	$20,000+/pair	$20,000	6	8	105
Bionic Eye	$35,000+	$30,000	6	8	105
Bionic Hand	$12,000+	$20,000	6	8	106
Bionic Gill	$5,000	$1,000	6	9	107
Bionic Leg	$25,000+	$20,000	6	8	106
Bionic Reconstruction	$50,000	$20,000	3	8	106
Braintap Implant	$8,000+	$1,600	5	10	109
Computer Implant	$10,000	$2,000	6	11	110
Cortex Bomb	$500	$50	0	9	108
Dermal Armor	$20,000	$4,000	3	9	108
Finger Mount	$5,000	$1,000	4	9	108
Finger Talons	$8,000	$1,600	3	9	108
Flesh Holster	$500+	$50	5	9	107
Full Cyborg Body	$250,000	(included)	3	8	106
Hidden Compartment	$1,000	–	5	8	106
Neural-Interface Implant	$4,500+	$1,500	6	10	109
Personality Implant	$30,000+	$6,000	5	11	110
Psych Implant	Var.	$1,500	4	10	109
Recorder Implant	$1,000+	$100+	6	9	107
Reflex Implant	$5,500+	$1,100	6	10	110
Silver Tongue	$6,500	$1,300	6	9	108
Stinger	$2,000	$200	3	9	108
Time Release Toxin	Var.	Var.	0	9	108
Weapon Mount	$2,000+		4	8	106
Wonder Glands	$3,000+	$300	Var.	9	108

COMMUNICATIONS

Name	Wt.	Cost	LC	TL	Page
Com Scrambler	0.25	$500	5	8	36
Holocom	4	$400*	6	9	36
Interplanetary T-Com	15	$8,000	5	15	37
Neural Interface Jack		$500	5	10	37
Neural-Induction Helmet	3	$10,000+	5	10	37
Neutrino Communicator	30	$20,000	5	10	37
Neutrino Receiver	0.5	$500*	6	10	37
Transtellar T-Com	75	$40,000	5	15	37
Videcom	4	$80	6	8	36
Communicators:					
Gravity Ripple	Var.	Var.	5	12	37
Implant	–	$1,000	5	8	36
Master unit	5	$1,000	5	8	36
Long-Range	10	$600+	5	8	36
Medium-Range	1	$200	6	8	36
Short-Range	.5	$50	6	8	36

COMPUTERS

Name	Wt.	Cost	LC	TL	Page
Systems:					
AI Battlecomp (C6)	5	$2,000	5	12	31
Mainframe (C5)	500	$200,000+	5	8	31
Megacomputer (C7)	2,000	$2,000,000	5	9	31
Microframe (C4)	200	$40,000+	5	8	31
Minicomputer (C3)					
full workstation	300	$15,000	6	8	30
portable	30	$30,000	5	8	30
Personal Computer (C2)	2	$1,000	6	8	30
Modifications:					
Dedicated	×1	×0.1×1d	6	8	30
Ghostcomp (C8+)	×1	×10	4	14	31
Interface Jack	Neg.	+$500	6	10	32, 37
Optical	×2	×5	6	8	32
Sentient (C6+)	×1	×3	5	10	31
Peripherals:					
Peripherals Package	20	$300	6	8	30
Printer	4	$100*	6	8	32
Text Scanner	2	$40	6	8	32

Name	Wt.	Cost	LC	TL	Page
Storage Devices:					
Mass Storage (per Tb)	500	$10,000	6	8	32
Optical Disk (10 Gb)	–	$5	6	8	32

COUNTER-SURVEILLANCE GEAR

Name	Wt.	Cost	LC	TL	Page
Bug Detector	1	$500	5	8	90
Bug Stomper	2	$1,200	5	8	90
Distortion Mesh	–	$5,000+	5	9	90
Privacy Field	4	$5,000	5	10	90

CRIMINAL EQUIPMENT AND BURGLAR'S TOOLS

Name	Wt.	Cost	LC	TL	Page
Autograpnel	6	$400	6	8	83
Credcard Cracker	2	$5,000	3	8	83
Electronic Lockpick	3	$1,500	4	8	83
Spinneret	7	$300+	6	9	84
Viral Solvent	1	$200+	4	11	84

DEFENSES

Name	Wt.	Cost	LC	TL	Page
Ablative Foam Tube	0.25	$10+	5	8	79
Anti-Tangler Aerosol	2	$100	5	8	79
CBR Filter	1	$200	6	8	79
Decontamination Aerosol	12	$300+*	6	8	79
Infrared Cloaking	5	$1,500	5	9	79
Laser Sensors	2	$2,000	5	9	79
Nuclear Damper	500	$250,000	1	15	80
Pestguard	2	$1,300	5	9	80
Neutralizer	½	$130	6	9	80
Prism Aerosol	1	$25	5	8	79
Reality Stabilizers:					
Heavy Stabilizer	8,000	$1,000,000	2	16	81
Portable Stabilizer	50	$60,000	4	16	81
Stasis Key	3	$4,000	6	16	81
Stasis Webs:					
Stasis Belt	50	$75,000	2	16	81
Stasis Chamber	200	$50,000	5	15	80
Stasis Cube	10	$20,000	5	15	80
Stasis Grid	1,000	$100,000+	4	15	81
Tau-Field Generator	40	$15,000+	4	16	81

ENTERTAINMENT

Name	Cost	LC	TL	Page
Dreamgames	$2/minute	6	10	40
Program	$4000+	6	10	40
Holoproj Program	$1,000	6	11	40
Holoventure	$150/day	6	9	40

EXPLORATION GEAR

Name	Wt.	Cost	LC	TL	Page
Depth Gauge	0.25	$40	6	8	22
Environmental Cage	600	$50,000	6	9	22
Gravpack	15	$2,000	6	12	23
Inertial Compass	1	$250	6	8	22
Military Wet Suit	9	$700	5	8	22
Bioplastic	6	$2,500	5	10	17
Modular Cage	200	$5,000	6	9	22
Rocket Piton	2	$40	5	8	22
Slick Suit	4	$700	5	10	22
Military	6	$1,600	5	10	22
Slick surface	1	$1,000	5	10	22
Wet Suit	5	$200	6	8	22

EXPLOSIVES & GRENADES

Name	Wt.	Cost	LC	TL	Page
Grenades:					
Laser-guided		+$50	0	9	67
Chemical	1	Var.	Var.	8	67
Concussion	1	$20	0	8	67
Flare	1	$20	5	8	68
Fragmentation	1	$20	0	8	68
Hell	1	$750	0	14	68
Implosion	1	$2,000	0	16	69
Mininuke	1	$800	0	12	69
Shaped-Charge	1	$30	0	8	68
Stasis Bomb	1	$1,000	0	16	68
Warbler	1	$50	3	9	68
PLASTEX	0.25	$20	4	8	68
PLASTEX-B	0.25	$20	4	9	68
detonator		$20	4	8	68
Smart Mine	2	Var.	0	8	69
Strobe Mine	2	$100+	3	8	69

HOUSING-RELATED

Name	Wt.	Cost	LC	TL	Page
Gravity Neutralizer	200	$10,000	6	12	8
Infinity Room	–	$5,000,000	6	16	9
Living House	–	$12,000	6	11	7
SmartHome System		$4,000	6	8	5

LAW-ENFORCEMENT EQUIPMENT

Name	Wt.	Cost	LC	TL	Page
Biohound	2	$2,000	4	10	91
Chemsniffer	2	$700+	6	8	91
Criminology Kit	6	$3,000	5	8	91
Electronic Handcuffs	0.5	$40	5	8	91
Neuronic Handcuffs	0.25	$200+	2	10	91
Tracer Needle	–	$10	6	8	91
X-ray Scanner	4	$2,000	4	8	91

LIFE-SUPPORT EQUIPMENT

Name	Wt.	Cost	LC	TL	Page
Air Mask	2	$100+	6	8	24
Air Tank (2 hours)	10	$100	6	7	24
Air Tank (24 hours)	73	$400	6	7	24
Biosuit	3	$5,000	5	11	26
Exploration Suit	8	$3000	5	10	26
Filter Attachment	1	$100+	6	8	24
Forcelock	22	$3,000	6	11	26
Heat Suit	5	$150	6	8	25
Life-Support Belt	2	$2,000+	6	11	27
Rebreather	1	$200	6	8	25
Reducing Respirator	5	$500	6	9	25
Respirator	3	$300	6	9	26
Second Skin	–	$300	6	12	27
Skinsuit	3	$450	6	9	26
Vacc Suit:					
Armored	80	$4,000+	4	8	25
EAVS	230	$39,000+	4	8	15
Heavy-Duty	20	$1,500+	6	8	25
Standard	10	$1,000+	6	8	25
Zero-G Worksuit	150	$15,000+	6	9	26

MEDICAL EQUIPMENT

Name	Wt.	Cost	LC	TL	Page
Automedic	600	$50,000+*	5	9	94
Braincorder	32	$50,000	1	14	96
Brainwipe Equipment	500	$50,000	0	10	95
Chrysalis Machine	1,100	$150,000	5	13	96
Clone Tank	150	$10,000	4	12	96
Diagnosis Table	250	$12,000	6	9	94
Ecstasy Machine	2	$500	4	11	95
Emergency Medkit	1	$300	6	8	94
Freeze Tube	750	$55,000	6	9	94
Medscanner	1	$900	6	9	94
Medsensor		$200	5	9	94
Micromed	70	$20,000*	5	11	95
MMSD	800	$40,000*	3	9	95
Neural Inhibitor	0.25	$200	4	10	95
Plastiskin Patch	–	$10	6	8	94
Pneumospray Hypo	0.25	$125*	6	8	94
Regen Ray	2,000	$60,000	4	12	96
Sensa-Skin Neutralizer	0.25	$150	6	11	96
Sensa-Skin Patch	*	$50	5	11	95
Smart Bandage	4	$1,200*	6	10	95

PERSONAL ITEMS

Name	Wt.	Cost	LC	TL	Page
Attaché Case	2	$80	6	8	27
Clothing Belt	2	$1,000	6	10	27
Credcard	0.25	$20*	6	8	8
Imprint Circuits		$100	6	9	27
Pocket Pack	0.5	$20	6	8	27
Sonic Shower Head	10	$400	6	10	27
Varicloth	Var.	Var.	6	9	27

POWER

Name	Wt.	Cost	LC	TL	Page
Power Cells:					
AA	–	$2	6	8	10
A	–	$10	6	8	10
B	–	$30	6	8	10
C	0.5	$100	6	8	11
D	5	$500	6	8	11
E	20	$2,000	6	8	11
Solar Panels:					
AA	–	$2	6	8	12
A	–	$10	6	8	12
B	–	$50	6	8	12
C	0.3	$300	6	8	12
D	2.8	$2,000	6	8	12
E	25	$10,000	6	8	12

RECORDING/PLAYBACK DEVICES

Name	Wt.	Cost	LC	TL	Page
Digital Camera	2	$500	6	8	38
Helmet Video	0.5	$100	6	8	38
Holo Camera	5	$1,000*	6	9	38
Holomotion Camera	20	$3,000+*	6	9	38
Holo Projector	8	$750	6	9	38
Holovisor	1	$500+	6	11	39
Interactive Holovisor	1	$2,500	6	11	39
Newscam	7	$2,500	6	8	38
Reader	2	$100	6	8	38
Recorder	1	$175	6	8	38

SCIENTIFIC EQUIPMENT

Name	Wt.	Cost	LC	TL	Page
Radiation Detectors:					
Film Badge	–	$1	6	6	21
Radiation Alarm	0.25	$50	6	7	21
Wristwatch Rad Counter	0.25	$100	6	8	21
Timescanner	10,000	$800,000	5	15	21

SECURITY SYSTEMS

Name	Wt.	Cost	LC	TL	Page
Automatic Defenses:					
Defense Globe	50	$6,600	1	8	89
Doorward	3	$1,100	5	10	89
Gas Canister	5	$300	Var.	8	89
Paralysis Grid	–	$10,000+	2	10	90
Electronic Locks:					
IR/Laser Key	0.5	$200+	6	8	88
Keypad	0.5	$100+	6	7	88
Scanlocks:					
Facial Scanner	4	$1,000	5	8	89
Genetic scanner	8	$2,000+	5	8	89
Palm Scanner	1	$200	6	8	89
Retina Scanner	2	$500	5	8	89
Voice-Print Analyzer	0.5	$100	6	7	89
Sensors:					
Automated Scanner	Var.	$1,500+	Var.	9	88
Beam Sensor	–	$400+	6	7	88
Lethal Beam Sensor	–	$2,000+	1	8	88
Pressure Sensor	–	$100+	6	6	88
Sonic Sensor	–	$1,000+	6	7	88
Surveillance Camera	0.5	$150+	6	7	88
Ward	20	$1,000+	5	11	90

SENSORS

Name	Wt.	Cost	LC	TL	Page
Bioscanner	1	$1,000	6	9	19
Chemscanner	1	$1,000	6	9	19
Multiscanner	5	$5,000	6	9	19
Radscanner	1	$1,000	6	9	19
Seismic Sensor	3	$1,000	6	8	18
Ultrascanner	10	$8,000	4	12	19

SOFTWARE

Name	Complexity	Cost	LC	TL	Page
Accounting	2	$1,000	6	8	33
Astrogation	Var.	Var.	5	8	33
Damage Control	2	$2000	6	8	33
Databases	–	Var.	Var.	8	34
Datalink	1	$400	6	8	33
Defense:					
Passive	3	$5,000	6	8	34
Active	6	$250,000	1	8	34
Electronics Repair	2	$500	6	8	33
Engineering	2	$5,000	6	8	33
Environmental Analysis	3	$3,000	6	8	33
Expert Systems	3	Var.	Var.	8	33
Gunner	4	$45,000	3	8	33
Internal Security	3	$2,500	6	8	33
Interpreter	4	$10,000	6	8	33
Medical	4	$40,000	4	8	33
News Daemon	1	$500	6	8	33
Optical Recognition	4	$20,000	6	8	33
Personality Simulation	5	$20,000	6	8	33
Routine Vehicle Operation	2	$3000+	5	8	33
Security	2	$30,000	6	8	34
Target Virus	3	$10,000	1	8	34
Targeting	1	$1000	4	8	34
Translation	6	Var.	6	11	34
Virus	2	$1,000	1	8	34
Word Processing	2	$850	6	8	34
Worm	3	$25,000	3	8	34

SPECIAL WEAPONS

Name	Weight	Cost	LC	TL	Page
Energy Web	60	$50,000	2	14	59

STEALTH TECHNOLOGY

Name	Wt.	Cost	LC	TL	Page
Chameleon Armor	10	$1,850	5	10	85
Chameleon Cloak	4	$1,500+	5	10	85
Chameleon Suit	10	$1,850	5	10	86
Distort Belt	3	$2,200*	3	10	86
Holobelt	4	$1,100*	6	10	86
Intruder Suit	12	$8,000	3	10	86
Invisibility surface	8	$12,000	3	10	86
Living Disguise Kit	10	$5,000+	3	11	86
Radscanner Shielding	–	$500	3	9	85
Sonic Screen	3	$1,000	4	11	86
Stealth Capsule	900	$25,000	2	9	85

SURVEILLANCE EQUIPMENT

Name	Wt.	Cost	LC	TL	Page
Com Tap	4	$3,000	3	8	84
Laser Listening Device	12	$1,200	4	8	84
Nanobug	–	$500	1	10	84
Programmable Bug	0.5	$500+	5	8	84

SURVIVAL GEAR

Name	Wt.	Cost	LC	TL	Page
Biosampler	1	$500	6	9	23
Envirobag	6	$75+	6	8	23
Enviro-Bubble	5	$800	6	8	23
Filtration Canteen (empty)	1	$175	6	8	23
Replacement filters	Neg.	$25	6	8	23
Gravity Mat	70	$8500	6	13	24
Pressure Tent, 8-Man	150	$5,000	6	8	23
Pressure Tent, 2-Man	30	$1,500	6	8	23
Pressure Tent, 1-Man	15	$500	6	8	23
Survival Cocoon	6	$8,000	6	10	23
Survival Foam	2	$700	6	11	24
Neutralizer	0.5	$10	6	11	24
Survival Module	4	$600	6	10	24
Umbrella Field	4	$2,200	6	11	24
Vapor Canteen (empty)	2	$450+	6	8	23

TEACHING/LEARNING TECH

Name	Wt.	Cost	LC	TL	Page
Instaskill	–	Var.	5	11	39
Sleep Teacher	4	$12,000*	5	8	39
Teaching Suit	20	$60,000*	6	9	39

TOOLS

Name	Wt.	Cost	LC	TL	Page
Biphase Rope:					
⅜" (10 yards)	0.5	$5	6	8	15
½" (10 yards)	2	$30	6	8	15
Construction Foam	22	$100*	5	9	16
Cybertek	800	$30,000	6	9	16
Exoskeleton	150	$35,000+	5	8	15
Fire Extinguisher Tube	0.25	$10+	6	8	15
Flashlight	1	$20+	6	7	15
High-Power Drill	4	$120*	6	8	15
Industrial Replicator	Var.	$1 million+	5	13	18
Laser Torch	5	$250	6	8	15
Living Metal	Var.	Var.	Var.	13	18
Minifac	1,000	$110,000	5	10	17
Molecular Bonder	2	$3,000	5	15	18
Monowire (100 yards)	0.5	$1,000	4	9	16
Power Glove	2	$2,000	5	9	16
Robofac	Var.	$1 billion+	5	10	17
Sonic Probe	0.25	$1,500	6	9	17
Universal Tool	2	$1,200	5	15	18
Tool Kits:					
Basic Tool Kit:					
Armoury or Electronics	100	$1,200	6	8	16
Mechanic or Engineer	300	$800	6	8	16
Mini-Toolkit	2	$400	6	8	16
Portable Shop:					
Electronics	1,500	$7,000	6	8	16
Mechanic, Engineer, Armoury	3,000	$4,000	6	8	16
Portable Tool Kit:					
Armoury or Electronics	10	$900	6	8	16
Mechanic or Engineer	20	$600	6	8	16

TRANSPORTATION

Name	Wt.	Cost	LC	TL	Page
Aquasled	60	$2,000	6	8	114
Backpack Parawing	20	$400	6	8	114
Contragrav Chair	200	$30,000	6	12	116
Contragrav Chute	20	$2,500	6	12	116
Contragrav Cycle	350	$100,000	5	12	116
Contragrav Platform	100	$4,000	6	12	116
Contragravity Module	15	$4,000	6	13	116
Contragravity Belt	20	$5,500	5	13	116
Dragonfly	70	$4,025	5	8	114
Drop Capsule	800	$10,000	6	9	115
Fusion Flight Pack	75	$24,000*	2	10	115
Gravity Cloak	5	$6,000	5	14	116
Interstellar Projector	Var.	$1 billion+	1	16	118
Nightwing Ultralight	680	$539,750+	4	10	115
Portable Telegate	20	$100,000	6	16	118
Smartcar	1,474	$21,420	5	8	114
Teleport Booth	1,000	$100,000	5	15	117
Teleport Projector	4,000	$5,000,000	2	16	118
Underwater Propulsion Pack	20	$600	6	8	114
Zero-G Thrusters:					
Hand Thruster	4	$50*	6	8	114
Thruster Pack	45	$2,000*	6	8	114

VIEWING AIDS

Name	Wt.	Cost	LC	TL	Page
Anti-Glare Goggles	0.5	$150	6	8	20
Infared Contacts	–	$300	5	9	20
Infrared Goggles	0.5	$600	5	8	20
Light Intensifier Contacts	–	$300	6	8	20
Macrovisor	2	$2,000	4	13	20
Multi-view Goggles	1.5	$1,200	6	8	20
Nightshades	0.5	$600	6	9	20
Sensor Visor	2	$1,500	6	10	20
Televiewers	2	$950	6	8	20

WEAPON ACCESSORIES

Name	Wt.	Cost	LC	TL	Page
Anti-Theft System	–	$100+	6	8	64
Articulated Weapon Harness	5	$600	5	8	64
D-Tag	–	$20	6	8	64
Designators:					
Active (Laser) Designator	2	$1,000	2	8	64
Passive Designator	30	$20,000	2	10	65
Holographic HUD Visor	0.5	$500	6	9	65
HUD Sight	–	$500	4	8	65
HUD Visor	0.5	$500	6	8	65
Laser Sight	Neg.	$200	4	7	64
Personal Transponder	–	$100+	5	9	66
Power Holster	5	$1,000	5	8	65
Powerpacks	6	$500+	3	8	65
Recognition Pad	0.5	$250	5	9	66
Space Proofing	–	$200	6	7	64
Sniper Mirror	1	$50	6	8	65

WONDER DRUGS

Name	Cost	LC	TL	Page
Adders	$25-50	4	8	97
Analgine	$50	4	9	98
Anti-Agathics	$25,000	6	10	99
Antirad	$150	5	9	98
Ascepaline	$150	4	9	97
Genericillin	$100	4	10	99
Gravanol	$70	6	9	98
Hypercoagulin	$25	4	8	97
Memory-Beta	$250	4	10	99
Morphazine	$10	5	8	97
Neurovine	$30	5	8	97
Purge	$20	6	10	100
Quickheal	$20-$50	6	9	99
Rage	$40	3	8	97
Revive Capsules	$5	6	8	98
Shaker	$20+	1	10	100
Soothe	$15	4	9	99
Superstim	$25-50	5	8	98
Suspend	$650	4	9	99
Tempo	$40	2	10	100
Torpine	$250	4	10	100

RANGED WEAPONS

Weapons are arranged according to the skill required to use them. Under each skill, the various weapons are separated into subcategories according to mode of operation.

Malf: The die roll on which the weapon malfunctions. Almost all **Ultra-Tech** weapons have a Malf of Crit. or better.

Crit. means that the weapon malfunctions only on a critical miss when the roll on the Critical Miss table indicates a malfunction.

Ver. means that the weapon requires a *verification roll*, another roll against skill. Any failure is the malfunction from the table; any success is simply a miss.

Ver.(Crit.) means that the verification roll must be another critical miss for the weapon to malfunction. Any other result is simply a miss.

Type: The type of damage the weapon does – impaling (imp.), crushing (cr.), an explosion (exp.), or a special effect (spcl. – see the description of the weapon).

Damage: The number of dice of damage the weapon does. A number in parentheses, e.g., (5), means the weapon is very good at piercing armor – the target's DR is divided by that number before subtracting from the weapon's damage. Note: gyroc and smartgun weapons damage assumes APEX ammunition.

SS: This is the snap-shot number, the final to hit number necessary to avoid a snapshot penalty of -4 without at least one turn of aiming.

Acc: The weapon's accuracy modifier. See p. B115.

½D: The range at which the accuracy modifier of the weapon drops to zero and its damage is halved. For weapons like grenade launchers, this range may be shown as a dash, indicating that damage is never halved; in this case, Acc drops to zero at half the maximum range.

Max: The maximum range of the weapon under Earth-normal conditions.

Wt.: The weight in pounds of a loaded weapon, including magazine and/or power cells.

RoF: The rate of fire of the weapon. The number is the number of shots it can fire each turn. If the number is greater than one, the weapon is capable of automatic fire, i.e., that many shots will be fired if the trigger is held down for the entire turn.

A ~ indicates a weapon that is not automatic, but can fire up to the indicated number of times per turn. All automatic weapons are capable of selective fire; they may fire either automatically or with RoF 3~. A fractional RoF (e.g., 1/10) means the weapon can fire once, but then requires that number of turns to reload (or cool down, in the case of Dino lasers) before it can be fired again.

Shots: This is the number of shots the weapon's magazine holds A /B, /C, /D or /E refers to shots per *power cell*. Unless the weapon has a fractional RoF (see above) it takes three turns to replace a magazine or cell.

ST: The minimum ST required to avoid an extra turn of readying the weapon after it is fired, and extra recoil penalties. T means that the weapon is normally used from a tripod mount; it uses Gunner rather than Beam Weapons skill (e.g., Gunner (Flamer)).

Tripods take three turns to set up, and are fired while the user is prone or kneeling. Minimum ST only applies when firing the weapon from the shoulder or hip. Tripod mounted weapons can also be fired from mounts on vehicles, walls, etc. It takes three turns to mount or dismount a weapon normally; exceptions are up to the GM.

Rcl: The recoil penalty of the weapon (p. B119).

Cost: The retail price of the weapon. Cost halves one TL after a weapon is introduced, and halves again at the next TL.

LC: The legality class of the weapon.

TL: The TL when the weapon is first introduced.

BEAM WEAPONS (BLASTER)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	LC	TL	Page
Blasters																
Blaster Pistol	Ver.	Imp.	6d	10	6	–	300	2	3~	20/C	5	-1	2,000	3	9	51
Blaster Rifle	Ver.	Imp.	12d	14	13	300	800	10	3~	12/C	6	-1	3,000	4	9	52
Heavy Pistol	Ver.	Imp.	9d	12	8	300	450	4.5	3~	16/C	8	-1	2,500	2	9	52
Heavy Rifle	Ver.	Imp.	6d×3	15	14	600	1,600	12	3~	60/D	9	-1	6,000	0	9	52
Electron Weapons																
Electron Pistol	Crit.	Imp.	5d×3	11	10	450	675	3	3~	20/C	6	-1	2,200	2	11	57
Electron Rifle	Crit.	Imp.	6d×5	13	14	900	2,400	9	3~	100/D	9	-1	3,500	0	11	58
Pulsars																
Assault Pulsar	Crit.	Spel.	3d×10 (2)	11	12	400	800	7.5	3~	60/D	8	-1	20,000	0	13	59
Heavy Pulsar	Crit.	Spel.	5d×10 (2)	14	14	600	1,200	25	1	24/D	13T	-1	30,000	0	13	59

BEAM WEAPONS (DISINTEGRATOR)

Disintegrator Pistol	Crit.	Spel.	8d (100)	10	12	–	1,000	4	1	6/C	-	0	6,000	1	15	61
Disintegrator Rifle	Crit.	Spel.	15d (100)	15	18	–	3,000	12	1	30/D	-	0	20,000	0	15	61

BEAM WEAPONS (ELECTROLASER)

Electrolaser Pistol	Crit.	Spel.	2d+1	8	4	60	120	1.5	1	10/C	-	0	1,200	3	9	52
Electrolaser Rifle	Crit.	Spel.	3d+1	9	12	100	300	5	1	5/C	-	0	1,800	2	9	52

BEAM WEAPONS (FLAMER) (GUNNER (FLAMER) FOR TRIPOD VERSIONS)

Flamers																
Hand Flamer	Crit.	Spel.	10d	4	12	70	150	4	1	8/C	6	0	1,300	2	9	53
Plasma Rifle	Crit.	Spel.	8d×2	5	16	80	250	12	1	70/D	9	0	5,200	0	9	53
Tripod Flamer	Ver.	Spel.	3d×10	6	20	100	300	45	1	40/D	12T	0	10,000	0	9	53
Fusion Guns																
Fusion Pistol	Crit.	Spel.	4d×10	11	6	300	450	5.5	1	6/D	7	0	3,200	0	12	58
Fusion Rifle	Crit.	Spel.	4d×10	16	10	500	750	16	4	20/D	11	0	6,000	0	12	58

BEAM WEAPONS (FORCE BEAMS)

Force Rifle	Ver.	Spel.	7d	13	8	50	100	5	3~	20/C	-	0	3,000	4	12	58
Force Rod	Ver.	Spel.	4d+2	10	5	20	30	1	3~	30/C		0	1,500	3	12	58

BEAM WEAPONS (LASER) (GUNNER (LASER) FOR GATLING VERSIONS)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	I.C	TL	Page
Gamma-Ray Lasers (Grasers)																
Gatling Graser	Ver.(Crit.)	Imp.	40d (5)	10	20	6,000	18,000	75	4	75/E	15T	0	40,000	0	14	60
Heavy Pistol	Ver.(Crit.)	Imp.	4d (5)	9	8	500	1,400	3	4	12/C	–	0	3,000	0	14	60
Military Dinosaur Graser	Ver.(Crit.)	Imp.	40d (5)	16	12	6,000	18,000	10	1/2	7/D	–	0	12,000	0	14	60
Military Carbine	Ver.(Crit.)	Imp.	3d (5)	10	12	1,200	2,400	7	8	160/D	–	0	6,000	0	14	60
Military Rifle	Ver.(Crit.)	Imp.	4d (5)	12	15	2,400	3,200	9	8	112/D	–	0	8,000	0	14	60
Lasers																
Dinosaur Laser	Ver.(Crit.)	Imp.	20d	16	12	4,000	12,000	9	1/2	2/2C	–	0	4,000	4	9	49
Gatling Laser	Ver.(Crit.)	Imp.	20d	10	20	4,000	12,000	75	4	150/E	15T	0	20,000	0	9	49
Heavy Pistol	Ver.(Crit.)	Imp.	2d	9	8	300	800	3	4	12/C	–	0	1,500	2	8	49
Holdout Laser	Crit.	Imp.	1d-1	10	4	50	100	–	1	5/B		0	500	0	9	50
Laser Crystal	Crit.	Imp.	2d	7	5	25	75	–	1	1		0	200	0	10	50
Laser Pistol	Crit.	Imp.	1d	9	7	200	500	2	4	20/C	–	0	1,000	3	8	49
Laser Rifle	Crit.	Imp.	2d	15	13	900	1,200	5	8	12/C	–	0	2,000	4	8	49
Military Dinosaur Laser	Ver.(Crit.)	Imp.	20d	16	12	4,000	12,000	10	1/2	10/D		0	6,000	0	9	50
Military Carbine	Ver.	Imp.	1d+2	10	12	750	1,200	7	8	200/D	–	0	3,000	1	8	49
Military Rifle	Ver.(Crit.)	Imp.	2d	12	15	1,500	2,000	9	8	140/D	–	0	4,000	0	8	49
Survival Laser	Ver.	Imp.	1d-1	10	12	150	300	4	3~	50/C	–	0	2,500	4	9	50
Microwave Lasers (Disruptors)																
Disruptor Rifle	Crit.	Spcl.	6d	13	10	500	1,000	9	3~	20/C	–	0	2,500	2	9	52
Scrambler	Crit.	Spcl.	1d+3	8	3	40	80	0.25	1	4/B	–	0	750	0	9	52
X-Ray Lasers																
Gatling X-Laser	Ver.(Crit.)	Imp.	30d (2)	10	20	4,500	13,500	75	4	75/E	15T	0	20,000	0	10	57
Heavy Pistol	Ver.(Crit.)	Imp.	3d (2)	9	8	400	1,000	3	4	12/C	–	0	1,500	0	10	57
Military Dinosaur X-Laser	Ver.(Crit.)	Imp.	30d (2)	16	12	4,500	13,500	10	1/2	7/D	–	0	6,000	0	10	57
Military Carbine	Ver.(Crit.)	Imp.	2d (2)	10	12	900	1,800	7	8	200/D		0	3,000	0	10	57
Military Rifle	Ver.(Crit.)	Imp.	3d (2)	12	15	1,800	2,400	9	8	140/D		0	4,000	0	10	57

BEAM WEAPONS (NEURAL)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	I.C	TL	Page
Hypnagogic Projector	Crit.	Spcl.	–	5	5	–	25	10	1	40/C	.	0	12,000	1	12	58
Nerve Pistol	Ver.	Spcl.	Spcl.	8	4	15	30	2	3~	30/C		0	1,000	2	10	56
Paralysis Gun	Ver.	Spcl.	–	6	4	–	25	5	1	15/C		0	1,500	3	10	56
Paralysis Rifle	Ver.	Spcl.	–	7	10	–	50	8	1	8/C		0	1,500	3	10	56
Wiper	Crit.	Spcl.	–	4	4	–	3	0.5	1	10/B	–	0	1,000	0	12	59

BEAM WEAPONS (SONIC) (GUNNER (SONIC) FOR TRIPOD VERSIONS)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	I.C	TL	Page
Screamers																
Screamer	Ver.	Spcl.	6d×2	4	10	250	500	10	1	10/C	–	0	3,000	1	9	55
Tripod Screamer	Ver.	Spcl.	6d×3	3	15	500	800	40	4	100/D	12	0	9,000	0	9	55
Stunners																
Sonic Stinger	Crit.	Spcl.		6	2	6	10	0.25	1	8/B	–	0	400	6	9	55
Sonic Rifle	Crit.	Spcl.	–	12	10	300	1,000	4	3~	20/C	–	0	2,000	5	9	56
Stunner	Crit.	Spcl.	–	4	3	12	20	1	3~	40/C	–	0	800	6	9	55

BEAM WEAPONS (TACHYONIC)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	I.C	TL	Page
Tachyonic Disruptor Pistol	Crit.	Imp.	5d (10)	10	10	2,000	3,500	2	1	8/C	–	0	5,000	2	15	61
Tachyonic Disruptor Rifle	Crit.	Imp.	8d (10)	12	12	4,000	6,000	5	1	40/D	–	0	25,000	1	15	61
Tachyon Shotgun	Crit.	Spcl.	Spcl.	10	10	–	200	40	1	8/E	–	0	20,000	0	16	61
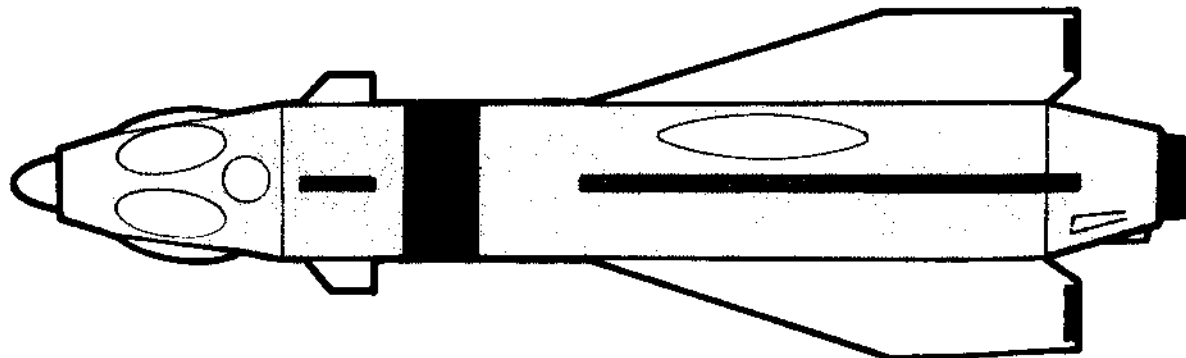
Gunner (Missile)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	LC	TL	Page
Hunter Missile Launcher	Crit.	Exp.	6d×25 (10)	–	–	–	10,000	15	3~	3	9	0	4,000	0	13	59
Infantry Missile Launcher	Crit.	Exp.	6d×10 (10)	–	–	–	4,000	15	1/4	1	7	0	5,800	0	9	54
M-LAWS	Crit.	Exp.	6d×10 (10)	–	–	–	4,000	35	1	5	11	0	9,500	0	9	54
Portable Missile Launcher	Crit.	Exp.	6d×8 (10)				4,000	15	1/10	1	9	0	6,000	0	8	50

Gunner (Mortar)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	LC	TL	Page
Electromag Mortar	Crit.	Spcl.	Spcl.	20	15	–	6,000	70	1	20	15T	0	15,000	0	8	46

Guns (Grenade Launcher)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	LC	TL	Page
Electromag GL.	Crit.	Spcl.	Spcl.	10	8	–	1,000	10	1	5		0	5,000	0	8	45
Mini-GL	Crit.	Spcl.	Spcl.	10	7	–	500	4	1	3	–	0	1,000	0	8	45
Splat Gun	Crit.	Exp.	5d (10)	5	9	–	500	20	8	8	15T	-2	3,500	0	9	55

Guns (Gyroc) (Gunner (Gyroc) for ARL)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	LC	TL	Page
Gyrocs																
ARL	Ver.	Spcl.	8d (2)	16	9	1,800	2,500	20	10	20/20/20	12T	0	3,000	0	8	47
Launch Pistol	Ver.	Spcl.	8d (2)	12	5	1,800	2,500	4	3~	3/3/3	–	0	800	2	8	47
Rocket Carbine	Ver.	Spcl.	8d (2)	15	7	1,800	2,500	9	10	10/10	–	0	1,500	1	8	47
Smartguns																
Smartgun	Crit.	Spcl.	Spcl.	–	–	–		3	1	6	–	0	4,000	2	14	60

Guns (Light Auto, Pistol or Rifle)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	LC	TL	Page
Chemical Slugthrowers																
Assault Carbine	Ver.	Cr.	6d	12	11	1,000	4,500	7	10	30/30	9	-1	1,000	1	8	44
Machine Pistol	Ver.	Cr.	3d	10	8	180	2,000	3.5	10	30	9	-2	700	2	8	44
Sporting Pistol	Crit.	Cr.	1d	9	6	50	200	1	3~	40	7	-1	200	4	8	44

Guns (Needler)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	LC	TL	Page
Gauss Guns																
AMR	Crit.	Exp.	6d×20	10	15	–	5,000	6	3~	60/C	–	0	2,000	0	15	61
Gauss Battle Rifle	Ver.(Crit.)	Cr.	8d (2)	12	12	1,200	4,500	7.5	12	60/C	–	0	3,500	0	9	53
Gauss Needle Rifle	Ver.	Imp.	2d+1	14	11	500	1,000	6	20	100/B	–	0	2,500	2	8	45
Gauss Needler (Pistol)	Ver.	Imp.	1d+2	10	4	100	300	1.5	12	100/B	–	0	2,000	2	8	45
Gauss SMG	Crit.	Cr.	5d (2)	11	9	250	2,500	5	16	60/C	.	0	3,000	1	9	53
Spring Guns																
Ice Gun	Crit.	Imp.	1d-1	9	3	50	150	1.5	3~	15	–	-1	600	4	10	56
Needle Rifle	Crit.	Imp.	2d	13	9	300	800	5	3~	100	–	-1	1,200	4	8	50
Needler (Pistol)	Ver.	Imp.	1d+2	9	1	100	300	1	3~	100	.	-1	500	3	8	50

Guns (Tangler)

Weapon	Malf	Type	Damage	SS	Acc	½D	Max	Wt.	RoF	Shots	ST	Rcl	Cost	LC	TL	Page
Tangle Pistol	Crit.	Spcl.	–	5	6	–	15	3	1	2	10	-4	500	5	8	51
Tangler	Crit.	Spcl.	–	6	8	–	20	6	1	5	8	-4	1,000	5	8	51

MELEE WEAPONS

With the exception of LC (legality class), weapon statistics use the same format as the *GURPS Basic Set*, Third Edition, p. B206. Melee weapons malfunction only on a critical miss.

Weapon	Type	Amt.	Reach	Cost	Wt.	ST	LC	TL	Page
Force Sword	Imp.	4d (5)	1	3,000+	2	–	3	11	63
	Cut.	8d (5)	1						
Monowire Blade	Cut	+1d (10), spcl.	**	**	**	**	3	9	62
Monowire Whip	Cut	+1d (10), spcl.	1-7	900	0.25	–	3	9	62
Neurolash I	Spcl.	Spcl.	1	650	2	–	5	10	63
Neurolash II	Spcl.	1d	1	2,000	2	–	2	10	63
Sonic Blade	Spcl.	5d (5)	C,1	2,500	2	–	2	10	63
Stun Wand	Spcl.	Spcl.	C,1	100	1		6	8	62
Vibroblade	Imp.	+1d (5)	**	**	**	**	3	8	62
	Cut	+1d (5)	**						

** varies by weapon type

INDEX