GURPS®

HIGH-TECH

BY MICHAEL HURST

STEVE JACKSON GAMES

"My wish for something to serve my purpose is perfectly fulfilled . . . . Wherefore I do honour to the machine and to its inventor."

– D.H. Lawrence

IT'S ALL HERE!

Weapons and equipment from the 14th century to the present. Whether you need to traverse the perilous jungles of Brazil, or stop a monster cold in its tracks, ***GURPS High-Tech*** has the gadget you need to get the job done!

High-Tech examines technology by period, from the rise of gunpowder (Tech Level 4) through the modern era (Tech Level 7), in enough detail to let players and GMs know what is available and feasible for each era. Subjects covered include:

Personal Weapons – From the matchlock musket to the assault rifle, ***High-Tech*** details over 100 guns, with detailed rules governing firearm operation.

Personal Armor – Many varieties of personal armor, including today's (and tomorrow's) high-protection combat vests. Dress for the occasion!

Heavy Weapons – From muzzle-loaded cannons to computer-guided missiles, heavy weapons make a big impression.

Explosives – Everything from firecrackers to H-Bombs.

Communication and Vehicles – From the heliograph to the cellular phone, from the ox cart to the space shuttle . . . welcome to the global village.

Medicine – From bloodletting to laser surgery: a concise survey of medical techniques and capabilities through the ages.

Tools – The "don't leave home without them" devices of every period, from flint and steel to the transistor radio.

Know your options.
Choose your weapons.
And above all . . .

BE PREPARED!

THIRD EDITION
PUBLISHED OCTOBER 1998

GURPS High-Tech is designed for use with the ***GURPS Basic Set,*** *Third Edition Revised.* Aside from specific game stats, this sourcebook will be valuable to any roleplayer or Game Master. Descriptions have been made as detailed and informative as possible, for easy conversion to any game system.

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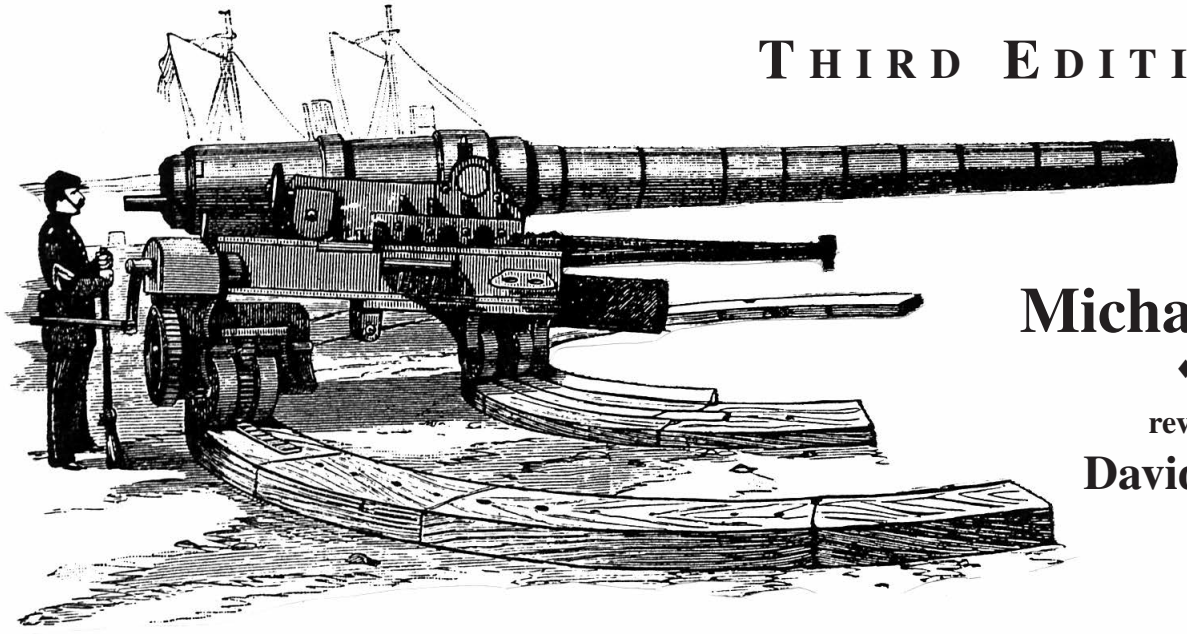
WEAPONS AND EQUIPMENT THROUGH THE AGES

THIRD EDITION



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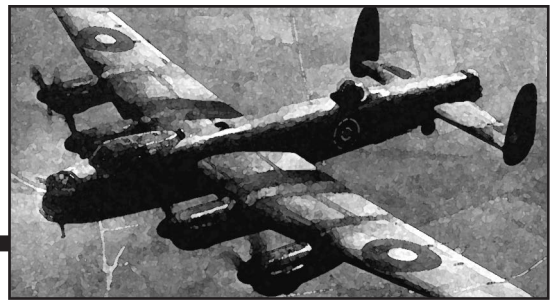


ABOUT GURPS

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

Pyramid (www.sjgames.com/pyramid). Our online magazine includes new rules and articles for ***GURPS***. It also covers all the hobby's top games – ***AD&D, Traveller, World of Darkness, Call of Cthulhu, Shadowrun*** and many more – and other SJ Games releases like ***In Nomine, INWO, Car Wars, Toon, Ogre Miniatures*** and more. And *Pyramid* subscribers also have access to playtest files online, to see (and comment on) new books before they're released.

New supplements and adventures. ***GURPS*** continues to grow, and we'll be happy to let you know what's new. A current catalog is available for an SASE. Or check out our Web site (below).

Errata. Everyone makes mistakes, including us – but we do our best to fix our errors. Up-to-date errata sheets for all ***GURPS*** releases, including this book, are always available from SJ Games; be sure to include an SASE with your request. Or download them from the Web – see below.

Q&A. We do our best to answer any game question accompanied by an SASE.

Gamer input. We value your comments. We will consider them, not only for new products, but also when we update this book on later printings!

Internet. Visit us on the World Wide Web at **www.sjgames.com** for an online catalog, errata and updates, and hundreds of pages of information. We also have conferences on Compuserve and America Online. ***GURPS*** has its own Usenet group, too: rec.games.frp.gurps.

GURPSnet. Much of the online discussion of ***GURPS*** happens on this e-mail list. To join, send mail to majordomo@io.com with "subscribe GURPSnet-L" in the body, or point your World Wide Web browser to: www.io.com/~ftp/GURPSnet/www/.

Page References

See ***GURPS Compendium I,*** p. 181, for a full list of abbreviations for ***GURPS*** titles. Any page reference that begins with a B refers to ***GURPS Basic Set,*** *Third Edition Revised;* e.g., p. B144 refers to page 144 of ***Basic Set.*** CI refers to ***Compendium I,*** CII to ***Compendium II,*** and V to ***Vehicles.***

INTRODUCTION

GURPS is the universal roleplaying system. As such, it must cover any imaginable genre. Our main purpose in this book is to support and encourage an especially neglected species . . . the historical roleplayer. Earth's history has as much wonder and adventure to offer as any fantasy or science fiction . . . yet gamers often neglect this richest of all possible game-worlds.

This is the technical resource book for any historical campaign set after the Middle Ages. ***GURPS High-Tech*** starts with Tech Level 4 – the period at which gunpowder weapons begin to dominate the battlefield – and goes from there to the weaponry of today and tomorrow. ***GURPS Ultra-Tech*** describes the devices of science fiction.

Tech Levels, therefore, are described here in terms of the history of our own Earth. But GMs of fantasy and science fiction campaigns will, we think, find this book useful as well. The rules and descriptions apply to any similar technology, on Yrth, or Krishna, or H. Beam Piper's Aryan-Transpacific.

Tech Levels 4 through 7 (our present day) each are covered in a chapter. The main focus is on guns, from the first primitive *handgonne* to the laser-sighted machine-guns of the very near future. But we have tried not to slight other important technology. Each chapter also covers travel, communications, medicine and a Tool Kit of useful, typical items for the period.

It should be emphasized that history can't really be divided into neat Tech Levels. In many cases, a device is invented, and even available in a limited fashion, long before the man in the street has heard of it. In other cases, a device may literally seem to appear before its time! We have tried to keep a general historical perspective rather than a strict chronology when assigning devices to the different TLs, but especially anomalous situations are noted where they occur.

High-Tech has rules for a wide range of tools, weapons and devices. But it can't possibly be exhaustive. We hope that this book will encourage historical research as well as roleplaying, as both players and GMs investigate the technology of day-to-day life in our past.

Therefore, we have tried to make it easy to adapt gadgets from other sources to the game world. Much of the bibliography (p. 127) is devoted to sourcebooks for equipment information. Any item that is adequately described with real-world information can be converted to game terms. See p. 106 for information about the terminology used; this will be especially helpful if you are translating a new weapon into game terms.

About the Author

Mike Hurst served as an artilleryman in Viet Nam. He has also been a security officer (both uniformed and undercover); a tank commander in the Texas National Guard; and Captain of the Guard of the Barony of Bryn Gwlad. He is an NRA-certified firearms instructor and holds a Texas Reserve Police Officer certification. He possesses two dogs, an undetermined number of cats, and several thousand books, mostly history and science fiction.

He has been a wargamer and miniatures gamer for nearly 20 years, and shows no sign of reforming. On the other hand, his beloved wife Brenda, who shoots ambidextrously, insists he had better quit playing and commence writing.

Relative Explosive Force

The concussive power of explosives is measured in relation to the explosive force of TNT (trinitrotoluene), an explosive invented in 1876. TNT has an arbitrary explosive force of 1.

Chemical explosives work by releasing energy held in stressed chemical bonds. Most common chemical explosives have Relative Explosive Force values between .3 and 2. So, for instance, black powder (REF of .5) does just half the damage that TNT does. A pound of TNT does 6d×2 damage, so a pound of black powder does 6d damage. (Explosion damage should be based on 6 dice where possible; this gives an appropriate spread of probable damage).

The following figures are a ballpark guide to relative power, pound for pound, of explosives, where TNT is rated 1.

Serpentine Powder (pre-1600)	0.3
Ammonium Nitrate	0.4
Corned Powder (pre-1850)	0.4
Black Powder (post-1850)	0.5
Diesel fuel/nitrate fertilizer mix	0.5
Dynamite (80%)	0.8
PETN (det cord)	1.0
TNT	1.0
Amatol	1.2
Gasoline	1.2
Tetryl	1.3
Composition B	1.4
C3	1.4
C4	1.4
Liquid hydrogen/liquid oxygen	1.5
Nitroglycerine	1.5
FAE munition (see p. 27)	5.0
Nuclear devices	see below
Antimatter	1.135×10^{10}

Fuses

A fuse is a way of predetermining the time of an explosion. It can be anything from a powder-train to an elaborate mechanical or electronic gadget. Fuses are either for projectiles or for emplaced charges. Designing a fuse that will fire at the selected time requires Demolition/TL. Setting an already prepared fuse is a Gunner skill for artillery rounds, and a Demolition skill for most other purposes. Under ordinary circumstances, no skill roll is required to *light* a fuse or powder train *set* by someone else.

Correct fuse setting is not an intuitive process, and there are a lot of ways to foul it up. GMs roll for fuse action against the Demolition skill of the one who set the fuse, and do not inform the user of the result until time for the explosion. GMs are encouraged to be sneaky; explosives are a tricky business and should be accompanied by mystery and catastrophe.

TL affects the predictability of a fuse. At TL4, predictability is 10% (1 second for a 10-second fuse, 1 minute for a 10-minute fuse, etc.). At TL5, 5%. At TL6, 1%. At TL7 and above, predictability is so good that, within human perception, it is effectively without error. See the sidebar on p. 35 for burning times of slow-match, quick-match and powder trains.

MAKING GUNPOWDER (Continued)

Early in the 16th century, *corned powder* was invented. To make this, meal powder is dampened and pressed into cakes. The cakes are dried and ground (carefully – don't strike a spark!) into grains of various sizes. Corned powder does not separate in storage or transport. In 1588 the Duke of Medina Sidonia was happy that the powder for the Spanish Armada was corned and not meal powder.

Another benefit of corned powder is that varying the grain size changes the burning rate. Fine-grained powder was used for small-bore and short-barreled weapons, and for priming, which need a fast rate. Coarse powder was used for large-bore weapons, and as a blasting explosive. (Black powder is graded by a system introduced in France in the 18th century in which FG is the coarsest grade, FFG is one grade finer and so on.)

Though by no means the ultimate in chemical explosive, corned black powder, carefully made, gives very satisfactory results, and can be produced – as indeed it was – even with medieval technology.

Most military rifles of the latter part of TL5 were single-shot, because the repeater actions then available could not handle rounds with the range and power that were wanted. For the same reason, most big-game guns were single-shot or multi-barrel. They were still significantly faster to operate than any gun of the pre-cartridge period.

Loading Cartridge Single-Shots

Loading is a Long Action. Loading time for a single-shot is three seconds: one second to open the action, one second to secure the cartridge and one second to put the cartridge in the action and close it. Loading time is the same standing, kneeling, sitting or prone. Loading on horseback requires a Riding roll at -1.

Multi-Barrel Cartridge Guns

Multi-barrel guns can be made on any action, and some very ingenious ones have been. A fairly common conversion of the Spencer repeater is to attach a shotgun barrel and action under the rifle barrel. The overwhelming majority of multi-barrels, however, are on the simple, hinged-breech, break-barrel action first used with separate-chamber breech-loaders in the 17th century.

Side-by-side double barrels are the most common; but over-unders; three-, four- or more barrel guns; and other variations are not unknown. In Germany and Austria, *drillings,* three-barrel break-barrels combining two shotgun and one rifle tube (or vice versa), are very popular.

Multi-barrel cartridge guns load in the same way as single-shots. They take an additional second per barrel.

Hinged-breech multi-barrel guns, such as most shotguns of the period, English Express rifles and European drillings, have a particular problem. There must be enough room for the barrels to be swung down to eject and load. Side-by-side guns do not have to be swung down as far as over-unders or drillings.

Side-by-sides need at least one inch of clear space under the horizontal line of the weapon for each three inches of barrel length to be successfully opened. Over-unders or drillings need one inch for each two inches of barrel length. Of course, the weapon can be turned sidewise or even upside down to open. But this adds one second per barrel to loading time because of the awkward position.

Firing Cartridge Single-Shots and Multi-Barrels

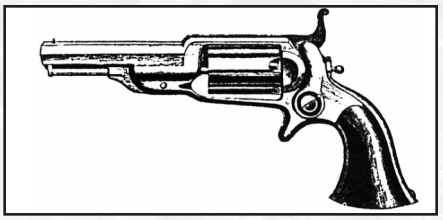
The success roll is against Guns. A success is a hit; a critical success goes to the *Critical Hit* table. A non-critical failure is a miss.

A critical failure may be a critical miss or a malfunction. Any jam result (9, 10 or 11) is a stoppage; the shot fired but the gun must have Immediate Action before it will fire again. Roll once more to see if the shot hit or missed; any failure or critical failure is a miss. Any dud result (8 or 12) is a misfire. With a multi-barrel, try firing the other barrel. Up to three attempts can be made in one second, if there are that many barrels. Before the misfiring barrel can be fired again, the firer must either make an Immediate Action roll, or have it repaired by an armourer.

With a single-shot, Immediate Action is necessary for a stoppage. (Immediate Action for a misfire is to load another cartridge and try again.) A critical success restores the weapon to action in 1 second. A non-critical success takes 2d seconds. A failure needs repair by an armourer. A critical failure doubles the repair time.

Metallic Cartridge Repeaters

The first repeating guns for metallic cartridges were revolvers. The Smith & Wesson .22 Short single-action was on sale in 1857, but they did not build a big-bore revolver until 1869. For legal reasons, S&W had a monopoly on cartridge revolvers in America until after the Civil War. The first militarily successful repeaters were, therefore, lever-action rifles, the Spencer and the Henry. Both were commercially available in 1863 and saw some military use in the Civil War.



FAST FIRING: FANNING AND SLIPPING THE HAMMER

Single-action (but not double-action) revolvers can also be fired by *fanning* or by *slipping the hammer.*

To fan a revolver, the weapon is held in one hand, with the trigger pressed and held all the way in fire position. The other hand repeatedly strikes the hammer, pulling it to full cock and releasing it to fire the weapon. Some experts have achieved fair close-range accuracy with the technique; for most shooters it is a good way to bruise the hand and make lots of noise.

Fanning is a Physical/Easy skill, defaulting to Guns-4 or DX-6. Acc is halved while fanning and Snap-Shot penalty is doubled.

A shooter must have two free and working hands to fan. Only shooters with four or more arms can fan two revolvers at the same time.

A revolver can be fired three times per second by fanning. Roll to hit separately for each shot. The second and third shots are at Rcl penalty.

Slipping the hammer is a one-handed technique for increasing the rate of fire. The weapon is held with the trigger pressed back as in fanning. The thumb pulls the hammer back to full cock, then releases it to fire.

A good slip-hammer shooter can fire twice per second. Slipping the Hammer is also a Physical/Easy skill and defaults to Guns-2 or DX-5. A shooter with this skill can aim and brace on the first shot in a series of slip-hammer shots; shooters without the skill cannot aim or brace. Roll to hit separately for each shot.

A revolver can be temporarily modified for fanning or slipping the hammer by tying the trigger back. Wet rawhide is the usual material for trigger tying. A gun so modified can only be used for fanning or slipping, unless the tie is removed.

The gun can be permanently modified by removing the trigger. Only a gunsmith can remove the trigger; anyone can tie it back.

Fast Firing Double-Actions

A double-action revolver cannot be fanned or slip-hammered, but it does not need to be. A double-action can be fired as fast by trigger pressure as a single-action can be by the more complicated techniques. The shooter may fire up to three shots in one second using double-action.

satellite-contact positioning gave artillery positions to the fraction of an inch. Really accurate and current meteorological data could be applied to every calculation. After 1980, when all this materiel had been fielded, first-round hits with no adjustment became routinely possible. This widened the gap between the artillery of the technologically advanced (or simply wealthy) armies and the backward armies. Most of the world's artillery was not advanced over TL6, but a little was far ahead.

Response time for TL7 (after 1980) artillery:

First round – one minute

Subsequent rounds – 30 seconds

Modifiers for troop quality are as for TL6 (see p. 82).

FOs with post-1980 equipment are +3 to locate themselves and their target. If they have located the target and sent data to a TL7 firing unit, there is a ⅔ chance that the first round will be within the normal dispersion (see p. 84) of the rounds of the target. If the round is not within this distance, any success on a second round correction will be. A critical success will be a hit on the target hex.

Air Defense Artillery

Guided missiles are now used against aircraft: ground forces use SAMs (surface-to-air missiles) and warplanes carry AAMs (air-to-air missiles).

Big, long-range (10-100 mile) missiles are radar-guided. Most are "semi-active:" the launcher's radar illuminates the target, and the missile homes on this. As radar emissions can reveal one's position, late 1990s missiles like the U.S. AMRAAM carry their own small radars; until that's in range, they are guided to the target inertially, via preprogrammed coordinates that can come not only from the launching aircraft's radar but also from another plane's or from non-radar sensors.

Smaller, short-range (2-12 mile) missiles are infrared- homers, tracking the target's heat emissions. Early heatseekers weren't very sensitive: they had to be fired from behind a target to home in on the hot metal of its engine exhaust, and could be confused by the sun or decoy flares. Post-1980s "all-aspect" missiles detect heat contrast between the target and the sky; they're harder to fool, and can attack aircraft from any angle.

Armor

The development of synthetic materials at TL6 meant that by TL7 it was possible to build light and flexible body armor with considerable effectiveness. The first in the field were the *flak jackets* (imprecise nomenclature; they were not intended for aircrew) of woven nylon. These were widely available for the Korean War of 1950-53 and were the common military armor for another 20 years.

The development of para-aramid fiber (Kevlar) led to even more effective flexible armor. From the mid-1960s, most police and security people (and a lot of gas-station attendants, convenience-store clerks and politicians) wore Kevlar armor. Kevlar could be made up as garments that were indistinguishable on the surface from ordinary clothes. It could also be resin-bonded into rigid armor as protective as steel plate at ⅓ of the weight. Combined with light-metal alloys, ceramics and air-filled padding, this could make armor that was mobile and would stop most of the likely threats. Woven Kevlar is almost worthless against impaling weapons, such as icepicks, but resin-bonded Kevlar is effective.

In the late 20th century, any armor could be built for the right price. In addition, for the time traveler or participatory fantasist, there is a special resource: after 1960, the growth of historical and fantasy recreational groups created a whole subculture of armorers who could duplicate or improve on any Medieval or Renaissance armor in modern materials. The problem is to find one, and then to persuade him to do what the *customer* wants instead of what *he* wants.

See the sidebar on p. 104 for some specific armor examples.

TL7 STARTING WEALTH

Starting wealth for this period varies greatly. Most of the years from 1950 to the end of the century are inflationary.

1950-1960 – $5,000.

1960-1970 – $7,500.

1970-1980 – $10,000.

After 1980 – $15,000.

The price of a Colt Government Model .45 automatic pistol goes from $87.50 in 1950 to $600 in 1992. On the other hand, all the money in the world couldn't buy a home computer in 1950, and less than $1,000 will buy one in 1985; the same price will buy a *much* better one in 1998. In 1950 the official U.S. price of gold is $32 an ounce; the free market price is about $100. In the 1990s the price is around $400 with frequent fluctuations.

TL7 TOOL KIT

Transistor Radio Receivers

The portable radio is taken for granted today, but it made a revolutionary difference to travelers and campers. It would operate for several hours on a single battery. Its owner, no matter where in (at least) the Western Hemisphere he might be, could pull out the whip antenna and get current news, weather reports and so on.

Available after 1960. Weight ½ lb. at most; cost $50 in 1960, rapidly dropping to as little as $10.

Military Transmitter/Receivers

These radios would be issued to troops that needed them. Available to civilians as surplus or on the black market, at widely varying prices . . . but dirt cheap as soon as they were obsolete.

1950-1960. One frequency; battery life eight hours. Range two miles with short antenna, seven miles with long antenna. 25 lbs.

1961-1975. 20 frequencies; battery life 12 hours. Range five miles with short antenna, 30 miles with long antenna. 15 lbs.

1976-1990. 50 frequencies; battery life 20 hours. Range 10 miles with short antenna, 50 miles with long antenna, around the world with addition of small dish antenna and satellite relay. 10 lbs.

Hand Calculators

Within a space of a few years, the hand calculator totally outmoded the slide rule. In 1970, a hand calculator would (barely) fit in a shirt pocket. By 1985, they were credit-card-sized.

Continued on next page . . .

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