

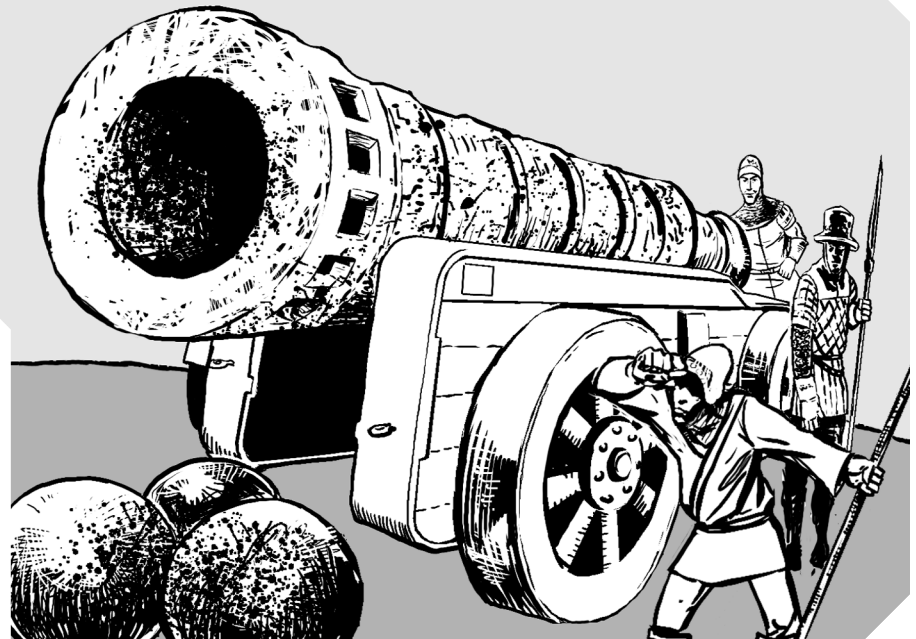
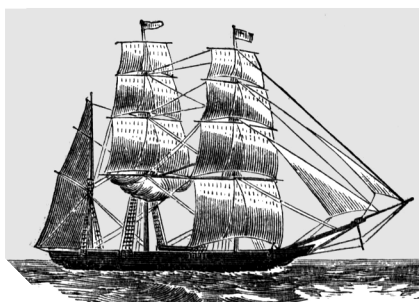
GURPS

Fourth Edition

LOW-TECH™

COMPANION 2

WEAPONS AND WARRIORS™



Written by **PETER V. DELL'ORTO, DAN HOWARD,**
and **WILLIAM H. STODDARD**

Edited by **SEAN PUNCH**

Illustrated by **ROD REIS**

An e23 Sourcebook for GURPS®

STEVE JACKSON GAMES

Stock #37-1662

Version 1.1 – December 2010



CONTENTS

INTRODUCTION	3	The Modern Army	11	Stakes/Pickets	26
About the Authors	3	Naval Warfare	11	Trench	26
About <i>GURPS</i>	3			<i>Roman Field Camp</i>	26
1. HISTORICAL EVOLUTION		2. WEAPONS		CITY DEFENSES	27
OF COMBAT GEAR	4	AND ARMOR	12	Ditch and Rampart (TL0)	27
HUNTERS AND GATHERERS	4	WEAPON DESIGN	12	Dry Stone (TL0)	27
Axes (TL0)	4	Realistic Weapons	12	Hard Earth (TL0)	27
Spears (TL0)	4	<i>Armor-Piercing Weapons</i>	12	Hedge (TL0)	27
Throwing Sticks (TL0)	4	<i>Training Weapons</i>	13	Wooden Palisade (TL0)	27
Bolas (TL0)	4	<i>Combination Weapons</i>	15	Brick (TL1)	27
THE FIRST CIVILIZATIONS	5	Determining Weapon ST	15	Cribwork (TL1)	28
Early Warfare	5	Cinematic Weapons	16	Mortared Stone (TL1)	28
Clubs and Maces (TL0)	5	<i>Cool Ethnic Weapons</i>		Piled Turf (TL1)	28
Microlithic Edges (TL0)	5	<i>and Armor</i>	16	Concrete (TL2)	28
Slings (TL0)	5	<i>Throwing the Unthrowable</i>	17	Embossing (TL2)	28
Blades (TL0)	5	<i>Spiky Bits</i>	18	FORTRESSES	28
Circumvallation	5	SHIELD OPTIONS	18	Causewayed Enclosure (TL0)	28
Massed Combat	6	Fighting With Shields	18	Hill Fort (TL1)	28
The Bow	6	Shield Damage	19	Terramara (TL1)	28
The Rise of the Chariot (TL1)	6	Customizing Shields	19	Motte and Bailey (TL2)	29
THE ANCIENT WORLD	7	SCALING WEAPONS		Castles (TL2)	29
The Iron Age (TL2)	7	AND ARMOR	20	<i>Guards and Watchers</i>	29
Decline of the Chariot Archer	7	Scaling Weapons	20	Star Fort (TL4)	30
Horse Archers (TL2)	7	Scaling Armor	21	HUGE GUNS	31
The Heavy Chariot (TL2)	8	Weapon and Armor		4. MOBILITY	32
Decline of the Chariot	8	Scaling Table	21	MILITARY TRANSPORTATION	32
Heavy Cavalry (TL2)	8	<i>Under the Hood: Weapon</i>		Foot	32
Combat Saddles (TL2)	8	<i>and Armor Scaling Table</i>	21	<i>Realistic Foot Travel</i>	32
Engines (TL2)	8	DAMAGE TO WEAPONS		Mounted	32
Warships (TL2)	9	AND ARMOR	22	Carts and Wagons	33
<i>What If: Pneumatic Artillery</i>	9	Damage to Weapons	22	Ships	33
THE MIDDLE AGES	9	<i>Quick and Dirty</i>		NAVAL COMBAT	34
Feudal Warfare (TL3)	9	<i>Weapon Damage</i>	22	Historical Development	34
The Knight	9	Damage to Armor	25	Naval Weapons	35
<i>The Stirrup (TL3)</i>	10	<i>The London Lobsters</i>	25	<i>Early Paddlewheels</i>	35
Plate Armor	10	<i>Quick and Dirty</i>		WARCRAFT	37
THE RENAISSANCE	10	<i>Armor Damage</i>	25	Ground Vehicles	37
Resurgence of Infantry	10	3. FORTIFICATIONS	26	<i>The Helepolis of</i>	
Munitions Plate	10	FIELD FORTIFICATIONS	26	<i>Demetrios Poliorketes</i>	37
Gunpowder	11	Natural Obstacles	26	Warships	38
<i>Firearms and Economics</i>	11	Ditch	26	INDEX	40

Additional Material: Thomas M. Kane and Sean Punch

Research Assistance: John Brent Macek

Master Armorer: John Brent Macek

Lead Playtester: Jeff Wilson

Playtesters: Douglas Cole, Shawn Fisher, Martin Heidemann, Leonardo Holschuh, Rob Kamm, Susan Koziel, MA Lloyd, Paraj Mandrekar, Garðar Steinn Ólafsson, Leigh O'Neil, Kenneth Peters, Emily Smirle, Shawn K. Stevenson, Antoni Ten Monró, and Dustin Tranberg

GURPS, Warehouse 23, and the all-seeing pyramid are registered trademarks of Steve Jackson Games Incorporated. *Pyramid*, *Low-Tech*, *Weapons and Warriors*, e23, and the names of all products published by Steve Jackson Games Incorporated are registered trademarks or trademarks of Steve Jackson Games Incorporated, or used under license. *GURPS Low-Tech Companion 2: Weapons and Warriors* is copyright © 2010 by Steve Jackson Games Incorporated. Some art © 2010 JupiterImages Corporation. All rights reserved.

The scanning, uploading, and distribution of this material via the Internet or via any other means without the permission of the publisher is illegal, and punishable by law. Please purchase only authorized electronic editions, and do not participate in or encourage the electronic piracy of copyrighted materials. Your support of the author's rights is appreciated.

INTRODUCTION

Most TL0 and many TL1 societies were effectively “pre-military,” yet managed to grow and evolve in several significant ways – including weaponry, if only for hunting. Few TL1+ civilizations were able to grow and evolve without a strong military presence, however. When rulers came along, they rarely ruled for long if they couldn’t hold onto power and wealth with large armies. Thus, they had to be military commanders as well as civilian leaders. Equipping and feeding a strong military required resources, though, and if those of the homeland were insufficient, then additional conquests were necessary. Of course, new territory required even *greater* forces to keep . . .

GURPS Low-Tech Companion 2 looks at the technologies of warfare. Note that it’s an appendix to **GURPS Low-Tech**. Many of the concepts discussed here draw on that work, although that supplement isn’t *required* to use this one.

ABOUT THE AUTHORS

Peter V. Dell’Orto started roleplaying in 1981, with **Dungeons & Dragons**, and has played **GURPS** since **Man to Man**. Since 1996, he has been an active **GURPS** playtester, editor, and author. He wrote **GURPS Martial Arts** with Sean Punch, **GURPS Martial Arts: Gladiators** with Volker Bach, and many articles for *Pyramid* magazine, including “Deathball” (with Sean Punch) in *Pyramid* #3/3. Besides his interest in writing RPGs, Peter is an enthusiastic martial artist. He currently trains Kachin Bando and holds *shodan* rank in Kendo. He has fought amateur MMA in the Japanese Shooto organization and

competed in Grappler’s Quest. His other hobbies include strength training, reading, painting miniatures, Japanese, and music. He currently lives and trains in New Jersey.

Dan Howard started roleplaying in 1984 with **Middle Earth Role Playing**, and quickly moved on to **Rolemaster**. He switched to **GURPS** shortly after its first edition; it has been his favorite system ever since. He started contributing to *Pyramid* magazine in 1998, and soon began playtesting **GURPS** publications. His debut contribution to a **GURPS** supplement was in the first edition of **GURPS Low-Tech** – a work he has been interested in improving ever since, especially in his pet area of armor. Dan has an Arts degree in History and Classical Studies. He holds a second dan black belt in Oh Do Kwan Tae Kwon Do, and has competed internationally. Other interests include historical armor reconstruction, renewable energy, and organic gardening. He currently lives in Maitland, Australia with his wife and three children.

William H. Stoddard is a professional copyeditor specializing in scientific and scholarly books in fields ranging from aerospace technology to archaeology. Fortunately, he likes reading nonfiction; his research library is threatening to take over his apartment, and he regularly visits the nearest university library for supplemental reading. His other pleasures include cooking, reading science fiction and alternate history, and running and playing in RPGs. His previous SJ Games work includes coauthoring the original **GURPS Low-Tech** and writing the latest edition of **GURPS Fantasy**. He lives in San Diego with his cohabitant Carol, two cats, two computers, and too many books!

About GURPS

Steve Jackson Games is committed to full support of **GURPS** players. Our address is SJ Games, P.O. Box 18957, Austin, TX 78760. Please include a self-addressed, stamped envelope (SASE) any time you write us! We can also be reached by e-mail: info@sjgames.com. Resources include:

New supplements and adventures. **GURPS** continues to grow – see what’s new at www.sjgames.com/gurps.

e23. Our e-publishing division offers **GURPS** adventures, play aids, and support in PDF form . . . digital copies of our books, plus exclusive material available only on e23! Just head over to e23.sjgames.com.

Pyramid (www.sjgames.com/pyramid). Our monthly PDF magazine includes new rules and articles for **GURPS**, systemless locations, adventures, and much more. Look for each themed issue from e23!

Internet. Visit us on the World Wide Web at www.sjgames.com for errata, updates, Q&A, and much

more. To discuss **GURPS** with our staff and your fellow gamers, visit our forums at forums.sjgames.com. To check out the web page for **GURPS Low-Tech Companion 2: Weapons and Warriors**, point your browser at www.sjgames.com/gurps/books/low-tech/companion2.

Bibliographies. Many of our books have extensive bibliographies, and we’re putting them online – with links to let you buy the resources that interest you! Go to each book’s web page and look for the “Bibliography” link.

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

Rules and statistics in this book are specifically for the **GURPS Basic Set, Fourth Edition**. Page references that begin with B refer to that book, not this one.

GURPS System Design ■ STEVE JACKSON
GURPS Line Editor ■ SEAN PUNCH
Managing Editor ■ PHILIP REED
Page Design ■ PHIL REED and
JUSTIN DE WITT

Art Director ■ WILL SCHOONOVER
Editorial Assistant ■ JASON “PK” LEVINE
Production Artist & Indexer ■ NIKOLA VRTIS
Prepress Checker ■ MONICA STEPHENS

e23 Manager ■ STEVEN MARSH
Marketing Director ■ PAUL CHAPMAN
Director of Sales ■ ROSS JEPSON
GURPS FAQ Maintainer ■
VICKY “MOLOKH” KOLENKO

DAMAGE TO ARMOR

Realistically, the rules under *Overpenetration* (p. B408) should apply to armor. If you suffered injury because an attack's damage exceeded your armor's DR, then your armor *must* have been damaged!

Look up the armor's weight on the *Object Hit Points Table* (p. B558) and read its HP from the "Homogenous/Diffuse" column. Most armor modifications – e.g., everything described under *Reinforced* in **GURPS Low-Tech** – affect the armor's final weight and hence its HP. Ignore weight reductions for high quality, however.

Armor is protected by its own DR at -1. When calculating injury, treat flexible armor as Diffuse and rigid armor as Homogenous; see *Injury to Unliving, Homogenous, and Diffuse Targets* (p. B380). The effects of injury are as described on pp. B483-484, with these extra details:

Less than 1/3 HP left – The armor gives the wearer *half* its original DR (round down). In addition, remove -1 from penalties to target chinks in it; see *Chinks in Armor* in **GURPS Low-Tech**.

0 HP or less – Roll vs. HT 12 every second to see if the armor falls off. Critical failure means it only *partially* detaches, and hangs awkwardly on the wearer: torso armor gives -1 DX, limb armor restricts the limb as if crippled, and a helmet gets dislodged in such a way that it covers the wearer's eyes! These effects remain until the damaged item is removed; see *Donning Armor* in **GURPS Low-Tech**. While the armor is worn, remove -2 from penalties to target chinks in it.

Example: Sir Gnaff is wearing a 24-lb. plate cuirass with DR 7. The table on p. B558 gives it 20 HP. Conan the Bar hits Gnaff with a mace for 12 points of crushing damage. Gnaff receives $12 - 7 = 5$ HP of injury. The armor is protected by DR $7 - 1 = 6$, so it takes $12 - 6 = 6$ HP of injury, leaving 14 HP. Conan's next wallop delivers 7 points of damage. The armor's DR 7 is just enough to prevent injury to Gnaff, but the armor itself has only DR 6, so it suffers another 1 HP of injury, leaving 13 HP.

Gnaff survives the battle but neglects to repair his armor. Another encounter reduces his armor to 6 HP. Since that's less than 1/3 of its original HP, its DR 7 is halved and rounded down to 3, and enemies who wish to target chinks in it remove -1 from their penalty.

Gnaff's next battle reduces his armor to -1 HP. He rolls against HT 12 and fails, so his cuirass falls off!

The London Lobsters

The "London lobsters" was a nickname given to Sir Arthur Haselrig's heavy cavalry by the Royalists during the English Civil War. At his own expense, Sir Arthur outfitted each man in heavily fluted plate armor that was proofed against firearms, giving them a lobster-like appearance. At the Battle of Roundway Down (1643), Sir Arthur himself survived *four* close-range firearms shots and several sword thrusts, and was only unseated after his horse was attacked. King Charles quipped, "Had he been victualled as well as fortified, he might have endured a siege of seven years."

Targeting Armor

It's sometimes possible to disable an opponent's armor deliberately. The options are *denting articulations* and *severing straps*. Only rigid armor has articulations or visible straps and lacing; you cannot target flexible armor this way.

Denting an articulation on plate armor prevents the enclosed limb or extremity from functioning. You must use a crushing attack. Possible targets are the knee (affecting the leg), elbow (affecting the arm), hand, or foot. Roll to hit at -6 *instead of* the location's usual penalty. If the attack gets at least 2 points of damage past DR, then regardless of armor HP, treat the affected body part as crippled until the damaged piece of armor is removed.

Severing the right strap(s) causes the piece to fall off! This requires a cutting attack. Roll at -8 to target a strap. If the attack delivers at least 2 points of cutting damage, then it cuts the strap. You must slice through two straps to remove torso armor, but just one for any other piece.

Quick and Dirty Armor Damage

If tracking HP for individual pieces of armor seems like too much trouble, then simply track HP for the *entire suit*. When the suit has less than 1/3 of its HP left, halve DR *everywhere*. At 0 HP or less, don't roll dice; the armor fails completely (at this point, most of it would have fallen off).

Repairing Armor

Damaged armor can be repaired. This calls for the same skill(s) you would need to make the armor; see **GURPS Low-Tech Companion 3**, or simply assume Armoury (Body Armor). Tools are also required, and their quality modifies skill (see p. B345). Use *Repairs* (pp. B484-485) to assess materials costs, skill modifiers, and effects, but note that each attempt takes one hour. Armor that has positive HP needs *minor repairs*, while armor with zero or negative HP demands *major repairs*. If you elect not to repair the armor, you can scrap it for its materials value – say, 5-10% of original cost.

Armor Maintenance

Armor must be cared for or it will deteriorate. If not regularly maintained by someone with at least 1 point in Armoury or Soldier skill, it loses 1 HP per *month* of regular wear or *year* in storage. Deliberate conservation attempts for armor in storage (only) can slow deterioration to 1 HP per *decade*.

Maintenance for regularly worn armor takes 10 minutes per week per piece (breastplate, helmet, gauntlet, etc.) but requires no actual skill roll. For armor with any kind of styling or decoration, *double* this time. However, some decoration methods, such as lacquering or tinning, also halve deterioration (1 HP per *two* months of wear or *two* years in storage).

HUGE GUNS

Early gunsmiths occasionally made incredibly huge bombards or cannon. These were typically one-of-a-kind projects (with some exceptions, like the great Turkish bombards described below). Rulers seem to have commissioned such pieces primarily to impress their rivals with their wealth and power; such guns often went unfired for years. But for the GM who wants to send adventurers to sabotage the enemy's most terrifying weapon – or let them fire one of their own! – here's historical information and statistics on some notable examples.

Unless otherwise stated, these are wrought-iron muzzleloaders. All are considered TL3, despite the late date of manufacture in some cases, because they have static mounts rather than carriage or pintle mounts (see *Aiming Fixed-Mount Weapons* in **GURPS Low-Tech**). Due to the massive heat release from their powder charges, these guns can't be fired more than a few times a day. If discharged after less than an hour of cooling, apply -2 to Malf.

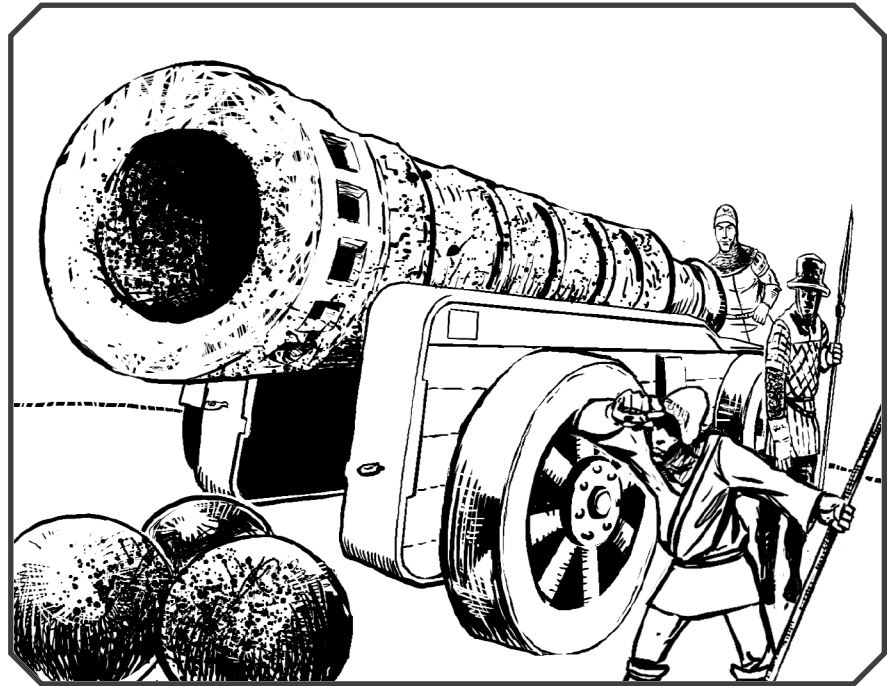
Dhul Dani (1628). Cast from bronze in Agra for the Mughal ruler Shah Jahan (also famous for building the Taj Mahal).

Dulle Griet (15th century). Made for the Duke of Burgundy about the same time as Mons Meg (below) and installed in Ghent in 1578. The name means "Mad Margaret," and refers to a character in Flemish folklore who leads an army of women to pillage Hell (depicted in a 1562 painting by Bruegel).

Great Turkish Bombards (1453). Mehmet II had several really huge guns made for the siege of Constantinople in 1453, and 42 more to guard the Dardanelles. Muzzles and receivers were cast separately from bronze, but unlike most smaller bombards, these guns were muzzle-loaded. Moving them was a heroic project; it took 200 men and 60 oxen to transport the largest Turkish guns. The recoil of these weapons was too great for a wooden frame to endure; instead, they were suspended in cradles of heavy ropes that let them swing in larger wooden frames, absorbing the recoil.

Mons Meg (1449). Made by Jehan Cambier for the Duke of Burgundy, and sent as a gift to James II of Scotland; the name was only adopted in the 17th century. It may have been installed by James IV on a warship, the *Great Michael*. It's now kept at Edinburgh Castle.

Murshidabad Guns. The Bengali city of Murshidabad has two huge breechloaders: the *Bachawali Tope* (before 1400) and the *Jahan Kosha* (1637). The statistics on the table describe the *Bachawali Tope*.



Raja Gopala (16th century). Made for one of Tanjore's Mughal rulers, this may be the largest bombard ever made. According to legend, the gunners were terrified of firing it – it was fired only once, with a powder train 2 miles long!

Tsar Pushka (1586). This gun was made by Andrei Chokhov for Tsar Feodor. Its outer surface is elaborately sculpted, showing the tsar on a horse, among other images. It's kept within the walls of the Kremlin.

Huge Guns Table

Terms and notation are as defined on pp. B268-271. For costs, "K" means thousands and "M" means millions.

TL	Weapon	Damage	Acc	Range	Weight	RoF	Shots	ST	Bulk	Rcl	Cost
ARTILLERY (CANNON) (IQ-5)											
3	Dhul Dani	6d×50 pi++	2	1,400/8,000	60,000/1,320	1	1(1,800)	164M†	-19	10	\$814K
3	Dulle Griet	6d×45 pi++	2	1,250/7,000	36,000/900	1	1(1,800)	144M†	-19	10	\$489K
3	Great Turkish Bombard	6d×11 pi++	1	300/1,700	40,000/1,500	1	1(10,800)	140M†	-19	8	\$544K
3	Mons Meg	6d×35 pi++	2	1,100/6,000	15,400/400	1	1(1,800)	117M†	-17	10	\$210K
3	Murshidabad Gun	6d×30 pi++	2	1,000/6,000	13,400/320	1	1(1,800)	113M†	-17	10	\$183K
3	Raja Gopala	6d×45 pi++	2	1,300/7,000	88,000/880	1	1(1,800)	180M†	-20	10	\$1.20M
3	Tsar Pushka	6d×60 pi++	2	1,700/9,500	84,000/2,500	1	1(1,800)	178M†	-20	10	\$1.14M

WARCRAFT

GURPS Low-Tech describes small warcraft on a scale suited to adventurers; e.g., chariots and war canoes. Heroes who go to war may encounter far larger vehicles!

The Helepolis is the ultimate example of a siege tower.

GROUND VEHICLES

Most low-tech ground vehicles were comparatively small, holding at most a dozen men, and often only two or three. But armies sometimes came up with much larger contrivances for special purposes.

Siege Towers (TL2)

Siege towers were first developed by the Assyrian Empire for use in taking cities. The Greeks, the Roman Empire, and medieval rulers continued to build them, until gunpowder rendered them obsolete. A particularly famous example was the *Helepolis*, built by Hellenistic general Demetrios Poliorketes (see *The Helepolis of Demetrios Poliorketes*, below) during the siege of Rhodes. Demetrios had previously constructed a somewhat smaller tower for his siege of Salamis, but the one he used to attack Rhodes exceeded it in magnitude.

The construction of siege towers isn't standardized. Each tower is built adjacent to the city it's intended to attack, and sized

to the city walls it must defeat. Some materials may be shipped in, but the tower itself is far too big to transport. It's shifted by men or animals positioned inside the base to protect them from enemy attack; they may push or pull at its structure, or turn capstans that drive its wheels. In any case, siege towers move *extremely* slowly – as little as a few yards per day. They require level ground to move at all; if the defenders can find a way to create uneven or muddy terrain, they may be able to immobilize a tower.

A siege tower's structure is made of heavy wood, able to withstand massive impacts; it's effectively a mobile fortress. An expensive siege tower, such as the *Helepolis*, may be armored with metal plates. A more common covering is the untanned hides of oxen or donkeys, intended to resist incendiary attacks from the city's defenders. Towers often have multiple platforms that can be used to shoot at the enemy; big ones may even carry catapults. When the tower reaches the city wall, one or more gangplanks are lowered to let shock troops cross over and assault the wall's defenders.

Given its size and slowness, a siege tower is better described as a (barely mobile) building than as a vehicle. In addition to the usual statistics for a building (see *HP and DR of Structures*, p. B558), it has a movement speed in yards/hour. It cannot be accelerated above this speed.

Example: A small siege tower, suitable for attacking a provincial town, stands 30' tall on a base 15' square. Its front and sides are armored with thick hides with DR 4. Its wooden walls are 4" thick and have DR 4, for total DR 8. It has HT 12 and HP 165. A crew of 10 men can shove it forward on its wheeled base at 6 yards/hour. \$26,400, 8,800 lbs.

The base price and weight don't include weapons. See **GURPS Low-Tech** for suitably heavy fixed-mount weapons.

The Helepolis of Demetrios Poliorketes

The *Helepolis* (Greek for "city-taker" or "destroyer of cities") is perhaps the ultimate example of a siege tower. It's built on a grille of timber 72' square, and has a total height of 144'. It has nine floors within, and occupants move between these via two internal staircases. The bottom level covers 4,225 square feet; the topmost level, 900 square feet. Its wide base for its height makes it very stable.

The entire front and both sides are covered with iron plates, probably about 1/4" thick. It has DR 24 on those facings and DR 12 elsewhere, and HP 600. The 222-ton tower has eight iron wheels, each 15' in diameter, and room for almost 1,200 men to push simultaneously; 3,400 men operate in shifts to move it. It can make at most 1 yard/hour, traveling only the length of its own base per day! Construction cost is \$3.4 million – \$3 million of that for the iron plates.

The tower contains 16 ballistae and four scorpions. Each has its own firing port, with leather-and-wool padded shutters that open and close mechanically. The bottom floor houses two 180-lb. ballistae and a 60-lb. one. The second floor has three 60-lb. ballistae. Each of the next five

floors sports two 30-lb. ballistae. The four 72" scorpions are placed two apiece on the top two floors. With tripods, these engines collectively add *another* \$3.5 million to cost and 70 tons to weight.

During the siege of Rhodes, the *Helepolis* drove the defenders from the battlements, and its catapults stripped the crenellations off the city walls. One tower and a section of curtain wall were brought down as well. Repeated attacks by the defenders managed to damage sections of the iron armor, forcing Demetrios to withdraw the tower. According to one account, the Rhodians managed to mire it in a swamp of sewage, dislodged some of its protective iron plating, and shot flaming arrows at it. In any case, the siege was ended by a negotiated peace and the *Helepolis* was abandoned. Legend has it that the sale of the *Helepolis'* iron plates was sufficient to finance the construction of the Colossus of Rhodes.

Armed, armored, and (slowly) mobile, the *Helepolis* is an early troop-carrying war machine . . . or perhaps a primitive, manned Ogre!

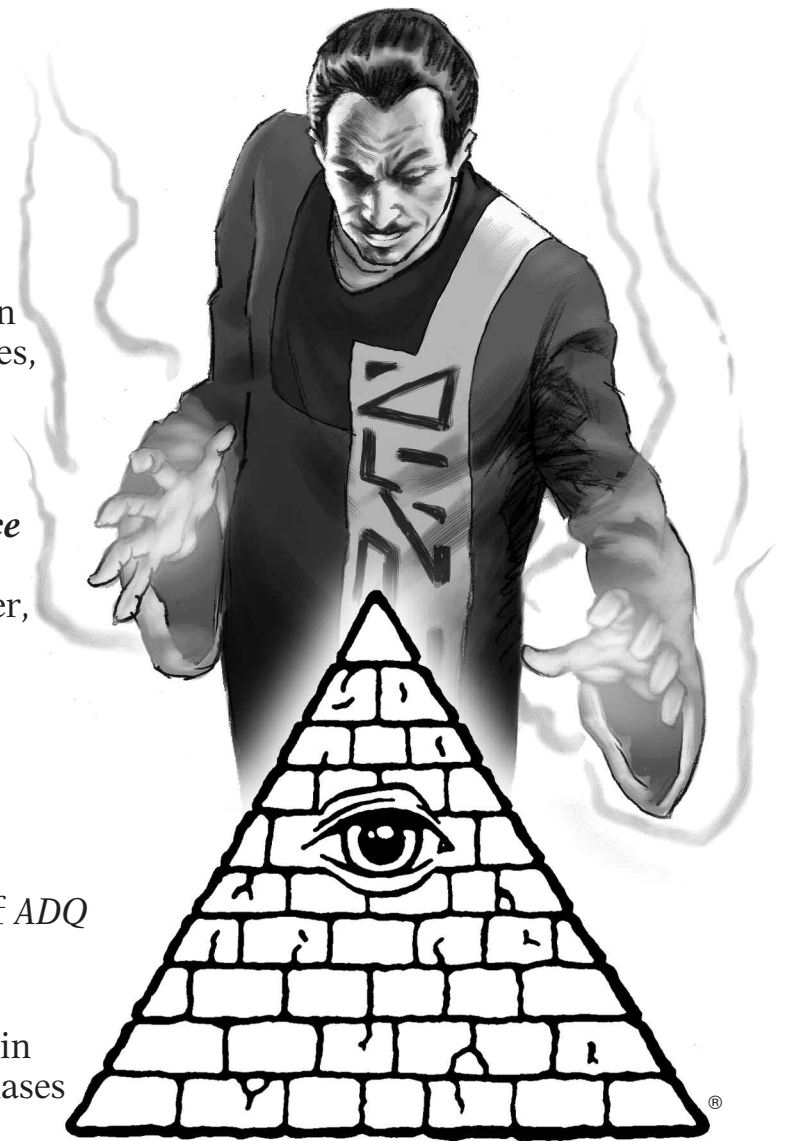
INDEX

- Age of, *Galleys*, 34; *Sail*, 35.
Animals, as guards, 30.
Archers, 6, 7, 10; *chariot*, 6, 7;
 horse, 7-8, 10.
Armies, *modern*, 11; *travel*, 32-33;
 see also Cavalry, Infantry.
Armor, *cool ethnic*, 16; *damage to*,
 25; *early*, 5-8, 10; *firearms and*,
 11; *maintenance*, 25;
 munitions, 10; *overrated*, 16;
 piercing weapons, 12; *plate*, 7,
 10, 25; *quick and dirty damage*,
 25; *repairing*, 25; *scaling*, 21;
 spiked, 18; *studded*, 18;
 targeting, 25.
Armor-piercer modification, 12.
Artillery, pneumatic, 9.
Axe head modification, 13.
Axes, *double-headed*, 18;
 introduction, 4.
Bachawali Tope, 31.
Baileys, 29.
Ballistae, 36.
Barbs modification, 14.
Basket hilts, 15.
Bigas, 7.
Birds, as guards, 29.
Biremes, 34, 36.
Blade shield modification, 20.
Blades, *DR and HP*, 23;
 introduction, 5.
Blunt modification, 13.
Boarding ships, 35.
Bolas, *introduction*, 4; *skill*, 17.
Bomb ships, 36.
Bombards, 31.
Boss modification, 20.
Bows, *DR and HP*, 24; *introduction*,
 6; *see also Archers*.
Brick defenses, 27.
Butt spike modification, 14.
Caracole, 11.
Caravels, 38, 39.
Carts, 33.
Castles, 29-30.
Cataphracts, 8.
Catapults, 9, 36.
Causewayed enclosures, 28.
Cavalry, 7-8, 10, 11; *firearms and*,
 11; *London lobsters*, 25; *travel*,
 32-33.
Chain modification, 14.
Chain shot, 36.
Chains, barbed, 17.
Chariots, 6-8.
Circumvallation, 5-6.
City defenses, 27.
Clubs, introduction, 5.
Combat, *see Warfare*.
Concrete defenses, 28.
Corvus, 35.
Cribwork, 28.
Crossbows, *double*, 18; *DR and HP*,
 24.
Defenses, location, *see*
 Fortifications.
Demetrios Poliorketes, 37.
Dhul Dani, 31.
Disarming spikes shield
 modification, 20.
Ditch defenses, 26; *rampart and*, 26,
 27.
Dogs, as guards, 29.
Dragoons, 11.
Dromons, 34.
Dulle Griet, 31.
Earth defenses, 27.
Embossing, 28.
End cap modification, 14.
Engines, war, 8-9, 36.
Estoc, 12.
Exotic Weapon Training perk, 17.
Falchion modification, 12.
Feudalism, 9, 10.
Firearms, 11, 35.
Fireships, 36.
Flails, bladed, 18.
Flange modification, 14.
Flexible modification, 13.
Foot travel, 32.
Fortifications, *city*, 27-31; *field*, 26.
Fortresses, 28-30.
Forts, *hill*, 28; *star*, 30.
Foxholes, 26.
Frigates, 38, 39.
Furusiyya, 10.
Gadlings, 18.
Galleys, 38; *introduction*, 34; *travel*,
 33.
Gastraphetes, 8.
Geese, as guards, 29.
Grapeshot, 36.
Greek fire, 36.
Grips, alternate, 19.
Guards, 29.
Guiges, *modification*, 20; *use*, 19.
Gunnery, 36.
Gunpowder, 11.
Guns, huge, 31; *see also Catapults*,
 Engines, Firearms.
GURPS, 7, 12, 16; **Basic Set**, 13,
 15, 16, 19, 22; **Low-Tech**,
 3-5, 7, 8, 10-16, 19-21, 24, 25,
 27, 29, 31, 33-39; **Low-Tech**
 Companion 1: Philosophers
 and Kings, 8; **Low-Tech**
 Companion 3: Daily Life and
 Economics, 25, 27-29, 32, 39;
 Martial Arts, 6, 7, 10, 14-17, 19.
Hammer head modification, 14.
Harpagos, 36.
Haselrig, Arthur, 25.
Hedges, 27.
Helepolis, 37.
Hilts, *basket*, 15; *modifications*, 15.
Hook modification, 14.
Hoplomachia, 6.
Hornbows, 6.
Horses, 32-33; *archers*, 7-8; *saddles*,
 8; *transporting by sea*, 33; *see*
 also Cavalry, Chariots.
Incendiaries, 36.
Infantry, 6, 7, 9-11; *chariots and*, 7,
 8; *travel*, 32.
Iron weapons, 7.
Javelins, introduction, 7.
Knights, 9-10; *see also Cavalry*.
Knives, DR and HP, 23.
Kusari modification, 14.
Lance cutout modification, 20.
Lantern hook modification, 20.
Liburnians, 34.
London lobsters, 25.
Long arms, introduction, 11.
Long handle modification, 13.
Longbows, introduction, 6.
Maces, introduction, 5.
Map, star fort, 30.
Matchlock firearms, introduction,
 11.
Microlithic edges, 5.
Middle Ages, warfare, 9-10.
Military transportation, 32-33.
Missile weapons, *DR and HP*, 24;
 on ships, 35.
Missiles, DR and HP, 24.
Mons Meg, 31.
Mottes, 29.
Mounted, *combat*, 7-8, 10, 11;
 travel, 32-33.
Murshidabad guns, 31.
Murus Gallicus, 28.
Muskets, introduction, 11.
Natural obstacles, 26.
Navies, *combat*, 11, 34-36;
 historical development, 34;
 tactics, 35-36; *transportation*,
 33; *warships*, 38-39; *weapons*,
 35-36.
Neck-strap use, 19.
Oil, flaming, 36.
Padded modification, 13.
Paddlewheels, 35.
Palisades, wooden, 26, 27.
Penteconters, 38.
Phalanx, 6.
Pick modification, 14.
Pickets, 26.
Plate armor, 10.
Polearms, DR and HP, 24.
Prongs modification, 15.
Quadrigas, 7.
Quadriremes, 34.
Raja Gopala, 31.
Ramming ships, 35-36.
Renaissance, warfare, 10-11.
Reptiles, as guards, 29.
Rifles, introduction, 11.
Rim blade modification, 20.
Romans, field camps, 26.
Running the Pole technique, 8.
Saddles, combat, 8.
Scorpions, 36.
Scutage, 10.
Sea battles, *see Navies*.
Self bows, introduction, 6.
Shields, *awkward*, 19; *customizing*,
 19-20; *damage*, 19; *fighting*
 with, 18-19; *weapons and*, 19.
Ships, *full-rigged*, 38, 39; *military*
 transport, 33; *of the line*, 34, 39;
 on-board armaments, 35; *table*,
 38; *war*, 38-39; *see also Navies*.
Short handle modification, 13.
Sickle modification, 15.
Siege towers, 37.
Slings, *introduction*, 5; *shot*, 5.
Sloops of war, 38, 39.
Snekkes, 38.
Spearhead modification, 15.
Spears, introduction, 4, 5.
Spikes, *weapon modification*, 14;
 shield modification, 20.
Stakes, 26.
Sticks, *early throwing*, 4; *DR and*
 HP, 24.
Stirrups, introduction, 10.
Stone defenses, 27, 28.
Swords, *double-ended*, 18; *DR and*
 HP, 23; *introduction*, 5.
Tables, *huge guns*, 31; *warships*, 38;
 weapon and armor scaling, 21;
 weapon DR and HP, 23-24.
Terramaras, 28.
Throwable modification, 13.
Throwing Sticks, introduction, 4.
Thrown Weapons skill, 17.
Transportation, military, 32-33.
Trenches, 26.
Trigas, 7.
Triremes, 34, 35, 38; *travel*, 33.
Tsar Pushka, 31.
Turf defenses, 26, 28.
Turkish bombards, 31.
Turtle ships, 38.
Ultra-light modification, 13.
Wagons, 33.
Warfare, *early*, 5; *feudal*, 9; *massed*,
 6; *naval*, 11; *Stone Age*, 4.
Warships, 9, 38-39; *see also Navies*,
 Ships.
Watchers, 29.
Weapons, *armor-piercing*, 12;
 breakage of, 22; *breaking*, 22;
 Bronze Age, 7; *cinematic design*,
 16-17; *cinematic examples*, 17-
 18; *combination*, 15; *cool*
 ethnic, 16; *customizing*, 13-15;
 damage to, 22-24; *determining*
 ST, 15-16; *DR of*, 23-24; *HP of*,
 23-24; *hunter and gatherer*, 4;
 Iron Age, 7-9; *Middle Ages*, 9-10;
 modifications, 12-15; *overrated*,
 16; *quick and dirty damage*, 22;
 realistic design, 12-16;
 Renaissance, 10-11;
 repurposing, 12-13; *scaling*, 20-
 21; *shield-hand*, 19; *Stone Age*,
 4-6; *throwing unthrowable*, 17;
 training, 13; *using oversized or*
 undersized, 21.
Wooden modification, 13.

STUCK FOR AN ADVENTURE? NO PROBLEM.

Warehouse 23 sells high-quality
game adventures and supplements
in print and PDF formats.

- Free downloadable adventures for *GURPS*, *In Nomine*, and *Traveller*!
- Fun gaming accessories – shot glasses, shirts, specialty six-siders, and more!
- PDFs from Atlas Games, Amarillo Design Bureau, Pelgrane Press, Goodman Games, and many others – plus gems from the up-and-comers.
- Original material for *Transhuman Space* and new *GURPS* supplements from Kenneth Hite, Phil Masters, David Pulver, Sean Punch, and William Stoddard!
- Fully searchable files of *GURPS Fourth Edition* supplements.
- Digital editions of out-of-print classics, from *Orcslayer* and the complete run of *ADQ* to *GURPS China* and *GURPS Ice Age*.
- Buy board games and roleplaying PDFs in the same order! Download digital purchases again whenever you need to.



STEVE JACKSON GAMES
warehouse23.com