

**GURPS**<sup>®</sup>

Fourth Edition

# LOW-TECH<sup>™</sup>

## COMPANION 3

### DAILY LIFE AND ECONOMICS<sup>™</sup>



Written by **MATT RIGGSBY** and **WILLIAM H. STODDARD**

Edited by **SEAN PUNCH**

Illustrated by **ROD REIS**

*An e23 Sourcebook for GURPS<sup>®</sup>*

**STEVE JACKSON GAMES**

Stock #37-1663

Version 1.0 – January 2011



# CONTENTS

<b>INTRODUCTION . . . . .</b> 3	Pigs . . . . .	15	<b>BREWING AND DISTILLING . . . . .</b> 32	
About the Authors . . . . .	Poultry . . . . .	15	<i>Pollution</i> . . . . .	32
About <b>GURPS</b> . . . . .	Sheep and Goats . . . . .	15	<b>6. SHELTER AND</b>	
<b>1. FOOD AND</b>	Other Domestic Animals . . . . .	15	<b>ARCHITECTURE . . . . .</b> 33	
<b>POPULATION . . . . .</b> 4	<b>3. HEAVY EQUIPMENT . . . . .</b> 16		BUILDING MATERIALS . . . . .	33
<i>Breeding Plants and Animals</i> . . . . .	<i>Basic Machines</i> . . . . .	16	<i>Structural Limitations</i> . . . . .	33
HUNTING AND GATHERING . . . . .	CONSTRUCTION EQUIPMENT . . . . .	16	Cost and Weight . . . . .	34
Gathering . . . . .	IRRIGATION AND HYDRAULICS . . . . .	17	HP, HT, DR . . . . .	34
Hunting . . . . .	INDUSTRIAL EQUIPMENT . . . . .	18	Building Materials Table . . . . .	34
<i>Butchering</i> . . . . .	ENERGY STORAGE AND		Construction Examples . . . . .	34
Trapping . . . . .	POWER TRANSMISSION . . . . .	19	BUILDING OPTIONS . . . . .	35
Fishing . . . . .	<b>4. MINING AND</b>		Construction Quality . . . . .	35
Whaling . . . . .	<b>EXCAVATION . . . . .</b> 20		Mortar . . . . .	35
<i>Firestick Farming</i> . . . . .	Locating Minerals . . . . .	20	Construction Variants . . . . .	35
Water Supplies . . . . .	Excavating Mines . . . . .	20	CIVIL ENGINEERING . . . . .	36
AGRICULTURE . . . . .	Ventilation . . . . .	21	CONSTRUCTION TIME . . . . .	36
<i>Vermin Control</i> . . . . .	Drainage . . . . .	21	ENVIRONMENTAL CONCERNS . . . . .	37
HERDING . . . . .	<b>5. MANUFACTURING . . . . .</b> 22		<i>Bathing and Bath-Houses</i> . . . . .	37
AGRICULTURAL ENVIRONMENTAL	MATERIAL COSTS . . . . .	22	<b>7. TRANSPORTATION . . . . .</b> 38	
QUALITY . . . . .	<i>Skills for Preparing Materials</i> . . . . .	23	INFRASTRUCTURE . . . . .	38
<i>Beekeeping</i> . . . . .	LABOR COSTS . . . . .	23	Roads . . . . .	38
ENVIRONMENTAL IMPACT . . . . .	CRAFTING ROLLS . . . . .	23	Bridges . . . . .	39
GRINDING AND MILLING . . . . .	CRAFT SECRET PERKS . . . . .	24	<i>Rope Bridges</i> . . . . .	39
COOKING METHODS . . . . .	Example: Metalworking		Portages . . . . .	39
Direct Heat . . . . .	Perks . . . . .	24	Canals and Aqueducts . . . . .	39
Heated Stone . . . . .	ARMS AND ARMOR . . . . .	25	Harbors . . . . .	40
Temporary Containers . . . . .	Weapon Composition . . . . .	25	CARGO SHIPS . . . . .	40
FOOD PRESERVATION . . . . .	Weapon-Making . . . . .	25	Dhow (TL3) . . . . .	40
Drying . . . . .	Armor-Making . . . . .	25	Hulks and Cogs (TL3) . . . . .	41
Salting . . . . .	SMELTING . . . . .	26	Junk (TL4) . . . . .	41
Smoking . . . . .	<i>Furnaces</i> . . . . .	26	<i>In the Air</i> . . . . .	42
Pickling . . . . .	FINE METALWORK . . . . .	27	TRANSPORT COSTS . . . . .	42
Spicing . . . . .	POTTERY . . . . .	27	<b>8. TRADE . . . . .</b> 43	
Fermentation . . . . .	WOODWORKING . . . . .	28	Currency . . . . .	44
Freezing . . . . .	GLASSMAKING . . . . .	29	<b>9. OCCUPATIONS . . . . .</b> 45	
<b>2. DOMESTICATED</b>	CLOTHWORKING . . . . .	30	<i>Apprentices and Masters</i> . . . . .	49
<b>ANIMALS . . . . .</b> 14	PAINTING, DYEING, AND		PROFESSIONAL SKILLS . . . . .	49
Cattle . . . . .	PIGMENTATION . . . . .	31	<b>INDEX . . . . .</b> 51	
Dogs . . . . .				
Horses . . . . .				

**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

*Additional Material:* Dan Howard and Thomas M. Kane

*Research Assistance:* Susan Koziel and Paraj Mandrekar

*Lead Playtester:* Jeff Wilson

*Playtesters:* Douglas Cole, Peter Dell'Orto, Shawn Fisher, Martin Heidemann, Leonardo Holschuh, Rob Kamm, MA Lloyd, John Brent Macek, Garðar Steinn Ólafsson, Leigh O'Neil, Kenneth Peters, Emily Smirle, Shawn K. Stevenson, Antoni Ten Monrós, and Dustin Tranberg

# INTRODUCTION

Behind kings in their glittering palaces, priests in their golden temples, and warriors and their walls of spears are the numberless masses who support them. Without weavers and tailors, kings have no royal robes; without masons, priests have no temples; without smiths, warriors have no arms; and without countless farmers, herdsmen, and merchants bringing goods to market, none of them get to eat. While unexciting on the surface, such matters can be the source of surprising adventure! Wars have been fought over things as mundane as alum supplies, and perilous journeys through strange foreign lands have been undertaken just to find a better shade of blue paint. Merchants and craftsmen may become heroes despite themselves by dint of *getting things done*, while concerns such as how goods are made, transported, and sold are vital to everyone – even to adventurers, who often want to possess hard-to-find gear, earn their fortune, and leave their mark on society. And for those who hope one day to *rule*, being able to answer such questions as “How many people can live on this land?” and “How much for the castle?” can mean the difference between glory and ignominy.

**GURPS Low-Tech Companion 3** looks at the everyday jobs and industries on which low-tech societies depend, from the fundamentals of subsistence (hunting and gathering, agriculture, and domestication), through making things (extracting resources, erecting buildings, and manufacturing both utilitarian and luxury goods), to how all this enables an individual to

earn a living and a society to thrive (jobs, trade, and transport). 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

Matt Riggsby holds degrees in anthropology and archaeology and, like the rest of his generation, works with computers. He has been the author or co-author of books on database design and development, as well as many articles for *Pyramid* magazine. He works for a company that produces TL8 medical devices, and lives in a TL6 house with his wife, son, and a pack of domesticated but semi-trained carnivores.

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 including 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 far 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](mailto:info@sjgames.com). Resources include:

*New supplements and adventures.* **GURPS** continues to grow – see what’s new at [www.sjgames.com/gurps](http://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](http://e23.sjgames.com).

*Pyramid* ([www.sjgames.com/pyramid](http://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](http://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](http://forums.sjgames.com). The web page for **GURPS Low-Tech Companion 3: Daily Life and Economics** can be found by going to [www.sjgames.com/gurps/books/low-tech/companion3](http://www.sjgames.com/gurps/books/low-tech/companion3).

*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**, Warehouse 23, and the all-seeing pyramid are registered trademarks of Steve Jackson Games Incorporated. *Pyramid*, **Low-Tech**, *Daily Life and Economics*, 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 3: Daily Life and Economics** is copyright © 2011 by Steve Jackson Games Incorporated. Some art © 2011 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.

# AGRICULTURAL ENVIRONMENTAL QUALITY

Like land used by hunter-gatherers (see *Hunting and Gathering*, p. 4-5), farmland may be rated as *Desolate*, *Very Poor*, *Poor*, *Typical*, *Good*, or *Excellent*. If farmers take over land from hunter-gatherers, or vice versa, the properties that make land decent for these two activities are sufficiently similar that the same quality grade may be used. However, quality changes over a different timeframe for farming.

Farmland's quality can decline over time, but increasingly sophisticated farming techniques slow soil degradation considerably. At TL0, anyone cultivating land must roll against Gardening once a year. At TL1+, he rolls against Farming, and has a bonus equal to TL. Any failure reduces his plot's quality by one step.

The *Agricultural Productivity Table* (p. 10) and *Animal Productivity Table* (p. 10) assume Typical land. For particularly high- or low-quality areas, adjust yields as shown on the *Quality and Productivity Table* (below). Modifiers for animal produce also affect the "Animals/Acre" column of the *Animal Productivity Table*; e.g., Desolate land supports 0.5 sheep/acre or requires 2 acres/sheep.

*Quality and Productivity Table*

Quality	Grains	Cattle	Sheep	Pigs	Poultry
Excellent	+25%	x4	x2	x2	x2
Good	+15%	x2	x1.75	x1.75	x1.75
Poor	-15%	x0.5	x0.75	x0.5	x0.5
Very Poor	-25%	x0.25	x0.5	x0.25	x0.25
Desolate	-80%	N/A	x0.25	N/A	x0.1

## Beekeeping

Humans didn't just domesticate mammals. A few insects were domesticated, too – the most important of which was the honeybee. Bees were domesticated at least as early as 2500 B.C. By TL2, beekeepers kept bees in artificial clay hives and, much as is done today, calmed the bees with smoke before harvesting.

Bees provide two important products: *honey* and *wax*. Honey was universally the most prized sweetener until the development of sugar. Beeswax had a huge range of applications: waterproofing, lighting, cosmetics, encaustic painting, etc. A single hive can produce up to 20 lbs. of honey and half as much wax; however, it must be destroyed to harvest it, and requires years to rebuild. An acre supports up to five hives.

# ENVIRONMENTAL IMPACT

Agriculture can be its own worst enemy. Cultivation may pollute the soil or destroy it by overuse. And nutrient depletion is only part of the problem. For example, water used for irrigation carries minute quantities of salt, which is left behind in the soil. In the short term, that's not a problem; over centuries, though, it can render fields all but unworkable. By the Roman period, some places in Mesopotamia could no longer support wheat and would only grow sparse crops of barley.

Deforestation is an issue for any expanding or technologically advancing society: higher technology demands more wood for charcoal, while growing populations require more lumber for

buildings, industrial equipment, furniture, and vehicles. Archaeological soil analysis indicates that the Mediterranean was heavily forested after the last Ice Age. Human occupation completely changed that environment, however, as people cut down trees to supply flourishing cities with metals (an active local metal industry can consume square miles of forest yearly), pottery, and shipbuilding. The decline of forests led to the land being covered with a variety of grasses and shrubs. Even low-tech firestick farming (p. 8) might have transformed forested areas permanently into grassland – after repeated burnings, grasses recover more quickly than trees and eventually dominate the landscape.

# GRINDING AND MILLING

The most important staple foods – such as grains and acorns – can be made easier to handle and cook by grinding them into a powder. Though heavy, grinding stones were sufficiently important that they were standard gear for small military units. Realistically, traveling adventurers are likely to carry them around, too. Grinding grain is hard work, costing 1 FP per hour.

*Simple Hand Grinders* (TL0). The earliest grinding tools were, essentially, two rocks. Typical examples are the *mano* (flat-sided handheld stone) and *metate* (coarse stone plate against which grain is ground), and the *mortar* (stone bowl) and *pestle* (stone beater used to grind grain against the inside of the mortar). Simple grinder that can process 4-5 lbs. of flour per hour: \$50, 40 lbs. Small grinder for kitchen or laboratory use: \$10, 8 lbs.

# BREWING AND DISTILLING

The fermentation of fruit juice into alcohol occurs naturally. Indeed, animals are sometimes observed getting drunk from eating overripe fruit! Crushing fruit into juice and letting it ferment into wine is simply organizing the process. Fruit produces half its weight in juice – that is, one needs about 1 lb. of raw fruit per cup of juice, or 16 lbs. per gallon.

Fruit juices are by far the best historically accessible sources of fermentable sugars, but it's possible to ferment any sugar-rich solution to produce alcohol. Where bees are exploited, honey can be turned into *mead*, its alcohol content similar to that of beers and wines. Several cultures of horse-riding nomads – from Hungary to Mongolia – fermented mare's milk, which is unusually high in sugar, into *kumis*, a mildly alcoholic beverage (perhaps 2% alcohol).

Brewing grain into alcohol was a significant economic development. Instead of putting considerable labor into growing inessential fruit to turn into wine, any surplus in the grain harvest could be made into a fermented beverage such as beer, ale, or sake (for brevity, such drinks are collectively referred to as "beer" hereafter). Grain needs help to ferment, however – alcohol-producing microbes can't consume starches. When exposed to appropriate enzymes, though, starches are converted into sugars, which the microbes *can* work with.

In most of the Old World, barley was allowed to sprout, which naturally produced starch-breaking enzymes. In the simplest processes, *malt* (sprouted grain) was left to ferment, yielding a thick, cloudy, mildly alcoholic brew (at most 3% alcohol). More complex recipes involved filtering an extract from the malt and adding yeast from a previous brewing to the sterilized extract.

In some of the New World, enzymes were introduced by chewing (saliva contains the same starch-converting enzyme found in malt). This process was simple but labor-intensive. In other parts of the New World, sprouted maize provided the same catalyst as malted barley, leading to maize beer. In Japan, a mold that produced appropriate enzymes was discovered. This was used to make rice wine, and kept between batches like a yeast starter.

Each gallon of beer requires 1-3 lbs. of raw grain; the more grain used, the stronger and better-tasting the beer. Low-quality beer – such as a peasant might make for his own consumption – requires 1 lb. per gallon and may be manufactured in batches of up to four gallons at a time. Total active time for malting the grain, preparing the mash, and setting it aside for fermentation is about a day, although it's spread out over several weeks. Taking greater care with the water and grain, and adding other ingredients (herbs are often included for flavor or preservative qualities), can increase working time to 2-3 days or more. Using larger vessels, practical for the professional brewer, allows batch sizes of 50-60 gallons.

Starting in TL3, beer and wine can be distilled to produce whiskey and brandy. Basic distilling requires about half of the undistilled liquid's weight in wood, an alembic, and a few hours of careful attention – or the undistilled liquid's full weight in fuel and a whole day for double distillation. Few alembics can hold more than a gallon, so batch sizes are very small, but batches of 5-6 gallons were possible by late TL4. Double-distilled liquor has 1/3 of the original volume.

Alcoholic beverages are often consumed as soon as they produce as much alcohol as possible – after a week or two of brewing for beer, within a month for wine. Longer aging in well-sealed containers can improve flavor, but poor seals or the presence of unwanted microbes can quickly turn the drink to vinegar. Higher alcohol concentrations allow longer storage times but require more fruit or grain, making them more expensive. One notable development was the introduction of *hops*. In addition to giving beer a bitter taste, hops preserve it for several weeks, enabling the possibility of long-distance beer trade. Hopped beers are first attested to in early TL2 (around 400 B.C. in Mesopotamia), but don't come to predominate until the 15th century A.D.

Roll against Professional Skill (Brewer) to ferment basic alcoholic beverages. Handle differences in fermentable stock (barley, grape juice, honey, maize, etc.) with *Familiarity* (p. B169). Distilling alcohol requires Chemistry at TL2-3, Professional Skill (Distiller) at TL4. The latter skill also covers fermenting appropriate materials into alcoholic solutions suitable for distilling.

## Pollution

Pollution and environmental hazards date to the dawn of civilization. With the high population densities and poor sanitation of the earliest permanent settlements, communicable diseases caused life expectancies to *decrease* from hunter-gatherer levels. Well into the Renaissance, cities were net consumers of people, with populations kept up by constant immigration from the countryside.

In addition to disease, indoor air quality was terrible. For most of history, indoor fires were set in a fireproof hearth, but there was no way of channeling the smoke out of the house. The roof had a hole where it eventually escaped, but chimneys weren't invented until TL2 and didn't become widespread until TL5.

As industries burned more wood and charcoal, there was also a recognizable impact on *outdoor* air quality. As early as TL2, some societies required that potters place their kilns outside city walls to reduce smoke. By the end of the Middle Ages, several cities suffered from visible smog.

Industrial processes even produced toxic waste. Anyone who smelted silver from ore was invariably exposed to lead, and numerous activities associated with fine metalwork involved contact with lead and mercury. Pigments often contained poisonous chemicals as well. Long-term work with alchemy, painting, dyeing, jewelry, or smelting lead-bearing ores could lead to symptoms such as reduced DX or IQ from several varieties of neurological damage, lowered HT or FP, or seizures with symptoms similar to epilepsy. Historically, many societies showed limited awareness of the problems of industrial toxicity – but most noticed only relatively severe cases in workers who had suffered particularly heavy, long-term exposure.

# CHAPTER NINE

# OCCUPATIONS

These are primarily jobs for NPCs, but adventurers might take them during downtime, or start out working regular jobs before more interesting events overtake them. See *Jobs* (pp. B516-517) for rules and terminology. Monthly pay is appropriate to TL4. At lower TLs, multiply by the appropriate factor (derived from the average incomes on p. B517):

TL	0	1	2	3
Income Multiplier	x0.78	x0.81	x0.84	x0.88

## Big Man (TL0)

Although this occupation is typical of TL0 tribes, political “fixers” who make a living by trading favors can be found in higher-tech societies, using the same skills.

*Prerequisites:* Finance-12; Merchant-12; Politics-12.

*Job Roll:* Worst prerequisite skill.

*Monthly Pay:* \$1,600, adjusted for margin of success or failure.

*Wealth Level:* Comfortable. Supports Status 1.

## Brewer (TL0)

Brewing beer and wine has been a popular job since the rise of agriculture, if not slightly earlier.

*Prerequisite:* Professional Skill (Brewer)-12.

*Job Roll:* Professional Skill (Brewer).

*Monthly Pay:* \$820, adjusted for margin of success or failure.

*Wealth Level:* Average. Supports Status 0.

## Fisherman (TL0)

This is appropriate for a subsistence fisherman or someone who fishes primarily for sale to others.

*Prerequisite:* Fishing-12.

*Job Roll:* Fishing.

*Monthly Pay:* \$410, adjusted for margin of success or failure.

*Wealth Level:* Struggling. Supports Status -1.

## Gatherer (TL0)

Largely a TL0 job, a few can still make a living on the fringes of high-tech societies by gathering and selling wild resources such as mushrooms, herbs, and small game.

*Prerequisites:* Area Knowledge-12; Survival (appropriate environment)-12.

*Job Roll:* Worst prerequisite skill.

*Monthly Pay:* \$400, adjusted for margin of success or failure.

*Wealth Level:* Struggling. Supports Status -1.

## Hunter (TL0)

This is another TL0 job that can survive on the fringes into later eras.

*Prerequisites:* Tracking-12; Traps or any ranged weapon skill at 12.

*Job Roll:* Worst prerequisite skill.

*Monthly Pay:* \$400, adjusted for margin of success or failure using *double* the margin.

*Wealth Level:* Struggling. Supports Status -1.

## Tribal Chief (TL0)

This represents a high tribal chief. A sub-chief would have Status 1, Comfortable wealth, and a monthly income of \$1,600.

*Prerequisites:* Any *three* of Administration-12, Diplomacy-12, Leadership-12, or Politics-12; Status 2.

*Job Roll:* Worst prerequisite skill.

*Monthly Pay:* \$3,800, adjusted for margin of success or failure.

*Wealth Level:* Wealthy. Supports Status 2.



## Animal Driver (TL1)

A wagon-driver has Teamster. A member of a caravan using pack animals rather than vehicles has Packing.

*Prerequisites:* Animal Handling (Equines)-12; Packing-12 or Teamster-12.

*Job Roll:* Worst prerequisite skill.

*Monthly Pay:* \$500, adjusted for margin of success or failure.

*Wealth Level:* Struggling. Supports Status -1.

# INDEX

- Agriculture, 8-10; *environment and*, 11; *impact*, 11; *land quality*, 4-5, 11; *number can support*, 4; *productivity table*, 10, 11.
- Air transportation, 42.
- Alchemist job, 49.
- Alcohol, 32.
- Animal driver job, 45.
- Animals, 14-15; *breeding*, 4; *costs of products*, 22; *productivity*, 10, 11; *vermin control*, 9.
- Apprentices, skill levels of, 49.
- Aqueducts, 40.
- Archimedean screws, 17.
- Architect job, 46.
- Architecture, *see Buildings*.
- Armorer job, 46.
- Armor-making, 25-26.
- Arms, *see Weapons*.
- Axe, hand, 6.
- Badans, 40, 41.
- Baghlahs, 40, 41.
- Balloons, hot air, 42.
- Barriers, for hunting, 6.
- Bath-houses, 37.
- Bearings, 19.
- Beekeeping, 11.
- Big man job, 45.
- Blacksmith job, 49.
- Blocks and tackles, 17.
- Boums, 40, 41.
- Brewer, *job*, 45; *Professional Skill*, 32, 45, 49.
- Brewing, 32.
- Brickmaker Professional Skill, 49.
- Bridges, 39; *rope*, 39.
- Bucket chains, 18.
- Building Laborer job, 46.
- Buildings, *construction time*, 36-37; *environment and*, 37; *HP, HT, and DR*, 34; *materials*, 33-34, 37; *options*, 35-36; *quality*, 35; *structural limitations*, 33; *see also Construction*.
- Bureaucrat job, 46.
- Butcher Professional Skill, 6, 49.
- Butchering, 6; *tools*, 6.
- Camels, 15.
- Canals, 39-40.
- Carpenter job, 46.
- Carpentry, 28-29.
- Carrying capacity, 4.
- Cats, 9.
- Cattle, 10, 11, 14.
- Ceramic, costs, 22.
- Charcoal-burner, *job*, 46; *Professional Skill*, 49.
- Cisterns, 17.
- Civil engineering, 36.
- Clerk job, 46.
- Clockmaker job, 49.
- Clothmaker Professional Skill, 23, 30, 50.
- Clothworker job, 46.
- Clothworking, 30.
- Cogs (ships), 41.
- Construction, *equipment*, 16-17; *labor cost*, 36-37; *quality*, 35; *structural limitations*, 33; *time*, 36-37; *variants*, 35-36; *see also Buildings*.
- Containers, 12.
- Cooking methods, 12.
- Corbelled masonry, 33, 35.
- Courier job, 46.
- Courtesan Professional Skill, 50.
- Craft Secret Perks, 24-25.
- Crafting, skill roll results, 23-24.
- Crane treadles, 17.
- Cranes, 17.
- Cribwork, 35.
- Crucible Steel perk, 24.
- Currency, 44.
- Deadfalls, 7.
- Dhows, 40, 41.
- Distiller Professional Skill, 32, 50.
- Distilling, 32.
- Dogs, 6, 14.
- Donkeys, 15.
- Drying food, 13.
- Dyeing, 31.
- Dyer Professional Skill, 31, 46, 50.
- Edge crushers, 18.
- Embossing, 35.
- Energy storage, 19.
- Environment, *agriculture and*, 11; *buildings and*, 37; *hazards*, 32; *land grades*, 4-5.
- Etching, 27.
- Excavation, 20-21.
- Farmer job, 46.
- Farming, *see Agriculture*.
- Fermentation, 13.
- Ferrets, 9.
- Fibers, costs, 22.
- Fire, *cooking with*, 12; *farming with*, 8, 11; *furnaces*, 26; *hunting with*, 7.
- Fisherman job, 45.
- Fishing, 7-8.
- Flake (tool), 6.
- Food preservation, 13.
- Forester, *job*, 46; *Professional Skill*, 23, 29, 50.
- Freezing food, 13.
- Furnaces, 26.
- Gamekeeper job, 46.
- Gatherer job, 45.
- Gathering, 4-5.
- Gears, 19.
- Gilding, 27.
- Glassblower, *job*, 47; *Professional Skill*, 30, 31, 49, 50.
- Glassmaking, 29-30.
- Goats, 10, 15.
- Gothic masonry, 36.
- Graceful Blade perk, 24.
- Grains, 8-11; *mills*, 18; *productivity*, 10, 11; *types*, 9.
- Griddles, 12.
- Grinding tools, 11-12.
- GURPS Bio-Tech**, 4; **Fantasy**, 44; **Low-Tech**, 3, 6, 7, 12, 22, 23, 25, 30, 34, 35, 38-42; **Low-Tech Companion 1: Philosophers and Kings**, 44, 50.
- Harbors, 40.
- Herding, 10; *productivity table*, 10.
- Herdsmen job, 47.
- Horses, 14-15.
- Hulks (ships), 41.
- Hunter job, 45.
- Hunting, 4-7; *big game*, 6; *dressing game*, 6, 7; *driving game*, 6; *small game*, 6; *see also Fishing, Trapping*.
- Hydraulics, 17-18.
- Hypocaust, 35.
- Illuminator job, 47.
- Industrial equipment, 18-19.
- Infrastructure, civilization, 38-39.
- Irrigation, 10, 17-18.
- Jeweler job, 47.
- Jobs, 45-49.
- Judge job, 47.
- Junks, 41-42.
- Labor, *costs*, 23, 36-37; *skill roll results*, 23-24; *time*, 23, 36.
- Lever, 16.
- Machines, *advanced*, 16-19; *basic*, 16.
- Manufacturing, 22-32; *crafting rolls*, 23-24; *labor costs*, 23; *material costs*, 22; *preparation skills*, 23.
- Mason job, 47.
- Masonry, types, 35, 36.
- Masseur Professional Skill, 50.
- Masters, skill levels of, 49.
- Masterwork Blade perk, 25.
- Materials, *building*, 33-34; *costs*, 22; *skills for preparing*, 23.
- Merchants, 43-44.
- Metals, costs, 22.
- Metalworking, *armor*, 25-26; *fine*, 27; *perks*, 24-25; *weapons*, 25; *see also Smelting*.
- Midwife Professional Skill, 50.
- Miller, *job*, 47; *Professional Skill*, 50.
- Milling tools, 11-12.
- Mills, *grain*, 18; *wire*, 19.
- Miner job, 47.
- Mining, 20-21.
- Money, 44.
- Money-lender job, 49.
- Monumental earthworks, 36.
- Mortar, 35.
- Mules, 15.
- Nets, 6.
- Occupations, 45-49.
- Oil presses, 18.
- Painting, 31.
- Partition factor, 34.
- Pickling food, 13.
- Pigmentation, 31.
- Pigs, 10, 11, 15.
- Pile drivers, 17.
- Pilot job, 47.
- Pits, for trapping, 7.
- Plants, *breeding*, 4.
- Plumbing, 36.
- Pollution, 32.
- Portages, 39.
- Porter job, 48.
- Pots, 12.
- Potter job, 48.
- Pottery, 27-28.
- Poultry, 10, 11, 15.
- Power transmission, 19.
- Pressure cookers, 12.
- Professional Skills, new, 49-50.
- Prospecting, 20.
- Pulleys, 16.

Ramps, 16.  
Regional carrying capacity, 4.  
Roads, 36, 38-39.  
Rodents, control, 9.  
Roofs, wooden, 33.  
Sailor job, 48.  
Salting food, 13.  
Saqiyas, 18.  
Sawmills, 18.  
Saws, 18.  
Screws, *for construction*, 27; *machine*, 16, 17, 27.  
Scribe, *job*, 48, *Professional Skill*, 50.  
Secondary products revolution, 10.  
Serf job, 48.  
Sericulturist Professional Skill, 23, 50.  
Servant job, 48.  
Shadoufs, 17.  
Sharecropper job, 48.  
Sheep, 10, 11, 15.  
Ships, 40-42.  
Shipwright job, 48.  
Skewers, 12.  
Skills, *crafting roll results*, 23-24; *new*, 49-50; *craft*, 25-32; *for getting food*, 4-11; *for preparing food*, 11-13; *for preparing materials*, 23.  
Smelting, 26-27.  
Smith job, 48.  
Smoking food, 13.  
Snares, 7.  
Soldering, 27.  
Spicing food, 13.  
Spits, 12.  
Stone, costs, 22; heated, 12.  
Tables, *agricultural productivity*, 10; *agriculture quality and productivity*, 11; *animal productivity*, 10; *building materials*, 34; *cargo ships*, 41; *construction labor cost*, 37; *crafting*, 24; *raw materials*, 22; *slope*, 39.  
Tailor job, 48.  
Tanner, *job*, 48; *Professional Skill*, 23, 50.  
Teacher job, 48.  
Tiling, 35.  
Toxic waste, 32.  
Trades, 43-44.  
Transportation, 38-42; *costs*, 42.  
Trapping, 7.  
Treadmills, 17.  
Tribal chief job, 45.  
Trip hammers, 18.  
Tubers, 8-10; *productivity*, 10.  
Tunneling, 36.  
Turnover rates, 43-44.  
Vaulted masonry, 33, 35.  
Vermin control, 9.  
Water, *cooling*, 36; *supplies*, 8.  
Waterwheels, 18.  
Weapon, *composition*, 25; *making*, 25.  
Wedges, 16.  
Whaling, 8.  
Wheels, 16.  
Wicker, costs, 22.  
Winches, 17.  
Windmills, 18.  
Wire drums, 19.  
Wires, types of, 27.  
Wood, *costs*, 22; *types*, 28-29.  
Woodworking, 28-29.

---

## STUCK FOR AN ADVENTURE? NO PROBLEM.

**e23 sells high-quality game adventures and supplements in PDF format.**

- Get complete sample adventures free for *GURPS*, *In Nomine*, and *Traveller*!
- PDFs from the major players in online publishing: Ronin Arts, Ken Hite, Atlas Games, and 01 Games.
- New gems from up-and-coming publishers, like Atomic Sock Monkey Press and Expeditious Retreat Press.
- Digital editions of out-of-print classics, from *Orcslayer* and the complete run of *ADQ* to *GURPS China* and *GURPS Ice Age*.
- Fully searchable files of *GURPS Fourth Edition* supplements.
- Original material for *Transhuman Space* and *In Nomine*, with new *GURPS* supplements from Sean Punch, William Stoddard, David Pulver, and Phil Masters!
- Buy it once, have it always. Download your purchases again whenever you need to.




---

**Download ● Print ● Play**  
**STEVE JACKSON GAMES**

e23 is part of Warehouse 23, the online store at Steve Jackson Games. Warehouse 23 is also the official Internet retailer for Dork Storm Press, Atlas Games, and many other publishers. Visit us today at [www.warehouse23.com](http://www.warehouse23.com) for all your game STUFF!