



The more you know, the less you need to fear. If you can grow your own food, then you don't need to worry so much about food shortages. If you know how to industrialize farming by making your own equipment, you worry even less. If you know how things work, you can fix them. If you know how to make things yourself, running out becomes a smaller problem.

Builders. If you don't already have one on your zombie-survival team, become one yourself.

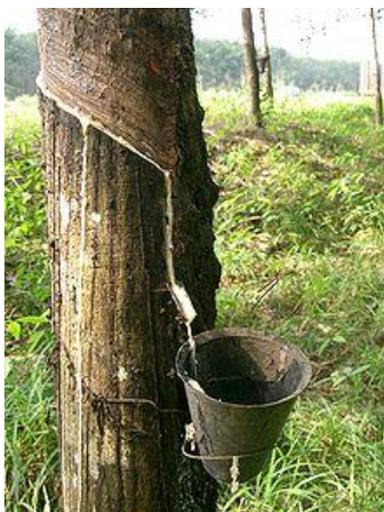
## High-Tech Slingshot



So you're lost in the woods and hard at work building (insert your name here)-andia when you realize that you could really use a slingshot to catch dinner. No problem. A

slingshot is a pretty simple piece of technology after all. You spend some time searching for a good "Y-shaped" stick and use a little piece of leather to make a pouch. So far, so good. So what about the rubber-bands?

When you consider the level of various technologies, there are more things to take into account than the simplicity of the machine or the number of parts. In the case of a sling shot, there are only three parts: a shaped stick, a patch of leather, and two bands of rubber. Sounds simple right? This should be considered a basic, primitive technology. But there is a catch. If the wilderness you are lost in resides in part of the English speaking world, you won't have access to rubber for a long long time.



Rubber is essentially congealed tree sap, but the trees it grows on come from Indonesia. That's a long way from Idaho. The raw resource needed to build a slingshot is unavailable to us here.



So if we were to place the slingshot on a technology scale, where would it fall? Well, first we need trade routes that can safely make it to Indonesia and back. That means we need the science of navigation to be top notch to cross the Pacific Ocean. Navigation requires astronomy, charts, possibly a compass, and all that is just to know where to go! Then we get to the ship itself. Building a ship to cross oceans with a cargo is no mean feat. You need advanced woodworking techniques (which require iron tools), textile technology for sails (requiring looms,

spinning, cultivation of fiber crops, and a whole lot of spare time), and overland transportation for the lumber and supplies to the shipyard. You are not going to do all this yourself in one lifetime, so you would need to organize a society with hundreds of skilled laborers willing to work together on this massive project. This means that you not only need a whole lot of technology and a lot of time, but also an army.

How advanced then is a slingshot? That depends where you live. If you are reading this in Indonesia, it's pretty basic. If you live in Idaho on the other hand, a slingshot is higher technology than high-seas navigation and a steam engine.



So as you look at that tasty squirrel on the branch and wish for a slingshot, what are your options? You can build an entire civilization to solve the problem one way, or you can spend 30 minutes making a sling from local plant fibers to slay that bushy-

tailed goliath. In every problem, customize your solutions to the local situation. The more you know, the more opportunities you will be able to capitalize on. Such knowledge creates options and will allow you to choose the simplest and easiest ways to accomplish your goals.

## Keeping Clean in the Apocalypse



What do all movies dealing with medieval times, wilderness survival, and the zombie apocalypse have in common? Bad wardrobe? Close. The people are always dirty.

In the modern age we enjoy, hand sanitizer, soap, disposable diapers, vacuum cleaners, running (hot) water, and entire departments of our department stores dedicated to hygiene and cleaning supplies. With all these amenities, hygiene, sanitation, and general cleanliness are things which we can really take for granted; but would we really be doomed to filth and disease without them?

Let's look at what it would take to make a bar of soap completely from scratch.

To make soap you need only three ingredients: wood ashes, water, and animal fat. The ashes contain potassium hydroxide, also known as lye, which is one of the key ingredients in a modern liquid soap.



**Warning:** do not use any aluminum containers for ashes or the completed lye solution. They will be eaten by the potassium hydroxide in a violent reaction. You probably don't want that.

The steps are as follows:

- Place a handful or two of dried grass at the bottom of a container to form a layer an inch or two deep.
- Next fill the rest of the container with ashes. (If you are just making a small amount of soap, just add enough ashes to make a layer twice as tall as the straw).
- Without shaking the container (you don't want the ashes to fill the empty spaces in the straw) form an indentation in the top of the ashes.
- Pour water in the indentation slowly, letting it be absorbed into the ash, until the ash layer begins to float up.
- Wait a few minutes and scoop the ash and straw out of the container slowly with a stick or two.
- The greyish yellow liquid at the bottom of the container is a lye solution. This is the active ingredient in the soap.
- Let this solution sit for several hours to settle. The dust and leftover bits of ash will settle to the bottom. Carefully pour off the liquid at this point into another container. To concentrate the solution, either leave it for a few days to evaporate away some of the water, or boil it off.
- Next you need lard. Lard is just rendered animal fat. "Rendered" means that, at some point, the animal fat was turned into a liquid by heat. Bacon grease or hamburger grease are both examples of rendered animal fat, or lard. To make it, simply find a fatty piece of meat and cook it slowly in a pot or pan (without adding any water). Cook slowly until the meat is good and crunchy, strain the meat out, and voila, you have lard.
- This is where you actually make the soap. Reheat the lard and add half as much lye solution as you have lard. Mix constantly for several minutes and then come back to mix it every few minutes on a low heat. When the soap reaches a thick consistency (like thick pancake batter), pour it into a mold and wait for it to harden.
- Soap has to mature for a week or two for the alkaline lye to convert the lard into soap. You can tell when it is done when it tastes like soap.
- This soap will make suds like regular soap and is good for bathing, cleaning dishes, and so on.



## Steam-Powered Frog



Darwin said that nature does not jump. Technology does. The history of the steam engine is a good example of this. The very first steam engine was invented by Hero of Alexandria in about 300 BC. This engine was a toy that would spin when its water boiler was heated. Kind of a neat science experiment, but not really useful for anything productive. After that, the steam engine died for almost 2,000 years without any progress at all. Then in 1698 AD, a man named Thomas Savery invented a steam powered water pump for draining water from mines. James Watt and steam trains followed soon thereafter. In other words, technology sat at basically the same level for eons, and then suddenly we had the industrial revolution. Other things changed, but the prime mover had lingered in muscles and water-wheels for centuries. Now we had engines for the first time.

So what made the difference? All the required technologies had already been in place since Hero's engine came out in ancient Greece, so why couldn't they build a useful steam engine then?

They could have. To build a steam engine you need a boiler, a flywheel, a valve, and a piston. These could all be made by ancient Greek artisans, and similar things were made quite frequently. The technology required to make a boiler is similar to that used to make a pot or a helmet, the technology for a flywheel is just like that for a chariot wheel, the technology for a valve is similar to that used by the goldsmith, and so on. It could have been done.

So why didn't they? If they had the technology to build a steam engine, why not build a steam engine?

Technology waited to jump before, not because the step was impossible, but because the idea never entered the heads of the people. People waited 2,000 years for the idea to come, possessing every tool needed to make that idea a reality. Now we have an advantage that they did not. We know that it has been done already. The idea is already here, and we can see the final product. From this point a modern person could figure out how to work his or her way up to that kind of technology much faster than it was done in history. 2,000 years could be cut down to a single decade.

From this point the challenge is to look back to see how things were done and how they could have been done better. In many cases this will involve shortcuts that our ancestors could not see in the thick of it. Square One embraces shortcuts, "Primitive technology hacks," and the like.

History progressed in jumps and spurts before, but if we had to do it all again, we could do some things differently. In other words, if we ever need to rebuild civilization from Square One, we won't need to take the scenic route.



Hero's Steam Engine

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