

Supplies

After the pole shift there will be looting. Gangs who have nothing of their own will be on the lookout for communities who have prepared themselves for survival, with the intention of taking everything they have. So it is important that when you are storing your precious supplies, diversification should be the order of the day. In other words, do not put all your eggs in one basket! Store your supplies in different locations. This way, if some of them do not survive either the pole shift or the after-time looting, chances are that others will. One way to do this is to bury supplies at points some distance from your habitat, well camouflaged and protected from the elements, and from pests and other creatures which might bring them to harm. Here is how this can be done.

Garbage containers, or large containers of any sort, can be bought and stacked inside each other until after the cataclysm. When the quaking and shaking have subsided, they can then be buried in the ground, filled with food, and other needed supplies. Inter these with their rims just above ground level. Be sure the containers are not punctured or leaking, then add enough weight of supplies to minimize the likelihood that they will get pushed up out of the ground. Use silicon caulking around the rim to seal the lid, preventing the intrusion of water or vermin. Camouflage (without crunching) your containers using dead leaves and other debris. Be sure you remember where your supplies are located! When these containers are emptied, they can be reused as mini root cellars, for hydroponics, or for water storage.

Caution: the importance of proper sealing cannot be overstressed, not only for the reasons mentioned above, but also to ensure that the lids don't become "crunch-unsealed". If your survival site is in a location where the ground is stable, you could set up supply caches before the pole shift for later retrieval; but this is a judgment call that must be made by your group as the time draws near, and it must be made carefully. A mistake in this regard could prove fatal.

Temporary Housing

An important fact with which to come to grips is that after the pole shift, most buildings, including our homes, will not be standing. Before the cataclysm, temporary shelters will be easy to put up. Tents, teepees, and yurts, vinyl shelters or any easily erected, simple-to-take-apart type of shelter will serve. Just prior to the pole shift this temporary housing should be taken down and stored, in whatever storage sites and boxes you have prepared. During the cataclysms, your group must find a way to protect everyone from the firestorms and high winds which will be a part of the shift. The simplest way to do this, of course, is the metal-roof-over-a-trench scenario, but probably, in the time remaining, your community will find a better and safer way to endure and survive.

When it is over, hopefully you will find your supplies etc. intact, and can at least re-erect your tents and temporary shelters. Some of these simple structures may become at least semi-permanent, while other necessities are attended to. In this regard, attempts should be made to ensure the comfort and habitability of your living space, so that you have one less thing to worry about while attending to situations which may be, at least temporarily, more important. Below are a few tips in this regard; however there is still time to accumulate your own information, and it must be stressed that this summary does not attempt to instruct you on how to build and survive, but only to act as a signpost to point you in the direction of your own salvation.

Tents

Dome tents will withstand the prevailing high winds and will have stability; but are expensive. The Shepherd's tent, used by wilderness outfitters, seems ideal, really, because of its roomy size, and also its more reasonable price. Could possibly be classed as a somewhat more permanent construction.

Teepees

There are different types of teepees, but the plains buffalo hide teepee (or maybe there is a more accessible material in

our modern times) with its large diameter and high and controllable smoke exit, seems the most suited to our purpose. Here again, because of its roomy construction, permitting for a larger inside fire, this teepee could be adapted to fit a more permanent lifestyle.

Yurts

Are apparently not quite as comfortable as the above examples, and are quite expensive.

Igloos

If you are going to live in a really cold climate, an igloo will probably save your life. Some quite complex and actually stylish igloos have been built by communities where the igloo is more or less a permanent type of housing.

Caves

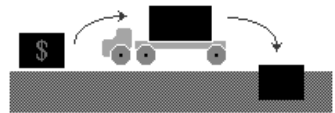
Small caves can be made habitable; larger ones could be quite easily converted into permanent homes. If set above valleys they are likely to be fairly dry inside; but caves should be approached with caution, since other animals needing shelter could already have moved in. If there are signs of other inhabitants, light a fire at the entrance ... but be sure to allow them an escape route! Beware of rock falls; insulate with a layer of dry plant material, and always build a fire toward the rear of the cave. Smoke from a fire built at the entrance will blow inwards.

Other shelters to consider are sod houses (for temporary use) or log cabins, which can, of course, be made into permanent homes. Although the above shelters are fine for temporary or even semi-permanent use, more enduring dwellings really should be constructed, as time goes by. Houses can be better insulated from climatic extremes; they afford more privacy and can be added to as your community grows; but most of all, permanent buildings will give your group both psychological stability, and, quite literally, a foundation on which to build its future.

Containers as Homes

One suggestion for shelter and storage after the pole shift is to use shipping containers. As has been stated many times before, it is not the intention of this booklet to give "how-to" instructions on the ideas provided here. Rather, the intent is to point you in the right direction so that you can search for your own information. In this instance, however, this is such an innovative notion, and there is no information available other than what is on the Troubled Times website. As usual there are advantages and disadvantages. One of the foreseen drawbacks is that containers of this type absorb a lot of heat from the sun; however, this is mitigated by the fact that there will not be much sunlight after the pole shift, and if some little heat can be absorbed from what sunlight there is, this could be a positive, rather than a negative property.

These used containers can be bought now, but quite often the reason for their being sold is that they have developed a leak. Ensure that if you are buying one now, it does not have such a leak. One could actually use these containers singly, or bolt them together for a bigger shelter, depending on the size of your group.

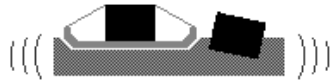


If your shelter is fully above the ground, there is the problem of exposure to wind, since your container is, after all, a box. There will be some extremely high winds both during and after the pole shift. There seems to be but one answer to this dilemma. When your group is picking the site for your container/shelter, select a location with natural wind-breakers, such as hills, ditches and the like. If your containers are placed on slabs, this whole structure could act as a "Noah's Arc".



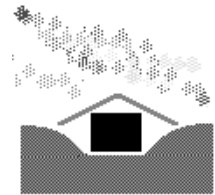
This concrete boat would be able to ride the waves of rippling land and survive the liquefaction (soil turning into a liquid) that is likely to occur in many areas. Depending on the ground conditions, this could be built differently. In soil that is not very deep to bed rock, one

would not worry about sides and possibly the slab thickness could be less. In places where there is soil and it is very deep to bedrock then the slab should be thicker and sides higher and possibly the slab is a little larger overall. This would have use after the pole shift as an excellent closed watertight storage to keep out the humidity, or as continuing housing.



Design considerations: Until one can get a structural engineer to look at it, estimate roughly a 14" thick slab for a bottom over liquefaction and about an 8-10" slab for a bottom close to bedrock. Use lots of large reinforcing rods and wire mesh. Use supports from rooftop to slab to make a triangle. Fasten storage units securely to bolts welded to large plates embedded in the concrete. Make sure the slab is done at least 6 months before the pole shift day for maximum strength."

A partially buried container would utilize the advantages of a fully buried container, while avoiding many of the problems. In this situation your container is kept above ground, and dry enough not to need any additional corrosion protection, other than a good industrial coating. Spray foam is waterproof, light, and paintable, and also insulates from heat and cold, and could therefore be used on the outside of any container/shelter. If you are in a colder environment you may want to paint the outside of your shelter black, to absorb as much as possible of what little heat will come from the sun; if you are in a warm climate, then white could be your color of choice. You also might want to consider storing other paint for the after-time, since it could be useful for camouflage.



The inside of a container can be sprayed with about four inches of foam, with air vents and escape hatches on all sides. This could serve during and after the pole shift, but there are cautions which must be noted. Remember, for instance, the caveat concerning spray foam, which could give off gases. Prefabricated foam sheets might

be better, and although soft cell would be good during the pole shift, for the after-time tight cell would be more durable, particularly if there are playing children in your group. A product called Liquid Nail will glue your sheets to wood, or plywood.

The main reason for a completely buried shelter would be protection from the elements, and although this purpose would be served, there are many cautions. If you are planning to bury your container/shelter underground, water seepage and soil liquefaction become an immediate problem. There will be lots of rain and run-off water, so do not place your shelter at the lowest point. Collapsing walls could be another hazard. Calculations would therefore have to be made for the type of soil density in which your container is going to be buried.

The collection of heavy gases such as radon, radioactive carcinogens, etc., could also become a concern. Depending on the acidity of the ground and the oxidation of the container, rust would eat through it in the same amount of time as, say, an automobile. In a full-bury situation, openings and hatches must be constructed on the roof, and these would have to be secured and waterproofed. There is no easy way to fully secure these openings, and they could become blocked if the container shifts during earth movement. It must also be remembered that after the container/shelter is in place, any material brought in will have to be limited to the size of the largest hatch.

Adaptive Structures

Conditions after the pole shift will not be optimal, even compared to conditions which existed when a lot of these options were being employed by people who lived before our modern, technological times. For example: although adobe bricks were used abundantly in less technological times, and possibly could be again, it must be remembered that drying bricks could present more of a challenge due to the constantly damp conditions, and the fact that there will be

little or no sunshine. The concept of straw-bale houses, which were being built, apparently, 100 years ago, may flounder for lack of viable straw after the cataclysm. This in part would be due to the fact that there will be little or no outdoor gardening, and thus straw will not form. Then, of course, there is the fact that unless cement, which figures largely in a lot of these ideas, can be either ported from the present into the after-time, or substituted when we get there (by mud, maybe), a serious disadvantage could be encountered when trying to build some of these houses. Having said that, here below are some examples of what could be done, were the circumstances propitious, and the right materials available.

Houseboat

One practical idea could be to live on a houseboat. This way, with there being so much water around after the pole shift, transportation wouldn't be a problem, and food, in the form of fish, seaweed and algae, would pop up right at your door. If you ever got really fed up with seafood and wanted a change, you could always land and trade some of your fish for something more palatable at the time.

Rammed Earth Homes

Would consist of earth mixed with a little cement. Even in our time, these kinds of homes are becoming known for their extra strength, and superb insulation. Construction forms could be of plywood, taken, maybe, from boxes used for storage, if any have survived. If this is not available, imagination and resourcefulness may enable your group to come up with a substitute.

Straw-Bale Houses

When the first little pig built his house of straw in the famous and well-loved fairytale, it turns out he was not far off track. He was, though, missing one essential piece of equipment ... a straw baler. A baler can compact wispy strands of straw into sturdy bricks that can be made into walls capable of withstanding assaults by hurricanes, fires, or pests. Farmers in the

Great Plains built straw-bale homes more than 100 years ago, and found the benefits to be enormous. Using such an abundant waste product is environmentally smarter than cutting down trees. Moisture damage is uncommon in a straw-bale home, and it is widely believed that these homes are more seismic-resistant than some of our modern buildings. Fewer advanced carpentry skills are required, which makes this a viable way to build, providing the circumstances are right, and the required materials available.

Coating Burlap

There have even been outbuildings constructed by coating burlap with a thin veneer of cement.

Adobe Brick

The basic resources for these bricks are sunshine, water, straw, and sand, and they were being made long before there was modern technology. Pueblos-masonry and adobe communal housing: Are an ancient form of native housing, and their durability has been proved, if properly built.

Navajo Hogan

On the surface, this looks like a great structure for permanent living after the pole shift, but the climate must be taken into consideration. An outside coating of concrete would provide some-but depending on your climate, maybe not enough-insulation. The construction of a Navajo Hogan is complex, which makes it unsuitable for temporary type housing. If built with the suggested addition of reinforcing with wire mesh or chain link (chain link would probably be stronger), this could be a pretty solid structure.

Earth Ship

Houses built with discarded tires filled with rammed earth, plus aluminum cans, and then bermed, look like a good way to go. The after-time, like our present, may be filled with tires and cans; but how intact they will be is, at the moment, anyone's

guess. If this is your choice and you have access to such things in the after-time, these are self-sufficient houses.

Cob

A mixture of earth, sand, and straw, cob is a cheap and effective building material. Construction seems to be simple, requiring little more than one's hands and feet! And cob buildings, which have survived for centuries in some places, seem resistant to just about everything.

Other Suggestions: Grain Silos, Sunk into the ground on concrete foundations, with the side door exposed. Shelters made out of steel pipe have nuclear-tolerance type strength, although it is admitted that more research needs to be done on this kind of shelter. Adapted Quonset hut. Full cylinder drainage pipes could form a sturdy, quake-resistant home, quickly constructed, and half cylinder buildings, now mostly serving as farm outbuildings, could be simply adapted to become living space. In addition, this type of pipe comes in kits, and sections could be easily stored for later use. These kinds of structures would have the same properties as domes-wind resistance, and general quake stability.

The ecolodge is a totally portable system that fits into a standard overseas shipping container. Its efficient design and portability into the after-time plus the fact that it is easy to erect and just as easy to take apart, make this a habitat worthy of consideration. Old military bunkers have also been suggested as a way to gain shelter both during and after the cataclysms; but we can be sure that if we know the location of these, so does the military. If money is not a problem, a fiberglass shelter (and specifically the Radius P10), would seem an ideal way to go.

Materials

No matter how careful we are after the pole shift, sooner or later things are going to start wearing out, and running out. For example:

the availability of lubricants and ball bearings will diminish as the years go by. Ball bearings can be greased and re-greased, providing that a lubricant can be found; but in the end, they will simply wear out. Then bushings will have to be made from whatever there is—nylon, bronze, brass or copper, depending on what is left. Recycling will be a must. Landfills have been suggested as a good resource for all kinds of recyclable material, but whether any of these will stay intact during the cataclysm is anyone's guess. The caution with landfills, even if they do stay intact, would be that along with your recyclables you could also end up unearthing disease pathogens, a phenomenon which we could well do without. This is probably moot, though, since, due to the expected strong quakes and shaking around, nothing will be left intact and such diseases will likely be rampant anyway.

So how to fix the problem of spare parts? Well, stockpiling, of course, is one way; but no matter how much we stockpile even if it is later rather than sooner, the dilemma will eventually catch up with us. All the moving and shaking will bring new material to the surface, or at least render it more accessible and therefore, later, mining may be possible. Manufacturing may also become a reality, but for both of these activities we must look to medieval practices, since, unless your group has a great supply of power and energy, these are what we are going to have to rely on. We will return to such concepts as the blacksmith's forge and will likely do so with gratitude. Meanwhile, there are substitutes for some materials which would be fairly simple to make.

One of our Troubled Times members gives us a description of how to make a Portland Cement substitute:

If limestone is heated red-hot for long enough, it turns into chunks of lightweight, white substance called quicklime. This is mixed with water which makes a chemical reaction (as in Portland cement). I think they called this slaked lime. To this bubbling white goo they added sand for mortar, or sand and gravel for cement. To waterproof it they liked to add volcanic ash, but since that was rarely available they used crushed

clay tiles instead. The red clay in the tiles made their mortar pink. So, when I can't buy a bag of Portland cement anymore, I at least know how to make it.

Ferro-Cement, a mixture of cement and chicken wire, is mentioned as a good, strong way to build; but of course being able to use this kind of thing would depend on how much cement and/or chicken wire can be ported from the present, or scavenged in the after-time. If you are in an area which produces it, bamboo is a strong and natural substance which can be used in a lot of ways. It could be a good idea to introduce bamboo to your chosen site before the pole shift, or, if your climate is going to change radically in the after-time, take some stock with you in order to make use of this strong, wonderful resource.



Practically any source of protein will yield glue when boiled down. One exception to this, apparently, is animal hooves and horns. Collagen is a protein and is found in different animal parts, as well as other substances. Rope may be of great importance after the pole shift. Rope can basically be made out of any material that can be cut into long, flexible strands, or is made that way. However, it could be a good idea to include a lot of rope in your after-time supplies, to give you a start. Your group should make a study of this resource before the cataclysm is upon us, since this is something every survival site is going to need. (A note to would-be blacksmiths: You might want to research Abraham Darby, who pioneered many of the blacksmithing processes.)

Furnishings

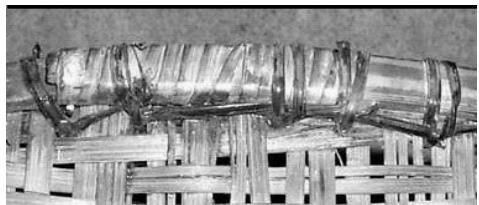
Immediately after the pole shift, it will be important for your group to get to a point where structure and order are dominant, and one of the ways to do this, after erecting your shelter, is to furnish it. Your choice of furniture in this instance may of necessity have more to do with practicality than personal taste; but once you have a completely furnished shelter, anything will seem possible, and you will have a secure base (psychologically speaking) from which to launch other

projects.

There are lines of furniture that will be better than others when it comes to setting up house after the pole shift. For example, air-filled furniture: chairs, ottomans, air mattresses—all that needs to be done with these is to blow them up, and go. Ideal for the immediate after-time, before the major unpacking of supplies has been accomplished. The caution with this type of furniture, of course, is that it will be subject to puncturing, and this should be taken into consideration when assembling supplies pre-pole shift. This inflatable furniture would be ideal if, for instance, you are planning to ride out the pole shift in a furnished shelter of some kind. Air-filled furniture bouncing around the room could get inconvenient, but would not be injurious. This type of furniture should be considered at best a temporary solution, since, by its very nature, it has a limited life span.

On the other hand, solid plastic furniture, currently sold for outdoor use, will fare better after the pole shift. Light, mildew-resistant, easy to carry around, easily stacked for storage, it could almost have been invented with an emergency in mind, so well suited is it to this concept. Also, plastic as a raw material can be melted and re-shaped into something else which may be of more benefit than the original furniture, and re-usability must be a consideration for anything we take with us into the after-time. Another product that should definitely be included in our plans is Ikea furniture. Sold in kits, and in flat packages easy to store and transport, this furniture can be assembled by an unskilled person.

Bamboo is another candidate for after-time lightweight furniture, and it is suggested that bamboo pins be used in its construction, since furniture made with rope and wire can fall apart fairly quickly. Pins would ensure a longer-lasting product. They are made by slicing a section of stem into sticks



which can then be inserted into precisely drilled holes. These pins could be made before the pole shift.

As regards sleeping arrangements, another suggested product is a humidity-proof mattress—and what better candidate than a mattress used at sea? It has closed foam cells, and therefore is waterproof. In addition, in the winter, your sleeping bag won't freeze to the bed, and this mattress provides excellent insulation.

Some folks, however, might prefer to sleep in a hammock. Lightweight, handy, easy to stow, easily washed and dried, able to be tailored to an individual's height, this marvelous resource has been around for centuries, and has more than proved its worth. In our modern society we are more or less accustomed only to the yard hammock, which does not provide the most comfortable way to rest. Seasoned hammock-users know that the trick is to sleep at an angle to the suspension line, as one reclines—flatter as one approaches the perpendicular, to the hammock line. A rectangle of cloth (heavy-weight denim is good) 60 inches wide and three or four yards long, depending on one's height, hemmed at the ends to enable a rope to be threaded for hanging the hammock on hooks, between supports. If nothing else is available, a tubular frame can be used to suspend the hammock, and it can be covered with a waterproof covering, or with netting, to discourage hungry insects. Easy to care for, and adaptable to a variety of climates.

One of the ways to create dishes and other useful things for your community is to study the art of pottery. Many and various things can be made out of clay, which is a fairly abundant substance throughout the Earth. It can be obtained most easily from stream banks and ponds. If it is wet when found, then you have saved yourself a step!

Hunting

Of paramount importance after the pole shift—both from the point of

view of morale and health—will be the ability of your group to hunt. There will be no room in a post pole shift society for niceties like a revulsion against killing animals, an indulgence which some of us urbanites allow ourselves at present. These animals will be part of the food chain; and if we wish to survive, as individuals and as a species, this fact is going to have to be accepted. The killing can and should be done humanely; but done it must be. Several hunting options will be available in the after-time; and some of these choices are listed below.



Guns

If guns are your weapons of choice, you must ensure that adequate supplies of both spare parts and ammunition are included in your pole shift preparations. For smaller animals, a pellet rifle is probably best; bigger game can be hunted with shotguns or rifles.

Slings

There are various types of slings, and many techniques for using them, and which weapon or technique you decide upon is a matter of personal preference. Slings will be a great method of hunting in the after-time, since they can as easily be used by children as by adults. They are also very portable and can be ready for use in the blink of an eye, once the correct level of familiarity has been attained. Choose your stones with great care, since hitting targets is easier with some stones than with others.

Bow and arrow

There are many who favor this tool, but that, again, is only a matter of personal preference. There are various kinds of bows, and again, which one is used must be your own choice. There will probably be metal scraps lying around in your area that can be used for construction of things like arrowheads.

Traps

There are several ways to trap wild animals, but many of them

are not very humane. One preferred method is to use a specially constructed cage or box, in which food is placed. Wild rabbits, small rodents and maybe even slightly larger things can be caught this way; the problem is that they are still alive, and especially if there are children around, one might not want to kill them. Caution: Many of these animals, notably wild rabbits, can be disease-ridden, and care should be taken when considering consumption.

With diminished sunlight there will be a reduction in plant life, and therefore, eventually, a decrease in the number of plant-eating animals such as deer. It will be essential, therefore, to make every shot count, and to this end it must be again stressed that practicing the art of hunting is a must, while replacement resources are readily available. Remember, too, that whatever your hunters manage to bring back will be a very welcome addition to the table, and a healthy boost to a diet that may become, after a time, bland, boring, or both! Skills in proper handling of these weapons should be learned and practiced by the group's designated hunters well before the catastrophe is upon us. This is particularly applicable in the case of the sling, and the bow and arrow, since materials for their construction will be at hand in the after-time. Guns will eventually wear out, and supplies of ammunition will dry up, and there will be no way of repairing or manufacturing either.

Fishing

Fishing has saved the lives of communities and individuals since time began, and there is no reason to think that a pole shift will change this. The art of fishing can be practiced from a boat in the middle of the water, or from a river bank, and is not only a healthy way to go as far as your dining-room table is concerned, but also can be therapeutic. As even city-dwellers are aware, there are many ways to catch fish. Although countless books have been written on this subject, below are just a few suggestions and ideas which hopefully will encourage you and your group to obtain more infor-

mation, while there is still time to do so. Some of these methods are non-technical and so particularly relevant to the after-time.

Trawling

Here is a description from one of our Troubled times members on how to construct a trawling basket, several of which can be made and taken with you into the after-time. This particular method is effective for crayfish, since they burrow into the mud at the bottom of ponds, etc., but may not work so well with other freshwater fish. However, there are other, well-documented ways of trawling.

To make a basket to trawl them, you just need to shape chicken wire into an open basket and strengthen the top with heavy duty fencing wire in a rectangular shape (to stop it from collapsing while dragging it), attach two ropes to corners, like crossover handles, then attach a long rope to the center of these handles and it's finished. Throw the basket out into the pond and wait awhile then start pulling the basket slowly over the bottom towards you. The basket picks up the yabbies out of the mud.

Bait and Wait

Another innovative way to catch fish is what I like to call the "bait and wait" method. Salt or fresh-water minnows and sprats, for example, can be caught by putting bread in a large jar, filling the jar with water, tying a string around its neck and letting it sink. When you pull up the jar the fish are kept inside by the push of the water—but a great many of them would be needed for an effective meal. Collect meal left-overs, or anything that gives off a strong, pungent odor. Place in a small burlap sack or cheesecloth bag, tie this container to a stout tree, and wait for the fish to congregate; then just use your favorite method to catch them. There is also, of course, chumming, which involves strewing an area with chopped-up dead fish parts, or other scrumptious goodies, waiting for the fish to show up for a good meal, then nabbing them for your

own good meal!

Rods, etc.

Fishing from the bank can be done with a fishing rod, hook and line, etc.. The trick will be to port enough equipment into the after-time so that you can keep your group supplied until such time as other methods can be found to accomplish the same thing.

Boats

There are plenty of small boats which can be taken into the after-time. If properly packaged, these should survive the shift and will prove most useful when it comes to providing fish for your table. A net would be one way to do it; but another effective method would be to use a fishing-otter. This is not an animal, but consists of a board with hooks in it, connected to a fishing line, which can then be either dragged along behind a boat, or from the shore.

Traps

There are some really simple traps, easy to use, which can be utilized to catch fish. A lot of information exists on this subject, but it could be helpful to construct some of these before the pole shift, and practice using them. This will ensure that whatever happens, your group will always have a healthy source of nourishment.

Sewage

Sewage, and its disposal, is probably not a topic to which the average person in the west gives much thought. We go into our indoor toilets, do what we have to do, flush, and for us, that's the end of it. The municipalities take over from there, and sewage is disposed of in ways we don't really care to contemplate. This, of course, will change, come the pole shift. Survivors will have to accord this topic the respect it deserves.

Many years ago, before humans began living settled lives, they would leave their excreta and urine on the ground, in the manner of all other land-based animals. The result was that the soil captured all the nutrients, and a sort of perpetual motion—or recycling process—was achieved. After the pole shift, we will have to indulge in some more organized version of this scenario. Asian societies have never forgotten the value of this kind of "waste" product, and even here in the west we are beginning to realize its worth.

Most solutions concern themselves with electricity, and fancy, highly technical paraphernalia which will mostly be useless unless you are in a really high-tech settlement. If this is going to be the case, then find your books and study them carefully, and fashion your own solutions.

For the average person, one of the simplest methods is the "garden" out-house. A shallow hole can be dug approximately three feet deep, and human wastes layered, often with the ashes from a woodstove (which are a good source for lime), and leftover food scraps, excluding meat. When the hole contains matter to about a foot from the top, another hole can be dug beside it, piling the dirt from the second hole into the first, used hole. Each time a hole is dug, move a lightweight shack-type structure over it. One of our members who actually did this reports that the following year he planted several piles of squash over the sites of the finished holes and the family was rewarded with a fantastic squash crop! So if squash, why not other things? You could make a great garden that way, providing the caveats concerning outdoor gardening after the pole shift are observed.

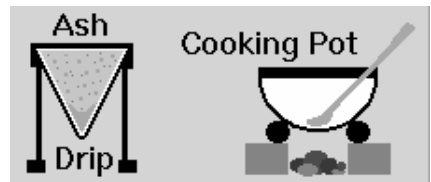
Cleaning Products

There are things we take for granted today which seem to be so necessary to our well-being and so readily available that finding substitutes for them may get lost in the bigger picture, when one is preparing for the pole shift. Soap, shampoo, household cleaning

products - these are but a few of the items which fall into this category. If there can be said to be anything "lucky" associated with this pole shift, it is that it is happening now, so soon after the emergence of the modern counterparts to these staples, so that knowledge of how to get back to basics is not so far behind us that we have forgotten how to do it. After all, people have been washing their bodies and hair for eons without soap in a pretty soap dish, or shampoo in a plastic container! Houses have been cleaned quite adequately without Windex or Mr. Clean. Here below are a few basic tips. As usual there is not too much detail, just enough, hopefully, to point your way along the road to a simpler existence.

Soap

Soap is easy to make, and this can be done using only what will be at hand in the after-time, substances such as ashes from your wood fire, and animal fat. Making lye water from ashes is similar to making drip coffee. Place paper or corn shucks to act as a filter along the bottom of a V or funnel shaped container and simply pour water in the top until it drips out the bottom into a pail.



The soap plant was used by the Native Americans to produce things like shampoo. In the capable hands of these creative people, this plant also rendered up food, and was utilized in ways as diverse as healing and brush making, and can also be a glue substitute! It blooms in dry places, in open woodlands and grasslands from May to July, and can be recognized by its striking blue-green leaves, and small, blue-veined white flowers.

Vinegar

The versatility of this simple, basic household staple is nothing short of astonishing. It can, for example, be used as a meat marinate, a wart dissolver, a pain reliever for Arthritis,

relief for itching and sore throats, as well as the quality for which it is most famous, the enhancing of food, to name but a few of its remarkable properties. Vinegar is comparatively simple to make. Choose a wide-mouthed glass or stainless steel container with a spout. Make sure the air can get to the vinegar, but put something over the mouth of the container to prevent visiting insects from going swimming. Make sure your container is not made of iron, aluminum or even plastic. Some plastics may be all right, but most will not; and in the face of this uncertainty, it is best to keep away from plastic entirely.

While the vinegar is fermenting, store in a dark place at a temperature between 80 and 85 degrees F. Light slows down the process, as do low or fluctuating temperatures, and too much light can actually kill your culture. If you happen to find yourself in an area where fruit—or fruit seeds—have survived and are readily available, then you will have vinegar as fast as it can be successfully made. As well as other uses, vinegar can be an excellent household cleaner. Vinegar can lower the pH in your hydroponics garden; baking soda can raise it.

Household cleaning such as Borax and baking soda are environmentally friendly substitutes for most modern cleaning products, but will not be easy to come by in the immediate after-time. In fact, unless you take them with you, they will be impossible to duplicate, Borax because it is a mineral and must be mined, and baking soda because it is complicated to make, and the ingredients will not be readily available. It might be possible at some point later to mine for Borax; but in the meantime we must go with what is simply available. So back we go to the old stand-by, vinegar. An all-purpose cleaner can be made with a vinegar and salt mixture, and vinegar, mixed with water will clean all sorts of things, and can be used alone for cleaning purposes. If you are in an area where lemon juice can be obtained, this can also be useful as a cleaning solution. The other great cleaner, of course, is ammonia, which comes from urine.

Medical Care

In the hours following the pole shift, there will be many medical emergencies, but no paramedics on hand to deal with them, and no ambulances to call. Therefore it is essential that, before the pole shift, while there is still time, we learn how to recognize and thus deal with certain crisis situations which will certainly be prevalent immediately after the catastrophe. Examples, to name but a few—heart attack, stroke, internal bleeding, various kinds of shock (fainting, allergic anaphylactic shock, cardiogenic, and blood loss), and exposure. No matter how many medical supplies you have stockpiled for use after the pole shift, there is going to come a time when such supplies run out. Thus it will be important for us to find alternative ways of dealing with disease. These are plentiful, and examples include:

Leech therapy

Leeches can be used to improve circulation to an injured body part, helping to prevent sepsis or gangrene. They also produce an anti-coagulant which keeps blood flowing during the healing process.

Maggot therapy

Maggots will eat dead tissue from a wound, which will prevent gangrene poisoning and allow new flesh to grow. The trick with maggots is to prevent them from damaging the new tissue.

Herbal medicine

It seems there are herbs to cure just about every disease known to man, and now, before the pole shift, is the time to study these, learn how they look and where they can be found.

Home remedies

There are many myths concerning what can be accomplished at home; but among these are some tried-and-true remedies such as urine therapy and colloidal silver which are worth

exploring.

Lead poisoning following the pole shift, from volcanic ash fallout and fractures in the ground affecting ground water is a serious issue that must be considered. Bone demineralization in undernourished survivors will add to lead intake. To avoid poisoning, lead should be prevented from entering the body. Dust mask can be used to reduce inhalation of lead containing volcanic dust particles. Drinking water will certainly be a major source of lead poisoning, and distillation is probably the easiest method for removal. When this is not possible, filtered mineral rich water, containing calcium, magnesium and not acidic is preferable.

There are many ways to reduce lead intake from food. Food rich in vitamin C, iron, calcium, and magnesium reduce lead assimilation. Dietary supplements of these components are a good way to reduce assimilation and to help the body to get rid of absorbed lead. If the first measure to prevent contamination is avoidance of lead, the second one is to use mineral supplements. Mineral supplements and vitamins should be stocked and more importantly, natural sources should be identified. Alimentary chelator, either synthetic (EDTA, Succimer) or found in plants (citric acid, oxalic acid) could be used as oral additives to prevent lead poisoning.

Gardening practices and plant selection in outdoors lead contaminated environments can minimize lead incorporation in crops. The addition of organic matter to the soil as well as a pH higher than 6, decreases lead incorporation by vegetables. Fruiting crops should be preferred to root crops and leafy vegetables should only be grown inside. Lead concentration in soil will be higher than in plants, therefore, vegetables should be carefully washed before consumption. Animal food tends to have lower lead levels than plants. Lead is more or less incorporated depending on animal species. When eating animals, poultry should be preferred; pigs, goats and rabbits come next, and finally cattle and sheep. Adult animals are also safer, since young animals concentrate more lead than adults. Lead concentrating organs such as bones, liver, kidney,

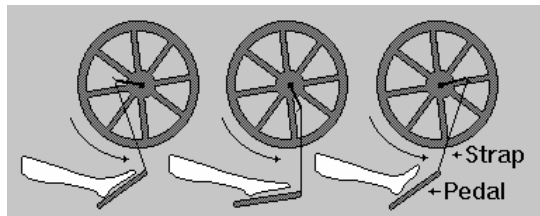
bone marrow, brain and testes should be avoided. Lead in seawater is very dilute and the concentration of lead in seafood should remain low.

Creating Clothing

Before your pre-pole shift stocks run out altogether, mechanisms for their replacement should be up and running, well practiced, with all the "bugs" removed from the system. Once again we will find ourselves returning to ancient arts, such as spinning and weaving. Later, if wool becomes available, knitting will be a factor. The needle and thread will be among the prime bargaining items, so groups would do well to over-stock on these articles for trading purposes. Non-electric sewing machines will also be at a premium, so survival sites should ensure a good supply of these is available, with plenty of spare parts with which to repair them. They will serve your group well, during the transition back to older customs.

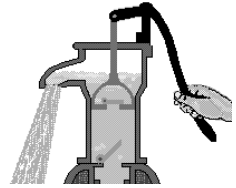
There are plants which will help with the clothing process. Flax is one such. Soaked in water and beaten, it produces long fibers which can then be made into linen. One project for interested group members before the cataclysm could be to assemble patterns for clothes-making. Animal skins will be another resource, but as any hunter will tell you, proper tanning and preparation of these skins before use is extremely important. There are different methods of doing this, and all are well documented. Heavier needles will be best for leather—and don't forget the thimbles! Depending on where you are, natural needles can be made from thorns or cacti.

Note: It is important not only to gain an understanding of how to use spinning wheels and such, but also to have a good grounding in their construction



Appliances

It will probably seem almost frivolous and quite irrelevant to some, for this booklet to be getting into this topic. What must be remembered is that we are transferring from a highly technological structure to a primitive existence, with all the physical and psychological upheaval that that implies. Even if you think you are mentally, spiritually, and physically prepared for such a cataclysm, the adjustment will still be a difficult one. From putting laundry in a washing machine and subsequently into a dryer, you will be faced with the daunting prospect of washing clothes in a river or stream, and even if there is one around, the water is likely to be polluted. There will no longer be any question of walking into a room and turning on a light, or using a toilet and just flushing it, of controlling the temperature with a thermostat, of cooking on an electric or gas stove, or of performing a myriad tasks with the ease to which our high technology has led us to become accustomed.



There are appliances which, if they—or their disassembled parts—survive the shaking and quaking associated with a pole shift, will help with this transition, provided you have a power source that can run these appliances. However you must remember that these are still machines, and sooner or later—and it will probably be sooner—they will wear out. Below are some examples of things you could use.

Hot Water

One of the things that will be prized after the pole shift will be the ability to heat water without a lot of fuss and trouble. From Lehman's comes a practical suggestion. Burn wood kindling and wood scraps for instant, on-demand, energy-efficient hot water. A thin water jacket surrounds the firebox. As the water heats it rises to the top, and draws in replacement cold water at the bottom. As long as the fire burns, you have plenty of hot water. From Jade Mountain comes a steam

engine. Their smallest size, the 5 HP Liberty, produces 50,000 Watts and heats 50 gallons of water from ambient to boiling each hour. This is a power source. Relevant to the situation for which we are preparing is the fact that these steam engines can be powered by firewood. Those who use this avenue in really cold climates now have an advantage ... the heat produced would be a Godsend; but you really wouldn't want this thing around on a hot, muggy, post-pole shift day!

Water Cooling

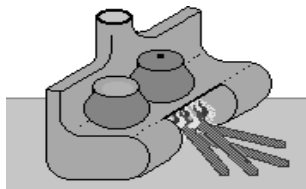
Also from Lehman's, a clay water cooler will keep your water cool without insulation or electricity.

Washing Clothes

From Jade Mountain comes a washing machine that works on a unique pressure system. Hot water heats trapped air, which then expands further, increasing pressure that forces water and soap at high speeds through fabrics. Super clean wash with a tiny amount of detergent, and no electricity. Also the James hand-washing machine. Hand-washing sounds like a chore, but with this machine it would be like a walk in the woods compared to the daunting prospect of dragging your laundry to the nearest river or stream, even if you could find a non-polluted one, or, in the alternative, preparing your water for washing, then still having to scrub everything clean by hand. The secret behind this machine is to soak your clothes in hot, soapy water for a few hours, then the swishing of a lever backwards and forwards for a few minutes will take care of the remaining dirt. There are also ringers for both of these machines, which need no electricity.

Kitchen Help

There are things which can make life easier in the kitchen, as an example, hand mills which can grind grain into flour. It also is worth checking out Jade Mountains range of emergency cooking stoves, and while



you're at it, their emergency heating systems. Although some of these are meant for camping, they could probably be used on a fairly permanent basis after the pole shift.

Light

An ongoing source of concern is how to handle the lack of light after the pole shift. Not only will the nights be dark, but the days also will be dim, due to the volcanic ash and other junk thrown up into the Earth's atmosphere by the shift. There are lighting products from both Jade Mountain and Lehman's, and providing you can port some of these into the after-time they will serve you for a while. A power source must be available to you in order to use the charge options; and the bulbs, though durable, will not last forever. Sooner or later, other ways are going to have to be found to light up our lives.

While there is still time, and if you are interested in making a slower transition from our technically-oriented modern society to a less hospitable world, these alternative options deserve looking into. It would be a good idea to study the catalogues from both Lehman's and Jade Mountain, since therein, marvels abound! And the surface of what is really available has not even been scratched here. But—and this cannot be over-stressed—sooner or later you are going to have to come to grips with the facts of your more primitive world; and maybe the sooner you decide to do that, the better.

12 Volt / DC

Once your group has decided to go with an electrical setup, your next question should be: A/C or D/C, alternative or direct current? A/C can be difficult to handle, especially if you are dealing with devices which are to be run by waterwheels, windmills, or generators, since in many cases a converter will be needed to convert back to D/C. It would therefore be much easier, and make more sense, to begin by using D/C devices and save yourself all that trouble. Once your group has decided to go with an electrical setup, your next

question should be: A/C or D/C, alternative or direct current? A/C can be difficult to handle, especially if you are dealing with devices which are to be run by waterwheels, windmills, or generators, since in many cases a converter will be needed to convert back to D/C. It would therefore be much easier, and make more sense, to begin by using D/C devices and save yourself all that trouble.

After the pole shift, even the most primitive electrical installation is going to require some pretty high-tech equipment; and if this is the road down which your settlement chooses to walk, you *must* have some experts who understand completely the way electricity works, and who know how to deal with it. If this is not the case, if no experts in this field are available to you, then perhaps it would be best for your group to find another energy source to fuel its needs. If an electricity-based survival site is in your future, there are a few factors of which you must be aware. Some of these are listed below, since to make this summary into a technical lecture on electrical power would be futile, and in any case impossible, due to the vastness of the subject.

Power

The power consumption of any device can be obtained by multiplying its voltage by its current, if this is not already written on the label. All the devices together, connected to a generator, must not require greater power than the generator can produce. This also applies to an accumulator.

Voltage

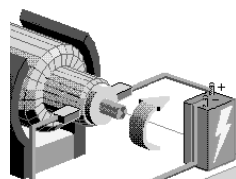
Regardless of the source, whether off the grid or from an inverter, any device, be it A/C or D/C, has an “assumed” voltage. Your computer, for example, operates on 120V, and this is its “assumed” voltage. This “assumed” voltage is important. Use a higher voltage, and the device will burn; use a lower voltage, and it won’t work. Low voltages are most appropriate for after-time living, as the likelihood is that any installation will be more or less primitive, and under such circumstances, fiddling around with high voltages could be

fatal. Equipment operating at 12V D/C would be a good compromise. Good sources for the procurement of such equipment are the marine and camping industries, and one of our Troubled times members has suggested that although pricier, the marine gear is a better buy, since it appears to last longer.

Generators

To power most equipment in a stand-alone situation (i.e. where transport is not necessary) one would need a large generator. This would be hard to build and maintain, and since high voltages are not needed, the best approach would be to obtain a 12V generator, the kind used in windmills. Bike generators are usually 6V, but two can be connected to produce 12 Volts. Now car parts—such as lights (which are quite bright)—can be used. While other generators are integrated into a power source module, bike generators or those from cars are usually separate parts which can be driven by wind, water, or human power. Generators must be sized for the load they will carry. From one of our Troubled Times members come these guidelines:

A current surge of short duration can be supplied by a generator, but a current demand of longer duration, such as a heavily loaded motor starting a high inertia system, can overload a generator possibly damaging both the generator and motor. For this reason, when determining the power your generator is to provide, it is important to calculate electric motor requirements at three times the running watts to compensate for the surge needed to start the motor.



- *Total the wattages of all small appliances, tools and light bulbs to be operated at the same time. Most appliances have labels showing wattage (if volts and amps are given volts x amps = wattage).*
- *Next determine volt-amperes (wattage) requirement of electric motors to be operated, remembering that the*

starting requires two or three times the nameplate or running (rated) watts. The starting (max.) V.A. can also be determined by referring to the motor code listing which indicates starting KVA per horsepower.

- *Total the watts and V.A. from these two steps to get total requirements, and allow for anticipated future needs or use of extra equipment by adding 25% to the total load.*

What must be remembered about D/C devices is that D/C cannot travel over long distances; therefore the source of the current must be near to the receiving device. D/C can be stored in batteries, which means you can generate it at your convenience, to use as needed. From the point of view of simplicity, 12V D/C systems are the most practical. They are also cheaper, and require less maintenance, voltagewise at any rate, than A/C based systems.

Batteries

At least for a while after the pole shift, batteries are going to be the mainstay of most settlements. Whether they will be used merely to power a few lights during the long, haunted post-pole shift nights, or to run some random appliances until the batteries themselves wear out; or whether indeed they will be part of a greater power network, used they will be, and given this fact, there are things you should know about batteries, how to maintain them so that in some cases they could last for 20 years or more. To judge by current research, it would seem that 12V batteries would be the way to go. They can power everything from water pumps to lamps.

Vehicular Batteries

Every vehicle is equipped with a 12V battery, and these are, and possibly will be, in the immediate after-time, the most readily available. Car batteries will become like currency after the pole shift, so stock up soon with “dry charge” 12V car batteries that can be activated later by adding the removed acid (which is why they are called dry), but will remain dormant until needed.

Dry Cell

You may want to purchase these dry-charge batteries new from auto parts shops, and store for later use after the pole shift. The acid is stored in a bag-in-a-box, and obviously this method of containment is safe. This would have to be carefully packed, and basic precautions should be taken to ensure that the acid storage containers are not crushed or punctured, and when stored, the boxes should be placed in a well-ventilated area.

Deep Discharge Batteries

The difference between a car battery and the deep discharge variety is that the auto battery is designed to supply a large amount of electricity in a short burst, whereas deep discharge batteries are designed to give a moderate amount of amperage for a long period of time. Thicker plates also allow them to withstand more discharge/charge cycles, hence making them more effective for renewable energy systems.

Golf Cart Batteries

The other problem with car batteries is that, once fully discharged, they never take a full charge, and are therefore less reliable than, for instance, golf cart batteries. Golf cart batteries can be drained down to zero, and still subsequently take a full charge. They can be connected in series to form a large storage unit for electrical power. Therefore, car batteries should really only be used as a stopgap until a community can collect and prepare enough deep cycle batteries.

Lead Acid Batteries

Deep cycle, lead acid batteries are the batteries of choice for over 90% of the off-grid homes. These work very well, and coincidentally—and fortunately—are cheaper than other batteries. They need to be kept warm and, as with all batteries, require to be kept in a good state of charge, and must be “vented” to the outdoors. Ways to maintain and rebuild these resources are still out there, and if this is the way your group

is going to go, then find that information and use it to your advantage.

Nichol-Cadmium (ni-cad) Batteries

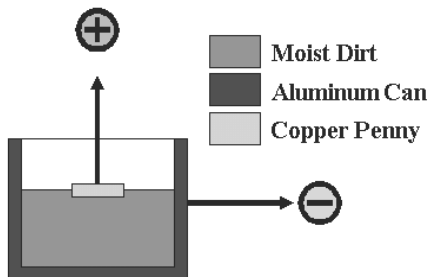
These are five to six times more expensive than other batteries, and have trouble copying the voltage range and charging characteristics of a lead acid type. Also, the fact that most inverters are designed for lead acid batteries makes it difficult to truly gauge the state of charge of the ni-cad.

Lithium

These batteries have a long life, and unlike ni-cad, do not have to be “bled” flat before re-charging, but can be charged at any time without damage.

Earth Batteries

Yes, you can make batteries out of such simple things as dirt, preferably wet, acidic dirt. If your soil is not acidic enough, then use urine. Several of



these batteries would have to be connected in series to obtain any useful voltage, but it’s free! The downside is—they would not last long. You would have to do a lot of work for very little return; but if it is all you have, it might be worth the effort.

If you are planning to rely on deep cycle batteries for 20 years, you must either take enough with you into the after-time, or, if possible, collect enough after the pole shift so that when batteries wear out—and they will—they can always be replaced. For the long run, and for storage for a later time, forget auto, and even heavy-duty, heavy-equipment starting batteries. They are designed to provide lots of current for a short time, and will not hold up to deep discharge. Collect deep discharge marine-type batteries, and batteries found in cell phone relay stations.

Fully charge your salvaged batteries by any means possible, then completely drain off the acid and store it in tightly closed glass containers (providing you can find such after the pole shift, or bring some with you, very, very well packed) in a dark place. Rinse out your battery with distilled water, and store. Once separated, both the acid and the empty battery will keep indefinitely. Simply replace the acid to put the battery into service. Keeping a good store of acid will prolong the life of your aging batteries. Keep a careful watch on the fluid levels of all the batteries in service, and add distilled water if the levels drop. Do not charge batteries over 40 amps, and 20 amps is safer. A discharged battery left in this state for more than two or three months loses a great percentage of its full-charge capacity.

Even though a battery looks as if it is dead and totally finished, don't give up on it yet! There are many ways to bring such batteries back to life. The key words here, as far as ensuring that your batteries have a long life, are "constant maintenance".

Bike Gen

After the pole shift, there will be no electricity unless we make it ourselves. One method could be pedal power. You can build and power a generator using merely an ordinary bicycle—probably an exercise bike would be best—and, taking turns at this, your community could pedal its way to a healthier lifestyle, and a higher standard of living. This could either be done in order to charge batteries with energy for later use, or to produce energy for some occasionally needed appliance.

It is cheap, portable, can be used any time, at any location, and all that is necessary is your own strength. The suggested standard is 12V DC, and a slow-speed, permanent magnetic DC motor is favored over the car alternator, since this would make the more efficient generator. The car alternator wastes a lot of generated current making a magnetic field in the field coils. Any continually needed appliances should not be hooked up to such a power source.

Neither would it be wise to make this your primary source of energy, but rather use it as a backup to run essentials in the event of a main power failure.

Here is a description by one of our Troubled Times members showing how to build such a generator. Remember, though, that if this is one of the options chosen by your community, you must ensure that sufficient spare parts are brought along for repairs, also the tools with which to accomplish such repairs, and enough batteries. How to make an effective bicycle generator:

Amp Meter

Put an amp meter (from a car or another source) in series with the alternator. This allows the person pedaling to see how much output is produced.

Front Wheel

Take the front wheel (tire, rim and spokes assembly) off and mount the remaining yoke on a stable platform made of wood. Use the same bolt holes that held the wheel on.



Rear Wheel

Raise the rear wheel about 1"-2" above the platform so that the rear wheel turns freely. Bolt this to the frame of the bike about 3"-6" in front of the back axle. This allows 2 support pipes on each side to bolt or strap it to. Could use 2" x 4" wood for the front and back supports. Use triangle supports cut from plywood or any other wood to make it stable (side to side motion). If needed carefully cut a notch in the back right wood support, so that the chain, and cables have plenty of clearance.

Belt

Purchase a V-belt or V-ribbed belt big enough to go over the alternator and back rim. I have found it easier to find the

Serpentine or 5, 6, or 8 V-ribbed flat belts in the lengths needed. A 5 ribbed belt is 45/64" wide. A 6 ribbed belt is 27/32" wide. An 8 ribbed belt is 1" and 1/8" wide. These are more expensive and cost about twice as much as the 11MM or 15MM wide single V-belts. However, they should last longer and will transfer more power. Also the alternators that use these have smaller diameter pulleys. Which is an advantage. Flat belts should work better on the bare bicycle rim. They would be less likely to turn over.

Alternator

The alternators that use flat belts are more expensive, deliver more amperage and typically have an internal voltage regulator. The older alternators have the voltage regulator separate and are a lot less to purchase. Typically local rebuilt prices are estimated to be \$20-\$40 for the older 60 amp (Ford, GM in the 1970's) type and \$110 to \$170 for the newer 70 amp and higher amperage. All of these types from time to time can be picked up at yard or garage sales.

Mounting

Mount the alternator on a piece of wood that is hinged (door hinge) to the platform (plywood, plank, etc.). This would be behind the back wheel. The weight of the alternator helps to give it belt tension. A spring could be attached to add more belt tension if needed.

The result would take no welding, and no great modification of the bicycle, so that if you wanted to unbolt it and put the back tire and front wheel back on you could still ride the bike. It does take wood and a long enough belt.

Crank-Up

Crank-up is a technology of the recent past—when the telephone was first invented, a call could only be made after an energetic cranking.

Below are a few examples of what is available, and it is up to your group to research this subject and expand upon the possibilities.

Radio

From Baygen comes a wind-up AM/FM/Shortwave radio. There are no batteries. 30 seconds of cranking yields 30 minutes of playing. Since there will be no AM or FM after the pole shift, shortwave radio is our primary concern here; and shortwave reception is excellent with an optional, retractable antenna. If you have nothing else, this radio may aid you in communicating with other sites that maintain some kind of shortwave communication. The Freeplay 360 global shortwave radio will give 45 minutes of play for 30 seconds' crank-up; however, this does need some kind of power source to make it work.

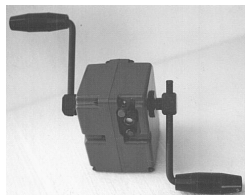
Light

The Freeplay flashlight needs a 30-second crank-up for two to three hours of shine time. The 2020 houses two independent systems in one compact unit. The first is a wind-up flashlight offering maximum dependability for times when light is needed immediately. The other is a rechargeable flashlight providing an intense beam for everyday use. The wind-up system is a battery-free source ideal for situations where recharging is not an option. The power generated by the wind-up is used to energize a cluster of white light emitting diodes (LED's) which have a life exceeding 100,000 hours. It takes 60 turns to generate approximately ten minutes of light; but still, there will probably be times when our gratitude for this light source will be infinite. With just the same options as the flashlight comes the Freeplay lantern which, if it is cranked up and the switch left off, the energy generated can be stored for use as soon as the switch is activated.

Generators

Human-powered pedal or hand generators will also be a useful plus for any settlement in the after-time. A 12V D/C

generator is about the best we can do at this time; and for 120V A/C it will be necessary to use an inverter off a battery. For 220V A/C, plan on a 120V to 220/240V transformer. From one of our Troubled Times members come these calculations as to what kind of power can be expected from such a system:



Keep in mind, cranking by hand will probably get you a sustained rate of about 50 watts. Pedaling you can average about 125 Watts, or 1/6 hp At a sustained clip, a maximum of 350 Watts can be achieved for short bursts, or up to 1500 Watts if you use a flywheel. For large loads this is not practical without a battery or battery bank.

At this point, you and your group have established a settlement akin to 3rd World countries or life 100 years ago. But with more planning and time, a technological existence is possible.

It is this setting that the next topics address.

