Volume

1

APPROPRIATE TECHNOLOGY

Drilling Water Wells by Hand

GWAM

Ghana West Africa Missions

DRILLING WATER WELLS BY HAND

Ghana West Africa Missions

P. O. Box 40
Searcy, AR 72145
Phone 501-307-1852

Table of Contents

Introduction i

CHAPTER 1

FINDING WATER

General Information 1

Where Should You Drill 3

What Is A Well? 4

How Do You Know When You've Hit Water? 5

Finishing The Well 5

Installing The Casing 6

The Platform 6

Installing The Pump 7

CHAPTER 2

THE DRILLING PROCESS

Setup 9

Drilling 10

Measure the Hole 11

A Well Log 11

Shutting Down for the Day 12

CHAPTER 3

PROBLEMS AND PRECAUTIONS

PROBLEMS

Cave Ins 13

No Progress 14

Debris Not Loading Into Bailer 14

Rope Breaks/Hammer or Bailer Stuck in Hole 14

PRECAUTIONS

People 16

Keep Your Tools Clean 17

CHAPTER 4

MANUFACTURING THE TOOLS

Tools 18

The Hammer 19

The Bailer 20

Making The Bailer 21

The Pulley 22

The Tripod 23

The Rope 24

Safety Hook 25

Speed Hook 25

Fishing Hook 26

Test Pump 26

CHAPTER 5

RELIEF, DEVELOPMENT, AND THE CULTURE

Cross-Cultural Awareness 29

Cross-Cultural Heartbreaks 31

Christian Relief and Development: Comparing Principles 33

Four Dimensions of Christian Development Ministry 34

CHAPTER 6

AGREEMENTS WITH THE VILLAGE

Agreement Form 37

Introduction

The purpose of this booklet is to help you to be able to use communal labor, and relatively inexpensive, and simple to make equipment to drill water wells for villages and individuals, and/or schools, clinics or other benevolent efforts you might be involved with. We are attempting to show you how to make the equipment, and how to use it once you have it manufactured.

We believe that everything you need to make the equipment, as described in this booklet, is available in every country of the world. The expertise for welding, etc. is also available, and can be found in any country where your work is located. You may have to go to a big city, but it should be available.

Water is as important as food for the life of the individual. In fact, a person can go many days without eating, but can go dramatically fewer without water. Our bodies are made up mostly of water, and the loss of it can kill us very quickly. There is no one in the world that lives without water, but there are many who live without GOOD water. One of the purposes we have in drilling a water well is to offer the village or individual a source of good, clean, contaminant-free drinking and cooking water. The World Health Organization estimates that 80% of the 3rd world's diseases come directly from their drinking water. If we could give everyone clean water to drink we would eliminate most of the sicknesses, and almost all of the parasites they encounter, which would dramatically improve their health. Improved health gives them the opportunity to be more productive, thus better able to care for their families. Statistics demonstrate that good water is a life-sustaining thing. In the villages of Northern Ghana, where people drink from contaminated ponds and other water sources, the infant mortality rate is three out of every ten children dying before their fifth birthday. Where we have drilled a well, and the people are drinking exclusively from the well water, the infant mortality rate has dropped to less than one out of ten! This is significant.

I have often gone into villages where a child has died from dehydration caused by diarrhea, which was brought on by the bacteria and contaminants in the drinking water. I've watched as people march toward a graveyard. The leader, usually an uncle of the family, would be carrying a rag-wrapped body of a small child, while the rest of the family and friends follow behind crying and moaning over their loss. When they arrived at the site, they would quickly dig a shallow grave, carefully lay the body in it, then cover it over with dirt, then finish with a layer of heavy rocks. There would be no marker, other than the rocks, and soon the grave is unrecognizable. Another little soul lost to history, and this could easily have been prevented if fresh, clean water had been available.

This booklet will show you how to change this situation. You will be able to organize the villagers themselves to drill a well that will provide good, clean water, which will make their lives easier and healthier as a result.

It is our prayer that you will use this information for the common good of the people you are working among. We also pray that you will share it with as many as are interested, so that more and more people might have access to good clean water.

This information can also help individuals to find a source of income. Natives can take what they learn, go from village to village and drill water wells for the people, and, for their expertise, charge them a nominal fee. By doing this, more and more families throughout the world can be helped in many ways.

Let us be eager to share and ready to do whatever it takes to make the world a better place than we found it. "As we have therefore opportunity, let us do good to all men, especially those of the household of faith." Remember, freely you have received, freely give.

Josiah Tilton
Ghana West Africa Missions
P. O. Box 40
Searcy, AR 72145

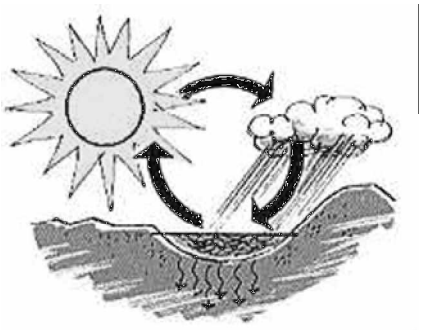
Chapter 1

Finding Water

> There is no shame in not knowing; the shame lies in not finding out.
>
> **Russian proverb**

One of the most difficult things to do when you are drilling water wells is to actually find water. This section will give you some general information to follow when searching for good, clean water.

General Information



God has been gracious to mankind and has offered him all that he needs to sustain his physical life. Perhaps, apart from the air we breathe, there is nothing we need more than water. We can live many days without food, but we cannot live long without water. We have to rehydrate ourselves regularly.

Water falls to the earth through rain or snow. It travels to streams, rivers and lakes. There it evaporates, forming more clouds for more rain, or it seeps into the earth to form an underground aquifer. Scientists estimate that there is thirty times more water underground than on top. That is an interesting statistic. In addition, although 70% of the earth is covered by water, only about 3% of the water supply is fresh water. A good portion of that is frozen at the north and south poles. In addition, the **Great Lakes** contain 95% of the fresh **surface water** in the U.S., and about 20% of the fresh **surface water** on the planet. That leaves precious little for the world to find and consume.

Fortunately, almost everywhere in the world there is an underground aquifer that can be tapped for fresh, clean, contaminate-free water. Underground water is found in three general formations:

- Sand
- Gravel
- Porous rock, or cracks in rock

As the water travels underground it is filtered by the sand and gravel that it flows through. This cleans the water and makes it potable. There are, of course, certain cases where water has flowed through rocks that contain minerals that are leeched from the rocks. This taints the water and gives it a bad taste, odor, or both. Most of the time, however, the water is excellent quality and better than any city water, which is treated with chemicals to cleanse or for some other use.

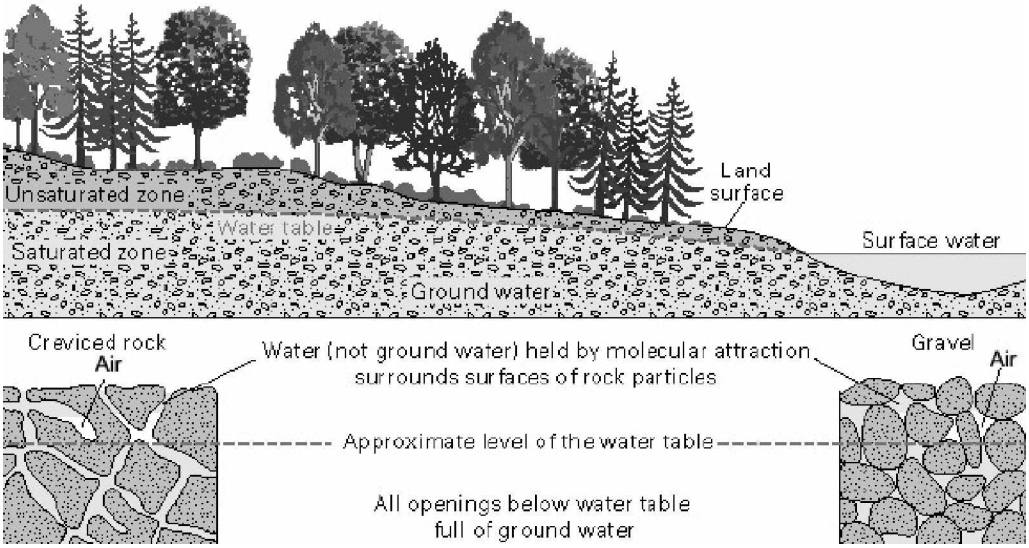
As a general rule, most of the good, clean, pleasant tasting water comes from layers of sand and/or gravel, and can be found at many different depths throughout the world.

The following comes from the U.S. Geological Survey site:
http://ga.water.usgs.gov/edu/earthgwaquifer.html

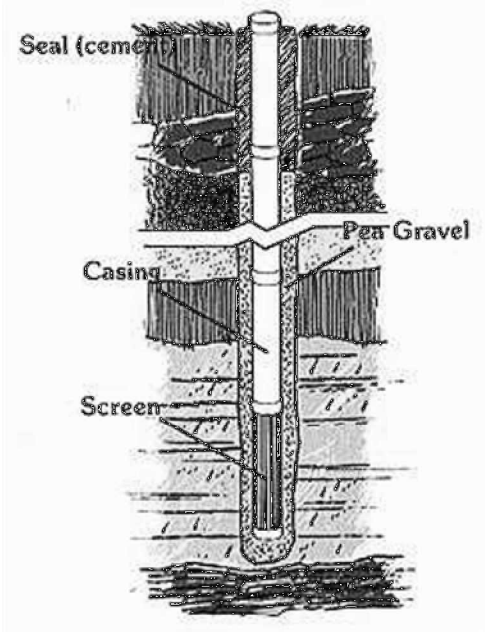
One of our most valuable resources is the water beneath our feet - something you can't see and may not even know is there! As you may have read, most of the void spaces in the rocks below the water table are filled with water. But rocks have different porosity and permeability characteristics, which means that water does not move around the same way in all rocks.

When a water-bearing rock readily transmits water to wells and springs, they are called aquifers. Wells can be drilled into the aquifers and water can be pumped out. Precipitation eventually adds water (recharge) into the porous rock of the aquifer. The rate of recharge is not the same for all aquifers, though, and that must be considered when pumping water from a well. Pumping too much water too fast draws down the water in the aquifer and eventually causes a well to yield less and less water and even run dry. In fact, pumping your well too fast can even cause your neighbor's well to run dry if you both are pumping from the same aquifer.

In the diagram below, you can see how the ground below the water table is saturated with water. The "unsaturated zone" above the water table still contains water (after all, plants' roots live in this area), but it is not totally saturated with water. You can see this in the two drawings at the bottom of the diagram, which show a close-up of how water is stored in between underground rock particles.



Sometimes the porous rock layers become tilted in the earth. There might be a confining layer of less porous rock both above and below the porous layer. This is an example of a confined aquifer. In this case, the rocks surrounding the aquifer confine the pressure in the porous rock and its water. If a well is drilled into this "pressurized" aquifer, the internal pressure might (depending on the ability of the rock to transport water) be enough to push the water up the well and up to the surface without the aid of a pump, sometimes completely out of the well. This type of well is called artesian. The pressure of water from an artesian well can be quite dramatic.



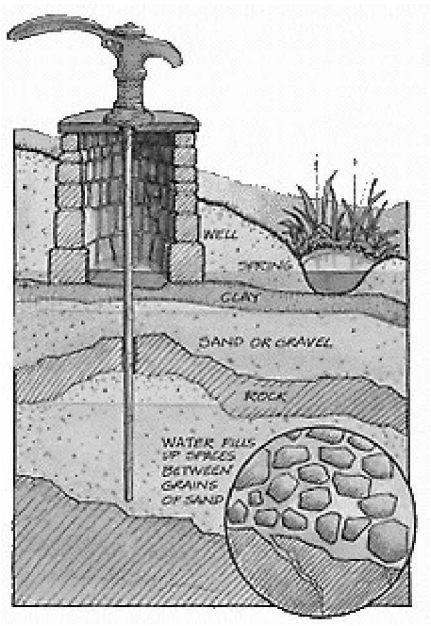
Where Should You Drill?

The general answer to this question is: You should ask the village Chief, elders, or population where they wish for the well to be. That is where you should make the first attempt to drill. Each village must have the understanding that the water well is THEIRS. If you wish to help the people, without appearing as the Great White Father, you have to allow the villagers to have input. (*See the sections on "Village Contract"* and *"Development and Relief"*) Let the villagers tell you where they wish for the well to be.

Fortunately, most of the fresh water beneath the surface of the ground occurs within 200 feet. Unless the area you are drilling in is famous for deep, dry holes, the chances are that by a little exploratory drilling you can find a good water-bearing stratum at a modest depth. In fact, the average depth of all U.S. domestic water wells is slightly less than 50 feet! (Due to surface contaminants, it is better NOT to drill a well that is less than 45-50 feet in depth) We drill wells in Ghana, West Africa. Our average depth is 105'. (We never drill past 200' – as the water becomes too heavy. When one "pumps" water, you are not actually pumping but lifting the water. Hand pumps set deeper than 200' become too heavy for women and children to pump. Since it is the women and children who generally go to fetch water for the family, you must consider them when setting a hand pump). We have a 60%+ success ratio. We recommend, therefore, that you allow whomever you are drilling for to choose the first site to attempt a well.

One of the things you should consider is the natural slope of the ground (you don't want your well site flooded by rain water), and of course you want to stay at least 50 feet away from septic fields, cesspools, or areas where the villagers generally go to the bathroom. Also, stay away from areas that are regularly frequented by animals. Other than that, one site is just about as good as any other for your first try.

The most important thing to remember is that you are not alone in your desire to help.



God is deeply concerned and involved. Jesus demonstrated God's care for people by feeding, healing and serving. Jesus came to show us the Father. NEVER leave God out of the search for water. Before drilling PRAY! When you hit water GIVE THANKS! Remember: "Every good gift and every perfect gift is from above, and cometh down from the Father of lights . . . " James 1:17

What is a Well?

The most basic definition is: A well is a hole or shaft drilled down through the earth to a water bearing stratum of sand, gravel, or a crack in the rock. The chart at the right shows you a well. Note that the top section is sealed off by cement. This prevents contaminants from entering the well from above. Any surface water must travel through the earth itself to reach the aquifer, rather than down the shaft. The earth, as we have already stated, cleanses the water making it safe to enter the aquifer. Also note: the well is cased with PVC (we case ours with schedule 40 four inch PVC). After the casing is in the hole, rock chippings or some porous type of gravel should be poured alongside the casing to help keep the hole open, and the well clean.

How Do You Know When You've Hit Water?

As you drill with the hand drilling system, you are constantly pouring water down into the hole (*see the section on the Drilling Process*). As you use the Bailer to bring the cutting up to the surface to clean out the hole, you will see what type of strata you are going through. Remember, sand and gravel are the most likely stratum from which you will get an aquifer. If you begin to see sand and/or gravel coming up, then you should check to see if you have hit water. One way to tell is if you are bringing up much more water than you have poured into the well. If you can tell that this is so, take your measuring line/tape and check the water level, as well as the depth of the hole. If you have a hole that is 60' deep and water that comes up to the 40' level, you can trust that you have a good well. Another indicator is the temperature of the water coming up. If it is cooler than the water you are pouring into the hole, then you can also assume the water is from the aquifer, rather than the water you are pouring in.

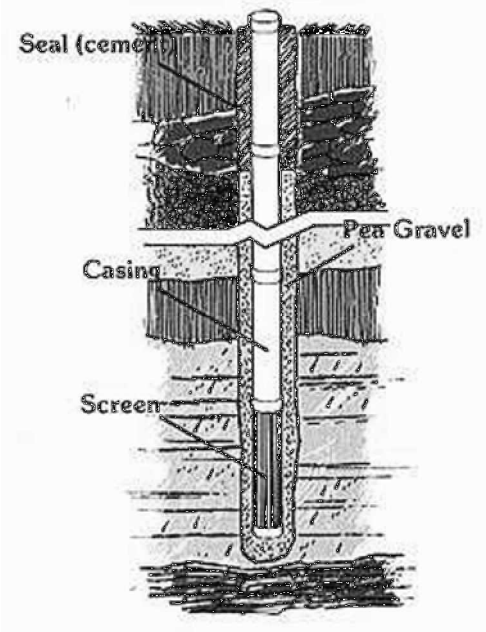
To determine for sure if you have a well or not, I recommend you do the following:

- Set your "Test Pump" frame (*see section on Test Pump*) over the hole so that it is secure and level.
- Begin lowering your foot-valve, first pipe section, and sucker rod through the pump base into the hole.
- Add pipes and sucker rod as needed until you are no closer than two feet from the bottom of the hole.
- Place the pump head assembly onto the pipe and sucker rod and then begin pumping.
- If you can pump continuously without the water in the hole getting finished, you have a good well. If not, disassemble the hand pump and continue drilling.

While this is a time consuming way to test, we have found it to be the best way.

Finishing the Well

Once you have determined you have a good well, the first thing to do is "case" the well, which simply means inserting a (we recommend) 4" schedule 40 PVC casing to keep the well from collapsing at some future time. At the bottom of your well, you will use a "well screen" or strainer (we often make ours by using a power saw and sawing slots into the PVC. We usually cut three or four slots vertically, leaving about a foot from the bottom uncut, and two to three feet from the top uncut. You can also purchase ready-made screen) to keep the sand and gravel out of your well.



Installing the Casing

The illustration on the left shows a typical completed well in a water-bearing stratum. Solid casing is joined to the well screen and continued all the way to the top. Some small pea gravel (Villagers are required to communally collect this) is poured on the outside of the pipe to within 20 feet of ground level. The pea gravel helps filter the sand out of the water before it enters the screen and casing. It also serves as a conduit or passageway for water from a stratum above the screened area to work its way down to the screen filtering through the gravel pack all the way. If you drill through a water-bearing stratum along the way and don't notice it, you haven't cut off the supply from the stratum. This is why we recommend only one section of screen and a good gravel pack. The top three to four feet of your well must be sealed with cement around the outside of your casing to prevent water contamination.

The Platform

After Casing the well, a platform must be constructed. The picture at right gives you an example of what we mean. The woman pumping is standing on the cement platform. The platform does not NEED to be as big as the one in the picture, and it does not have to have the lip around it. Most of the platforms we make are three by five feet, without the lip.

The *arrow* points to the pump base. This must be cemented into the platform. It **MUST** be **LEVEL**. Once the platform is constructed and the base installed, you should wait about five days for the platform to cure before trying to install the rest of the hand pump.

Installing the Pump

I am assuming that the wells you will be drilling are for remote villages that have no electricity, and will not have electric pumps on them. This is why I am describing the installation of a hand pump.

You will need a set of tools to install the hand pump assembly. The tools include (We got ours free from UNICEF. I suggest you go to your UNICEF office and ask them to get them for you. If they cannot, you will have to buy them. The people at UNICEF can, most likely, tell you where to get them.)

A vise – this will hold the pipe and sucker rod, as you lower them into the hole and put them together.

NOTE: The part of the hand pump that goes at the bottom of the well is called the "foot valve." Inside the "foot valve" are two valves that open when the pump handle is lifted. They allow water to flow into the valve assembly. The valves close when the pump handle is pushed down. They close so that the water can be lifted up to the surface. With each stroke of the handle the valves alternately open and close so that water can fill the pipe leading to the surface, and can then spill out of the spout and into your bucket, or other receptacle.

Onto the foot valve a length of pipe and a length of sucker rod must be attached.

- Place the sucker rod into the pipe
- Lay the pipe horizontally
- Hold the foot valve assembly up to the sucker rod and pipe and attach the sucker rod first
- Attach the pipe next.
- Slowly lower the entire assembly through the vise, which is attached to, the pump base into the well.
- When the pipe has about a foot left above the vise, close the vise.
- Attach the next section of sucker rod and pipe
- Continue this until the foot valve is at the bottom of the well, at least a foot above the bottom (You will probably have more pipe sticking out of the well than you need. If this is the case, cut the pipe and sucker rod. Thread them both, so they can attach to the pump head. You will understand what I mean when you are in the process of installing the hand pump.)
- Assemble the pump head onto the pipe and sucker rod

- Pump! AHHHHH Good, Clean WATER!

Wait a minute – the water is **NOT** clean! When you first begin to pump water from the well it will, most likely, not be clean, but will appear muddy. After several hours, perhaps days, of use, the water will begin to clear and the well will be clean. Prior to that time, the water is still good to drink; it will just taste a little muddy. Compare it to the pond where the people have been fetching their water and see if it is not much cleaner than what they got from there. Do not worry about the muddy water. The villagers will not be worried about it at all. They will be happy to have the well, and it won't be long before the mud will go away.

Chapter 2

The Drilling Process

> You don't just luck into things as much as you'd like to think you do. You build step by step, whether it's friendships or opportunities.
>
> **Barbara Bush**

Setup

The drilling process, like everything else, is a step-by-step process. This section will teach you the various steps you need to take to set everything up and begin the drilling of a water well.

Once you have all of the tools needed for drilling, determine where you will drill the well (see page two – "Where to Drill"). Consider your helpers. You do not want those who will be pulling the rope to have to pull uphill. They should be on flat ground, or on the downhill side of your operation. This will make their job, which is the most difficult, as far as physical labor is concerned, much easier. At the same time, you have to have a place to empty the mud from the hole, as you remove it. The mud and water will have a tendency to flow downhill. You do not want it to flow into the same area that your pullers are standing. It would make their job hazardous, as well as messy. On one side of the tripod dig a hole where you will empty the contents of the bailer. As you empty the bailer, the hole will begin to fill with water and mud. The mud and debris will settle to the bottom of the hole, and you will be able to reuse the water. This will keep you from having to go for more water. To make it easier to empty the bailer, place a rock or log beside the mud hole and tip the bailer over it to raise the bottom of the bailer higher than the top. This will aid you as you empty the bailer.

Next, set the tripod up where you want to drill your well. The tripod does not have to be completely level, as the hammer will come down in the same spot each time anyway. You should, however, make the tripod as level as possible for ease of operation.

Attach the rope over the pulley, and hook the hammer to the rope. Attach the other end of the rope to a tree, a car bumper, log or some other immovable object. Have your crew pull on the rope, raising the hammer off the ground. Once the hammer stops swinging, have them slowly lower it until it just touches the ground. Making sure the spot where it touched is well marked, have them lift it slightly, move it to one side, and lower it to the ground, laying it down.

Take your posthole digger and dig a four or five foot hole at the spot where the hammer touched. The deeper you can dig the better it will be, as the first few feet with the hammer are the most difficult.

Drilling

The first few feet will be the most challenging to drill because the hammer will have a tendency to move around more, and the driller will have a difficult job keeping it centered. Also, because the hammer is close to the surface, when the hammer is dropped into the water and mud it will have a tendency to splash some out of the hole. The driller will, most likely, be the recipient of the mud! If it is proving difficult, try lifting the hammer only a foot to eighteen inches, then release it. As the hole gets deeper, you can raise the hammer higher for each blow. Starting with shorter lifts and drops will help the driller to have greater control.

Remember: The hole will be wider at the top, but will narrow as it gets deeper, and this will eventually keep the hole straight.

Once your starter hole is finished, have the crew raise the hammer and then lower it into the hole. Pour in some water – about a gallon, and begin drilling. To drill, Have your crew raise the hammer a couple of feet – less at first, as your hole will be too shallow to raise it too far – then release the rope, letting it slide through their hands (they should be wearing gloves to keep their hands from rope burns, cuts, etc.). They should keep their hands around the rope, so they can then grip it again, pull it up and let it drop. Over and over – raise and drop. You, or someone, should stand over the hole guiding the hammer to keep it going into the hole. Add water regularly so the cutting will make mud.

Once you have gone down a ways – after you have done this for a while, you will be better equipped to determine how far you should drill before cleaning the hole – lift the hammer completely out of the hole and, unhooking it, lay it aside. Hook the bailer in its place and allow it to drop into the hole. The bailer will fill with the mud and cutting. Quickly raise it to the surface and empty it by tipping it over and allowing the mud and water to flow out. Make sure the flap valve is clear of obstruction and lower the bailer into the hole again and again until the hole is clean. Once you have cleaned the mud from the hole, remove the bailer. Next, hook the hammer back on and repeat the process over and over until you have a good well.

This is a very simple process, and with a little practice you can do it!

Measure the Hole

You should regularly measure the hole to determine your progress. This is invaluable when making a well log (see the next section), and when trying to retrieve a tool that is stuck in the bottom of the hole. By measuring regularly you will know the depth of the hole. This will help you in many ways, which you will see as you continue through this manual.

A Well Log

In Ghana, the government requires us to keep a record of the geology of the holes we drill. This is called a well log. It works like this: As you drill you will go through various layers of soil and rock types. You should keep a measurement and record of the various soils and what depth they began and ended. It should also record the depth of the well, and the static water level (this is the highest point of the well where the water rises).

The well log will give the government vital information about the geology of the area where you are drilling. It will also give you some guidance for the additional wells you may drill in the area. The more you know about the geology the easier it will make the job of drilling a well. You will see the benefit of this after you have drilled several wells in an area.

Another benefit of keeping a log is that it will give you a regular progress report. If you take a reading every half hour you will be able to tell how fast you are drilling. If your well is twenty feet deep at the beginning of the hour, and it is twenty-two feet deep at the half hour, you know you are drilling four feet per hour. This would be tremendous, but don't count on going that fast. If you are able to drill twenty feet per day you will be doing very well indeed.

How to Tell

One of the tools you are supposed to have made is a sand screen. This is just a frame with mosquito netting (screen) stretched across it. When you bring a bailer load of mud up from the hole, pour it into the screen. Take some clean water and wash it. Check and see what type of soil, rock, etc. is left. Are there rocks? Do they appear to be whole, or are they chips off a larger rock? Do they compare with anything you have already taken from the hole? Do they compare with rocks that may be lying on the ground around you? Is it clay, or coarse sand? Is it fine sand? Determine what you are bringing out and make a record of it.

Shutting Down for the Day

It may be that you are a very fast driller, and the geology of the material you are drilling through is just the right type of stuff to allow you to drill 100 feet and get a good well in just a few hours. I doubt this will ever happen, however, and therefore you need to take some precautions against losing your tools needlessly.

At the end of the day, or when you are taking a break, even if just for a few minutes, remove your hammer or bailer from the hole. If you leave it in the hole the water may dry and the tool become stuck fast in the dried mud. The hole could also cave in and trap your tool at the bottom. Neither of these will happen as long as you remove the tools when quitting or taking a break.

In addition, cover the hole with a strong piece of wood, and pile some bricks or heavy rocks on top of the wood. This will prevent children from throwing things into the hole, and it will keep people from accidentally stepping into the hole and possibly breaking a leg.

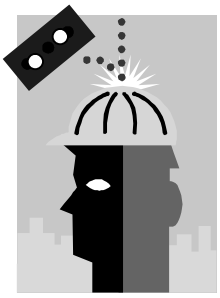
It is always better to be safe than sorry. Removing tools and covering the hole will keep you safe, and keep you from being sorry.

Chapter 3

Problems and Precautions

> We are continually faced with a series of great opportunities brilliantly disguised as insoluble problems.
>
> **John W. Gardner**

Problems



CAVE INS

One problem you may have is the one of cave-ins. You may be drilling and drilling, and bringing up lots of mud and debris, but every time you measure the hole is the same depth. This is an indication that the hole is caving in. This problem may call for casing to be put into the hole. If so, you will have to install the casing and drill inside the casing. Obviously, if your bailer is six inches in diameter, the inside diameter of the casing must be larger than that.

The casing should be steel, with threaded ends, which will join together with couplings. The first section of casing to go into the hole should have a special end fitted on to it. The end should be like the bottom of the bailer, having a thicker boot attached. This will keep the casing from bending as it goes through the hole. If you are using casing that is very strong, you may be able to just use the casing, and it might not bend.

Often, the casing will slide into the hole under its own weight. At other times you will have to pound it into the hole. The one thing you do not want is for the casing to go in so fast that it slips out of your hands and slides all the way to the bottom of the hole. In order to lower the casing with control, you need to have some "casing clamps" around the casing. (See casing clamps in tools list) A minimum of two clamps with two or more people holding each clamp is a necessity, as the casing will soon get to be very heavy. After a couple of lengths of casing are installed, you should have at least three clamps holding the casing, and several people around the casing holding on to the various clamps. You will begin to understand how to use the clamps when you have to use casing. Be prepared, however, and have the casing and clamps available.

NO PROGRESS

A lack of progress could be caused from several things:

- **Caving in** – Unless you can case the well, you will not be able to do much about the caving in problem. I spoke of this above.
- **Especially hard rock** – This and the next problem are more difficult and would be better answered by just picking everything up and moving twenty or thirty feet from your original hole and starting over.
- **Rounded rock** – the hammer is slipping off the edge of the rock and not going straight into the hole
- **Hammer bit is dull/bending** – either you have used the bit for a very long time, or you made it from too soft steel. If the former, sharpen the bit with a file. If the latter, you really need to go back and have a bit made from hardened steel. Steel taken from the springs of automobiles is tempered so that it can withstand heavy loads and pressure without bending or breaking. Be sure you use this type of steel or you will be making very slow drilling progress, and will be sharpening the bit often.

DEBRIS NOT LOADING INTO BAILER

When you are hammering through solid rock, there are times when, even though you are pouring water into the hole, you drop the bailer down to clean out the hole and nothing comes out but water. How do you clear the rock chippings out of the hole? One thing you can try is to pour some mud into the hole. The chippings are heavier than the water, and, with nothing to stick to, they drop to the bottom of the hole. When the bailer is lowered, it opens and allows the water to enter it, but, since the rocks are not suspended in the water, they do not enter the bailer. If you pour some mud down the hole and then lift and lower the bailer a few times, the rocks will be stirred up and will mix with the mud, which will then go into the bailer allowing you to raise them to the surface for emptying. You may have to do this several times to clear rock chippings.

ROPE BREAKS/HAMMER OR BAILER STUCK IN HOLE

There will, more than likely, come a time when you will say something like, "OOPS! The rope broke and the Hammer is at the bottom of the hole." What do you do when that happens?

One of the tools you were supposed to make is called a fishing hook. The hook is attached to a rope and lowered into the hole. Because the hammer or bailer has the big looped end, where the rope is normally attached, you should have pretty good success in retrieving the hammer or bailer from the well. Once you lower the hook, and the rope has slack in it, begin to raise the hook. The point is to try and hook the tool onto

the loop. Once you have done so, pull the rope slowly out of the hole and retrieve the tool. In order to keep the tool from binding up on the side of the hole, it is always best to loop the rope through the pulley, as the rope will then be over the center of the hole.

A word of caution is necessary here. Do not waste time. The hole has a tendency to dry out. You do not want the mud at the bottom of the hole to dry and encase your tool, making it more difficult to retrieve than it already is. So work quickly. If the hole seems to be drying out, add more water to keep it moist. This will allow the mud to stay pliable, and the tool to be pulled out easier.

REMEMBER: Check your rope and attachments often. If there are any frayed parts, replace that section immediately. Don't let the rope break, if you can help it! You are there to find water, not to fish!

As you are trying to fish the hammer/bailer out of the hole, and you are not able to hook it, listen as the fishing hook is being lowered. Can you hear the hook hitting the lost tool? If not, the hole may have caved in and buried the tool. If you suspect this to be the case, measure the hole. Is the hole much shallower than it is supposed to be? This would indicate a cave in. This is bad, but it does not mean you have lost your hammer for good.

If indeed it is the hammer lost in the hole it may be possible to clear the hole with the bailer, at least, enough to allow you to hook the fishing hook onto the loop of the hammer. Try the following:

- Pour water down the hole, and then tie the bailer onto the rope, lowering it into the hole.
- Work the bailer up and down, trying to mix the water with the dirt that has caved in, add more water
- Retrieve the bailer and empty it. If you are getting a good amount out of the hole, repeat over and over
- If, after several tries at clearing the debris from the hole, you hear the bailer hit the hammer, retrieve the bailer and attach the fishing hook. Lower it and try hooking the loop of the hammer once again.

It is possible to add a weight of some kind onto the rope, above the hook, and lower the hook into the hole. The weight may be heavy enough to force the hook into the soft dirt, which has caved in, onto the hammer. It may go in far enough to allow the hook to catch the hammer's loop, and give you the opportunity to raise the hammer from the hole.

As you are trying to raise the hammer past the caved in area, it would be good to tie a loop in the rope and put a pipe or strong stick through it. Then you can get people on both sides of the pipe to help lift the hammer past the debris. This will give you greater leverage than just trying to raise the hammer with the rope over the pulley.

It also may be that the strain on the rope is too great. Try doubling the rope. Try to unhook the fishing hook, raise it to the surface and tie a second rope to it. Rehook the tool to the loop and try lifting again. The double rope may give you just the leverage you need to lift your hammer or bailer out of the hole.

One more thing you might try is to attach the fishing hook to a strong chain, catch the loop on your hammer or bailer, and then place a railroad tie, or similar strong board across the middle of the hole. Get a hydraulic jack and, by whatever means you are able, attach the loose end of the chain to it, and then try jacking the tool out of the hole. Don't give up too soon.

One final attempt: If the hole is not too deep, it may be worth digging down and trying to get the hammer out. If the hole is too deep, however, you will just have to fill in the hole, make a new hammer, and start over. It is not an easy decision to make, but eventually you may have to make it.

Seriously! Prayer helps in all cases!

O LORD my God. Hear the cry and the prayer that your servant is praying in your presence this day.
1 Kings 8:28 NIV

Precautions

PEOPLE

Paul admonishes the Corinthian Christians with the following:

"What do you have that you did not receive?
And if you did receive it, why do you boast as though you did not?"
1 Corinthians 4:7

Whoever you are and whatever you have done the gift of life and the ability to do what you do is a gift from God. We are nothing without the Father of "lights" giving us our daily and regular blessings. If we have received everything we have and are, we need to humble ourselves and act as if we believed this.

The people you will be working among are just like you. They are no more nor are they less. They are just people. In all their ways they are weak, strong, smart, dumb, ignorant and knowledgeable, just as you are. They deserve respect as people made in the image of God. With respect for them, you will be able to gain the cooperation

needed to accomplish the tasks set before you. You will get them to join in with you, and share your dreams.

Just because you are there to give something, you cannot lord it over them, or treat them as if they were less than you. They are not! With the proper respect, great things can be accomplished, and God will be glorified.

I am offering this as the greatest precaution: Treat others as you would like to be treated. The respect you pay others will come back to you a hundred-fold, and your work will be made much, much easier!

KEEP YOUR TOOLS CLEAN

ROPE: After ending the day's work, take the time to clean your tools, most especially the rope. Sand and mud can become caked on the rope. The more you use the rope, the more the sand acts as an abrasive and cuts into the rope. If you clean it regularly you will prevent premature wearing of the rope.

TOOLS: Cleaning all of your other tools should include a light coating of oil from time to time. After washing the various metal tools, take the time to wipe them off with a rag that has been soaked in used motor oil. Instead of just allowing the tools to rust, and deteriorate, clean and oil them and they will last much longer.

PULLEY: If you make your pulley from a bicycle or motorcycle wheel, take the time to grease it also. The bearings will last a long time if you occasionally take the wheel apart and grease them.

Chapter 4

Manufacturing the Tools

> We find greatest joy, not in getting, but expressing what we are. Men do not really live for honors or for pay; their gladness is not in the taking and holding, but in the doing, the striving, the building, the living. It is a higher joy to teach than to be taught. It is good to get justice, but better to do it; fun to have things, but more to make them. The happy man is he who lives the life of love, not for the honors it may bring, but for the life itself.
>
> **R. J. Baughan**

The next several pages are going to teach what tools you will need in order to drill, and how to manufacture those tools. Taking the time to make good tools will be a blessing in the long run. One of the men I admire most in the entire world, who is like a father to me, is George Chisholm, an Elder in the church in Traverse City, Michigan. He told me to spend as much money as I could afford whenever buying anything. The old adage, "You get what you pay for," was something he deeply believed, and tried to convince me of. I found it to be true in every case. Take time to make the best tools you can make. They will last through many operations, and reward you with good service.

TOOLS

There are seven major pieces of equipment needed for drilling water wells by hand.

- Drilling Hammer

- Bailer
- Pulley and tripod assembly
- Rope
- Fishing hook
- Test pump setup
- Measuring string/tape

The Hammer

The hammer is used to break through the soil and make a hole that will eventually break into an underground aquifer giving you a source of fresh, clean water. The hammer is heavy, somewhere between 80 and 120 pounds. It has a cutting bit on one end and a steel loop, to attach it to the rope, on the other end. (See Fig. 1A)

Fig. 1A

The Body of the hammer is made from a solid piece of 4" steel, and should be between 3 and 4 feet long, depending upon how heavy you want it to be. On the top of the body (see Fig. 2A) a **Loop** of 1/2" steel rod is bent and shaped into a U, then welded onto the 4" steel hammer. **NOTE:** Do not use soft steel for the loop, as it will bend easily and wear quickly. The loop will be used for lifting the hammer as you drill the borehole.

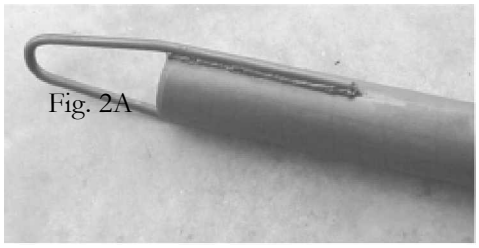
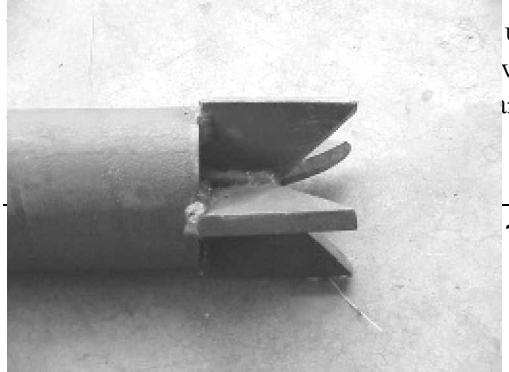
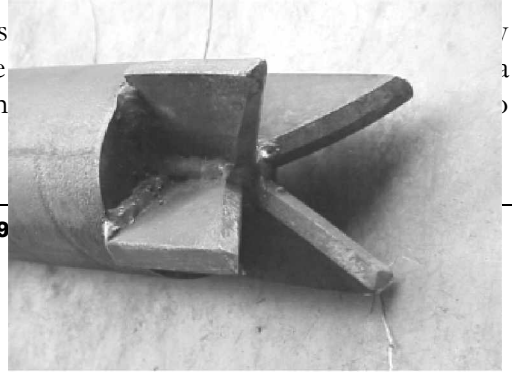


Fig. 2A

The Bit, (see Figs. 3A, and 4-5A) must be made of extremely strong steel. We recommend making it from the springs of an automobile or truck. This type of steel is readily available, and is very strong. You will be hammering into rocks and other debris, and soft steel will lose its edge quickly and have to be sharpened often. DO NOT USE SOFT STEEL. The outside edges of the bit should extend beyond the sides of the hammer itself. This is so the mud can have room to move around the bit as it is being dropped into the hole. A 1/4 to 1/2 inch gap should be plenty.

Fig. 3A





drill past the broken pieces. The hole would have to be abandoned and the entire process started again.

As you look again at Fig. 3A, note that the teeth (circled) are actually on the outside, and not at the center. You want to take small bites as you chew up the earth. If your bit has but one point in the center it will prove a very difficult job to drill a hole. The bits on the outside help chew the hole so the debris can be broken up and retrieved with the bailer. A pointed bit will stick into the earth and will be much harder to use, causing more labor and slower progress. Remember when you stuck the point of a knife into a hunk of wood? It stuck and you had to wiggle it back and forth to remove it. That is how it will be with a single point hammer. (see Figs. 4A, 5A, 5B)

Fig. 4A

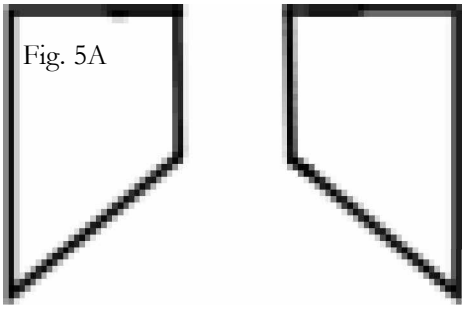


Fig. 5A

The bits must be large enough so they will not bend and the hammer will not be pushed sideways by a rock or other obstruction. Also, the bit must be sharpened on both sides. This also keeps the hammer from sliding to one side or the other.

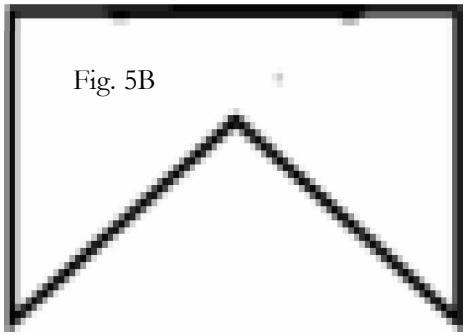


Fig. 5B

THE BAILER

The bailer (see Fig. 7A) is a hollow tube used to lift the mud and debris from the bottom of the hole to the surface, where it can be discarded. It is called a "bailer" because it actually "BAILS" out the hole, much as one bails out a boat.

The bailer is made up of three parts:

The two half bits (Fig. 5A) weld onto the solid, two toothed, bit (Fig. 4A), so as to make a four toothed bit (Figs. 3A and 4A)

1. The tube, made of six inch steel casing

2. The flap valve, opens to allow mud, water and debris into the bailer tube, and closes to trap it there when the bailer is lifted out of the hole

3. The loop at the top of the bailer (Fig. 7B) is used to attach the rope to the bailer, so that it can be lowered into the hole and lifted out.

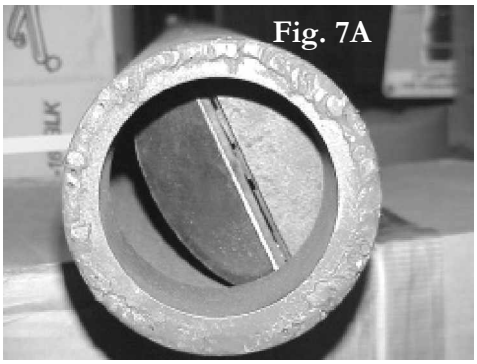


Fig. 7A

Looking in from the bottom of the bailer you will notice the flap valve. It is partially open, and it opens upward. As you drop the bailer into the hole, it will contact the mud at the bottom of the hole. When it hits the mud, it will be forced open by the mud trying to go up the tube. As you pull the bailer to the surface, the flap valve will close holding all of the mud inside. Once you have the bailer all the way out of the hole, you merely tip the bailer over a rock or log, allowing the bottom to be raised higher than the top, and the contents will pour out the top of the bailer. If mud gets stuck inside, take a stick, pole or other long object and poke the contents out.

Bailer is made from a 4-foot section of six inch steel casing. **NOTE**: If you are going to be drilling in rock, the Bailer **MUST** be the same size as the hammer or it will not fit into the hole. If you are drilling in soft material, however, it is better if the bailer is six inch and the hammer four inch. This helps to keep the hole straight.

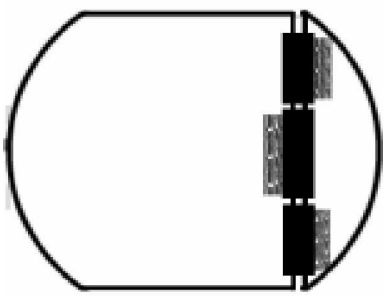
Making the bailer:

The bailer can be the same size as the hammer, and it must be if you are drilling through rock. If you are drilling in unconsolidated material, however, the bailer can be bigger than the hammer. When the hammer is dropped through soft material it will gouge out more than just the size of the hammer, so a larger bailer is useful for cleaning out the hole.

The bailer should be made of lightweight steel, but not so light that it easily bends. The purpose of the light weight is to keep the weight down when you are lifting debris out of the hole. You do not want it to be so heavy you cannot lift it. Keeping the bailer as light as possible will help. A 1/4 inch casing should be adequate for the bailer.

In the bottom of the bailer is a flap valve. This valve opens up, in the direction of the top of the hole, when the bailer is dropped into the hole. This allows the debris to flow into the bailer. The flap then closes, to trap the debris, when the bailer is lifted. The flap valve is made in the following way:

Start with a 3 1/4 inch pipe with an outside diameter of 1/2 in and inside of 1/4 inch. Cut into 3 pieces: 1 = 1 1/4"; 2 = 1". Use a 4 inch length of 1/4 inch round steel for the hinge pin. Assemble the pipe pieces with the larger 1 1/4" piece in the middle of the two smaller 1" pieces. Put the



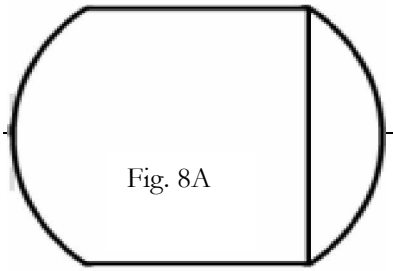


Fig. 8A

1/4" steel rod in the center of the pieces. **Next**, cut the two flap parts (see Fig. 8A) from a single 5" round piece of 1/4" flat steel. Trim the edges so the flap can stand upright at the side of the 6" casing. **Next**, Weld the two smaller hinge pieces to the smaller piece of steel, and the larger hinge piece to the flap itself. (Fig. 9A below) (Figure 9B shows a flap valve from the bottom of the bailer.)

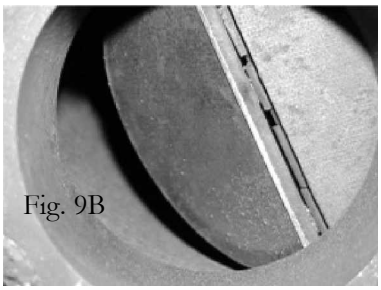
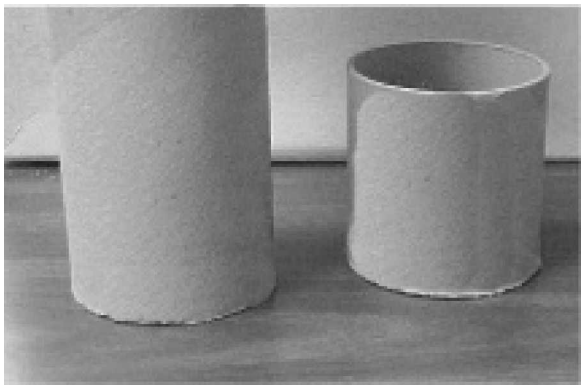
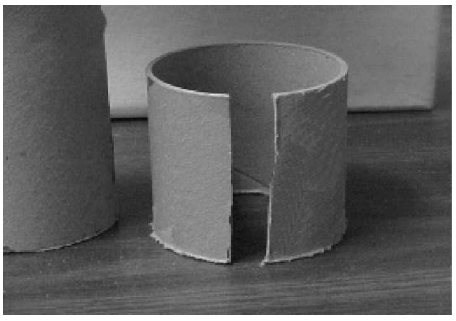
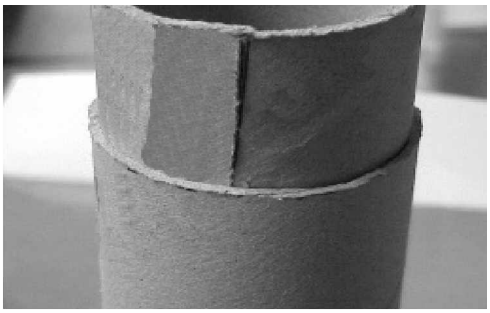


Fig. 9B

Next, cut a 2¼-inch piece of the six inch steel casing. Then cut a 1¼-inch vertical strip from the piece. (see Fig. 10A) Bend the piece, trying to keep it as round as possible, until the two sides meet. (see Figs. 10B—C) Weld the two sides together in order to make a tube section that will fit inside the six inch steel casing. Next, Place the hinged flap onto this section, and weld the smaller flap so that it is securely fastened. Make sure the flap valve moves up and down freely. Next, push the flap valve assembly into the steel casing. Lay the casing on the ground and look inside to make certain the flap valve opens, and does not bind up on the side of the casing. If it binds, and does not open 90







Figures 10A—C are cardboard cutouts showing you how to make the base for the flap valve, which goes inside the bailer

degrees, take the assembly out and file the straight edges until the valve works freely. Once this is done, weld the valve in place.

Finally, weld a loop on the top of the bailer so the rope can be hooked to the bailer for use. (look again at Fig. 7:A)

THE PULLEY

The pulley is used to allow the rope to move freely lifting the hammer or the bailer in and out of the hole with ease. The object is to use a pulley that will allow you to work with as little physical labor as possible. You want your crew to stay with you through the whole process, not to chase them away by making their job too difficult.

There are many different types of pulleys, and most hardware stores sell them. I know of some who have tried to use pulleys that were much too small, and they failed miserably, and believed this was not a good system. It was not the system itself, however, but their choice of pulleys. The pulley in Fig. 12A below is a sample of the type of pulley we made. (see also figure 12B)

It is made from square steel stock, a front motorcycle wheel and axle, and four inch steel casing. The picture gives you enough information to make one for yourself. Because you might make one from a bicycle wheel, or a wheel of a different size, I will not try to give you any dimensions. Note, though, we have welded a bar across the tops of the four-inch casings. The casings are used to hold pipes, large bamboo, or wooden poles, to form a tripod on which the pulley sits. It should sit some eight to ten feet above the hole you are drilling. This is to give the driller (person) room to work, and to give enough clearance for the hammer and the bailer.

THE TRIPOD

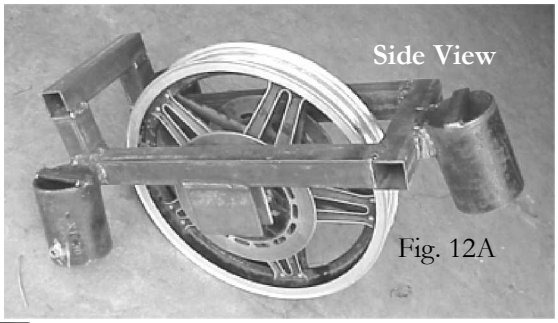


Fig. 12A

As you look at figure 12B you note that there are three places where the legs of the tripod are attached. Each of these 4-inch casings is about 4 inches long, and topped with a steel plate to keep the legs to the tripod from slipping through. Each of the casings is also welded at a small angle so the tripod can stretch outward, making a sturdier base.

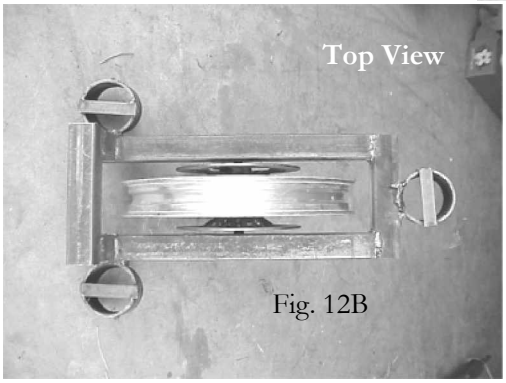


Fig. 12B

If you choose a different type of pulley, one that hangs from a chain, or is hooked into a platform, etc., then you will have to design your own type of tripod. If you use this type of pulley, you can use any of a number of materials for the legs of the tripod. If you are in an area that produces large bamboo, you can use ten foot long

pieces of 3 1/2—4 inch bamboo for the legs. Bamboo is very strong, and will last a long time. In addition, it is not too heavy. You could also purchase 2 1/2—3 inch steel pipes for the legs, or two 2 X 4's nailed together and trimmed at the top so they fit into the 4-inch casing, for each leg. Whatever you use, please be certain it is strong, and the legs are spread far enough to make a sturdy base for the pulley, as you will be putting much stress on the tripod when you pull the hammer up.

THE ROPE

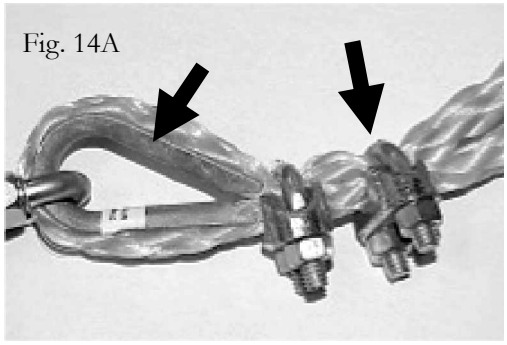


Fig. 14A

It may sound silly to talk about a rope, but there are choices to make and things to think about. In most third world countries it is the hand woven ropes that are most readily available. The half-inch size is quite strong, and will be adequate for lifting and lowering the hammer and bail. However, these also wear out quickly, and must be checked often. If they break while the hammer or bailer is down in the hole, you will have to spend much time trying to fish either part back out of the hole. Also, the hand made type of rope has a tendency to unwind, and must rewound often otherwise it loses much strength.

A better choice is the braided nylon rope. A good half-inch nylon rope will last for a long, long time. A braided rope will not unwind, and does not fray as easily as twisted rope. Of course, the nylon rope is more expensive, and might have to be imported or carried into the country where you will be using it. This can be a problem, especially if you hope to make this a village level type of work. It is always better to use locally available materials, so when you are gone the people there can still get what is needed to carry on with the work.

The rope must have a metal insert (rope eye—see Fig. 14A) tied into the end of the rope. This is for strength, to keep the end of the rope from wearing out quickly. There is going to be some type of hook hung between the rope and the hammer or bailer, and it will hang on the rope eye. If you merely tied the rope to either the bailer or hammer, it would quickly wear out, as it would be getting a great deal of pressure on the one spot where the loops hang. With the metal eyes the pressure is spread out and there is less wear and tear on any one given spot.

Rope eyes are very common and can be found in most hardware stores, or, once a metal worker in any country knows them, can be manufactured quite easily. They come in various sizes to fit all rope widths. There are several ways to attach the rope eye. You can merely tie it on with a knot—which I do not recommend, as knots tend to untie easily. You can weave it together by weaving the end of the rope just above the metal eye. You can take the rope and tie it by wrapping smaller rope or twine

around and around it. This is a very secure way of fixing it. Also, you can buy clamps of several different types and clamp it in. The choice is yours, but remember to make it village level, if you intend to have the villagers carry on the work once you are gone.

SAFETY HOOK

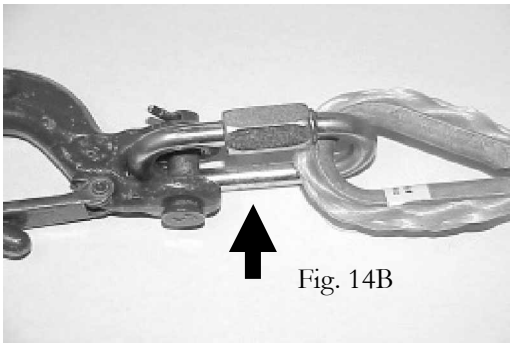


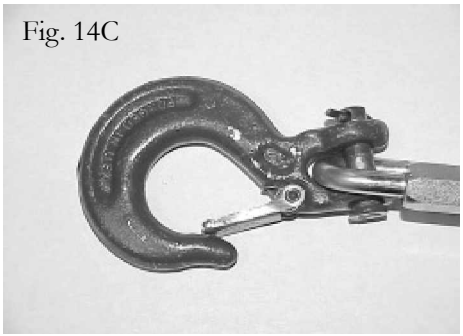
Fig. 14B

You need some type of safety hook to hook between the rope eye and the speed hook. I use a "C" type hook that screws together. (Fig. 14B) I put the rope eye through, and then the speed hook, and then I bring the screw part down and screw the ends of the clamp/hook together. (Sorry—I don't know what this is called, but it looks like a "C" with threads on the ends and a nut that attaches to both ends of the "C".)

SPEED HOOK

Finally, you will need a speed hook to quickly attach or remove the bailer and/or hammer. I use a regular, heavy weight hook, with a spring latch that keeps the hook securely attached to the loop on the hammer or bailer. (Fig. 14C)

Fig. 14C



FISHING HOOK

The fishing hook is a simple tool. If you are a fisherman, you are familiar with the treble hook that is often used in fishing. (Fig. 15A) The hook you need to make is the same design, except it is much bigger. Take three 1-foot sections of 3/8" steel rod and bend them into a **J** shape. Take another 1-foot section of 3/8" steel rod and bend it to make a loop. Weld the three **J** pieces together with the loop to form a hook similar to the one in fig. 15A.

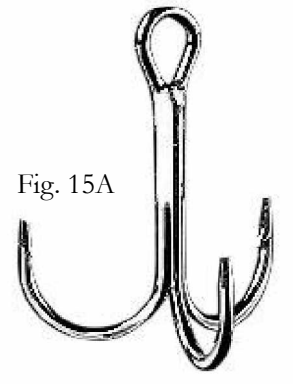
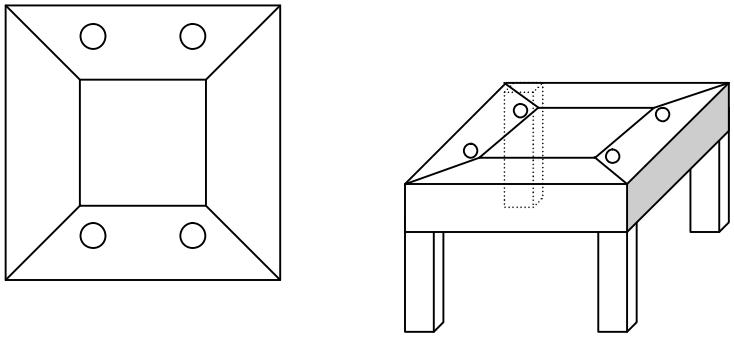


Fig. 15A

Test Pump

In order to determine if you truly have a producing well, I recommend you build a test pump platform, and have a test pump with you. The platform is necessary so you can have your hand pump stable and level as you attempt to pump water from your well. You can certainly design one yourself, but the following is my design.

TOP VIEW **SIDE VIEW**



You may want to make the feet a little more pointed, so you can push it into the dirt easier, and it will be more secure. Make it large enough so it will be stable when you bolt the hand pump onto it. Remember, you will be assembling the hand pump in the same way you assemble it for a regular well, only you will be bolting it to the metal platform you will make. The platform is made out of ¼ inch square tube steel welded together to form the bed and the legs. You will have to drill four holes in it to bolt the pump base on, then you set the platform over the hole and install the foot valve, pipe and sucker rod as explained earlier in this manual.

Chapter 5

RELIEF, DEVELOPMENT, AND THE CULTURE

"Leadership is action, not position."
–Donald H. McGannon

"What's a Sun-Dial in the shade?"
–Benjamin Franklin

Recently I read an article about some relief work that was being done by Australians in Indonesia. Their purpose was to set up food distribution centers where the people could go to buy food at extremely discounted prices. As money was being raised, so were many questions. There were as many ideas about what to do, as there were people involved. Half of the people believed there should be some long term solution to the food shortages, while the other half believed something had to be done immediately in order to ward off starvation for thousands. The more they argued, the less they accomplished. Wouldn't they be amazed to know that almost every benevolent organization in the world goes through the same type of arguments? Which is best "relief" or "development?" Shouldn't we care if people are starving to death? Wouldn't it be better to just go in and feed people, then worry about the long term later? Will this issue ever be settled?

There are times when someone needs your attention immediately, and they need a rapid response. For instance, we often hear that if someone is hurt in an accident we should not move him or her until medical help arrives. What if, however, someone is in an accident and his or her car catches on fire? Should you remove them from the car, and get them a safe distance from the fire, or should you wait until the medics arrive and let them worry about the person? Of course, you remove them from the car, even if it means you might increase their original injury. If you do not remove them, they will die in the fire! Something has to be done immediately, and you will worry about the long term later.

At the same time, it is a foolish thing to concentrate only on the short term, without considering what will happen in the future. A flood may have harmed a remote village, and all of their crops washed away. If they have to wait until the following year's harvest to get any food, obviously, they will starve to death. They will surely need immediate care. This is relief. You raise the funds, buy the food, and distribute it to those in immediate need. While supplying their immediate need, however, you NEED to be about the business of development. That is, helping them to help themselves so that the lack of food situation does not happen again. There may be more floods in the future, but careful planning and work can eliminate the need for outside help. This is development.

Now consider the question: "Which is most important, relief or development?"

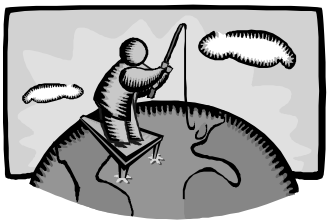
> The grandest of all laws is the law of progressive development. Under it, in the wide sweep of things, men grow wiser as they grow older, and societies better.
>
> **John Christian**

The problem with this question is the same as the one that asks the question, "Can God make a rock so big that He cannot pick it up?" The reasonable man or woman cannot answer the question. Relief is ultimately important – if the person is about to drown, or be burned in a fire, or starve to death. If they are naked, hungry, cold, sick, or dying, they need immediate relief. If their needs are not immediate, yet they still need help to develop, is the development not vitally important? Of course. So the answer cannot be "one or the other." It must be both. We relieve the immediate need and care for the long term.

Short term: The cripple at the Pool of Siloam was asked if he wanted to be made whole. After hearing why that was not possible, Jesus took care of the man's immediate need – "Rise, take up thy bed, and walk." (John 5:8). Surely Jesus knew what He was doing when He cared for the man's immediate need. Jesus gave the man "relief." The man was crippled, and needed to be able to walk. He had his immediate need fulfilled.

Long term: Later, after the man was questioned about the "sinful" act of carrying his bed on the Sabbath, Jesus met the man in the temple. I don't know everything that

happened when they met. I don't know if the man saw Jesus and went to Him in gratitude, or if he ever thanked Him. What I do know is this: Jesus talked to the man and told him, "Behold, thou art made whole: sin no more, lest a worse thing come unto thee." (John 5:14) Jesus was taking care of the long term. Perhaps the reason the man was lying on his bed to begin with was because of some sin he had committed. To heal him would not have taken care of anything but the immediate. Jesus was inclined to care for the immediate need, but He was looking to help the long term also. Therefore, Jesus took the opportunity to teach the man what he needed to keep himself from a worse fate. Sin was the problem, and with sin prevented, so would be a "worse thing."



No matter what our mission is, we need to consider the wisdom in this. If the need is immediate, we must care of the need right then, but we must also help in such a way that the need does not arise again, or if it does arise it will not be so acute. We give the fish and teach to fish, so they eat today and then feed themselves for as long as they live.

As we serve, we need to be aware of our plans and goals. We need to consider carefully what we want to do. Is it practical and reasonable, or is it quixotic? Can our plans be implemented, and do the people we want to help with our plans even want what we are offering? Do they really need what we are offering? Have we asked them what their felt needs are, or have we gone in and made our own "extremely limited" assessment? If we are to truly help a person or people in the long term, we have to involve them in each stage of the development. They have to share our dreams and goals. Our service must be in fulfillment of what they believe are their real needs. Otherwise, they will share in it only as long as we are there, then, once our input ends, the whole thing will collapse. There is little glory for God in that!

Cross Cultural Awareness

One of the major problems we as Americans have is our inconsideration of the cultures of other people. We do not consider that others have practices or traditions different than ours. Because of this, we often fail to examine what we do in the lands of others. We try to force American ways into a world where America is just a name. It is essential for us to know something of the culture we are going into, and to include that culture in our thinking and work. If we are to help a people, we have to help them within the framework of their culture. Being culturally sensitive is the Christian way to do our service. Remember what Paul told the brethren at Corinth:

> Though I am free and belong to no man, I make myself a slave to everyone, to win as many as possible. To the Jews I became like a Jew, to win the Jews. To those under the law I became like one under the law (though I myself am not under the law), so as to win those

> under the law. To those not having the law I became like one not having the law (though I am not free from God's law but am under Christ's law), so as to win those not having the law. To the weak I became weak, to win the weak. I have become all things to all men so that by all possible means I might save some. I do all this for the sake of the gospel, that I may share in its blessings.
>
> 1 Corinthians 9:19-23

We become like the people we work among if we are to have a successful ministry among them. Look at the following bloopers made by large companies in advertising campaigns:

- Coors put its slogan, "Turn it Loose," into Spanish, where it was read as "Suffer From Diarrhea."
- Clairol introduced the "Mist Stick," a curling iron, into Germany only to find that "mist" is slang for manure. Not too many people had use for the "manure stick".
- Scandinavian vacuum manufacturers Electrolux used the following in an American campaign: Nothing Sucks Like An Electrolux.
- The American slogan for Salem cigarettes, "Salem-Feeling Free", was translated into the Japanese market as "When smoking Salem, you feel so refreshed that your mind seems to be free and empty."
- When Gerber started selling baby food in Africa, they used the same packaging as in the U.S., with the beautiful baby on the label. Later, they learned that in Africa,, companies routinely put pictures on the label of what's inside, since most people can't read English.
- Colgate introduced a toothpaste in France called Cue, the name of a notorious porno magazine.
- An American T-Shirt maker in Miami printed shirts for the Spanish market, which promoted the Pope's visit. Instead of "I saw the Pope"(el Papa), the shirts read "I saw the potato"(la papa).
- In Italy, a campaign for Schweppes Tonic Water translated the name into "Schweppes Toilet Water".
- Pepsi's "Come Alive with the Pepsi Generation" translated into "Pepsi brings your ancestors back from the grave," in Chinese.
- Frank Perdue's chicken slogan, "it takes a strong man to make a tender chicken" was translated into Spanish as "it takes an aroused man to make a chicken affectionate".
- When Parker Pen marketed a ballpoint pen in Mexico, its ads were supposed to have read "it won't leak in your pocket and embarrass you". Instead, the company thought that the word "embarazar"(to impregnate) meant to embarrass, so the ad read: "It won't leak in your pocket and make you pregnant".
- Did you know people in the Dominican Republican are very animated and freely use gestures in conversation? In El Salvador that is considered poor manners. Czechs consider the home to be very private. They do not visit each other unannounced, and even spontaneous visitors call ahead. In Guinea, to pass by a friend's home without stopping briefly is an insult.

Because of ignorance, the advertisements were not accepted well, and the products did not get the desired attention. They were recognized, of course, but for the wrong reasons. As you go about your duties in the foreign fields, be constantly aware of how people do things. Ask questions. Consider the feelings of those you are working among. You are not there to make a name for yourself, but to serve the Lord with gladness, and help those who need your help.

So, as you begin a drilling work in whatever country you will be working in, and among the various peoples of that country, be culturally sensitive. Make sure the thing you are doing is what they feel is needed. Your wants and desires take second place to theirs, for you are not working for yourself, but for them.

Cross-Cultural Heartbreaks

He was just a young boy, perhaps ten or eleven. I doubt that he had ever been to school. He couldn't go. He wasn't free. He was "employed", *that's a poor word for it,* full-time. He worked hard too. Put in many hours. His job? He was a guide for a blind beggar. The problem was, his employer was his father, grandfather, uncle or someone his parents had given him to. He was unpaid, and required to be the guide. So the employment was (is it fair to say?) a form of slavery.

It was in Ghana, West Africa. I lived there for a while. I was walking through town one day when the boy led the man up to me. The beggar began singing and holding his hands out to me, pleading for some money. My heart broke, not for the blind man, but for the child. I thought of the young boy, his child's heart, and what must have been a lonely life. There were other children playing nearby. The boy kept looking at them with longing in his eyes. I could tell he wanted to go and join in. He wanted to laugh, jump and run. He wanted to be a child. He never would be.

As I looked at the boy, the blind man, and the situation, I wanted to shout. This is crazy, I thought to myself. How can people do this to a child? After I passed by, and cooled down, I began to take a hard look at culture. Who did I think I was? God never told me to go into all the world and make people into Americans. That was not my mission. My mission was to help them find God and become His children. God is not interested in making Americans. He is interested in adoption.

As you go into the world, you will find dozens, perhaps hundreds of situations you think are terribly wrong, and in desperate need of change. You must consider, however, whether your perceptions are American or Biblical. If they are Biblical then, of course, you need to do some teaching and correcting. If they are American,

however, you have to mind your own business. Many things we see as foolish, immature, or simply wrong, are things they have seen, known, or done their whole lives. To the people you work among, they are normal and natural. They would not understand why you would find them silly. They would find you quite narrow if you complained to them about their practices. Therefore, take time to explore the right and wrong of a situation before you make a judgment and condemn the action. It is better to say nothing than to make enemies of those you would help.

> Every culture has its distinctive and normal system of government. Yours is democracy, moderated by corruption. Ours is totalitarianism, moderated by assassination.
>
> **Unknown Russian**

> We merely want to live in peace with all the world, to trade with them, to commune with them, to learn from their culture as they may learn from ours, so that the products of our toil may be used for our schools and our roads and our churches and not for guns and planes and tanks and ships of war.
> **Dwight D. Eisenhower (1890 - 1969)**

Following is a chart created by Monte Cox, Director for Center for World Missions, Harding University, Searcy, Arkansas.

As you read through it you will be able to better visualize the differences between "Relief" and "Development."

I am deeply thankful to Professor Cox for allowing me to reproduce it here.

CHRISTIAN RELIEF AND DEVELOPMENT: COMPARING PRINCIPLES

Monte Cox, Ph.D.

DEVELOPMENT	RELIEF
GOAL	
Facilitate change	Deliver services
Attacks root causes	Treats Symptoms
Prevention	Cure
Long term objectives	Short term objectives
Inspire cooperation	Finish project
Independence	Meet immediate need
Build capacity	Stop-gap solutions
Transformation	Temporary relief
World view change	Behavioral change
Holistic and integrated	Reductionistic and compartmentalized
PRIMARY PARTNERS	
Community focus	Individual focus
Church as "healing community"	Individual recipients
ORGANIZATION	
Decentralized	Centralized
Uses existing structures	Uses donor's structures
Much local ownership	Little local ownership
Participatory	Hierarchical
Uses local resources	Uses foreign resources
Indigenous leadership style	Expatriate leadership style
Volunteers/Non-professionals	Salaried staff
Generalists	Specialists

SCALE	
Small	Big
Grass roots	Institutional
Personal	Impersonal
Low appropriate tech	High Tech

INTERACTION OF LEADERS/CHANGE AGENTS AND PRIMARY PARTNERS	
Fraternalistic	Paternalistic
Incarnational	Extractionistic
Reciprocal relationship	Donor-recipient relationship
Begin with locals' perceived needs	Begin with expats' perceived needs
Participatory appraisal/evaluation	Top-down appraisal and evaluation
On-the-job training	Centralized training
Moves at local pace	Moves at expat's pace
Emphasizes flexible process	Follows standard blue-print

PERPETUATION	
Sustainable (reproducible)	Non-sustainable
Empowerment	Continued dependency
"Help others help themselves"	"Help others"
Nonformal "problem-posing" education	Formal Western education
Uses contextualized media	Uses alien media
Emphasizes stewardship	Ongoing donor mentality

FOUR DIMENSIONS OF CHRISTIAN DEVELOPMENT MINISTRY

HEIGHT

*motivated by God's mission to reconcile all things to Himself
*facilitated through the church as the "healing community"
*integrated vertically with all other types of ministry
*infused with wisdom and power from above

DEPTH

*goal is transformation on deepest level of being
*aims at worldview change as key to transformation
*attacks root causes, especially sin, not just symptoms

BREADTH

*broad holistic agenda
*focuses on a few but with intent to impact everyone

*decentralized organization spreads ownership
*participatory leadership empowers more people

LENGTH

*begins with the end in mind
*long-term objectives include establishing a church that will serve as agent of reconciliation until the Lord comes
*inclined against short-sighted use of outside funds
*concern for appropriate scale with sustainability in mind
*sustainability balanced by sense of global responsibility and stewardship

Chapter 6

Agreements With the Village

You will find that the mere resolve not to be useless, and the honest desire to help other people, will, in the quickest and delicatest ways, improve yourself.

John Ruskin (1819 - 1900)

When you begin to work with the villagers, it is imperative that you go to them with your idea of them working with you to get a well for their village. You cannot just go in and tell them you are going to drill a well for them. You have to let it be their decision. You are making an offer. Allow them to accept it. The following is what we normally do when we go into a village to offer a water well:

1. Pay our respects to the Chief and his elders
2. Present our reason for visiting him

a. Ask if they would like to work with us in providing a water well

b. Negotiate their part in the effort

i. They have to provide the site (cannot be someone's property but must be communal property)

ii. Communally, they must provide sand and gravel for the base

iii. Communally provide two (2) bags of cement

iv. Elect/Appoint a well caretaker, and a five-person well committee

v. If there is no road to the village, communally clear a road

vi. Communally collect $500 for, Government required, maintenance fund (When pump is repaired the money comes from the fund and the village is expected to replace that money. If we ever quit the work, we turn all equipment and the maintenance fund over to the government. They take care of maintenance from that point on.)

3. Both parties sign agreement form: Following is a copy of our contract:

AGREEMENT FORM

APPENDIX F

The following is the only binding, written agreement between the Church of Christ Rural Water Development Project, hereafter called the PROJECT and _____, hereafter called the COMMUNITY. This agreement covers the drilling of a deep-water borehole and the installation, on going maintenance and a repair of the hand pump. This agreement securely binds the PROJECT and the COMMUNITY to abide by ALL of the conditions stated in it.

Any and all other written or verbal agreements, discussions, etc. between the PROJECT and the COMMUNITY have no binding force on either party.

The borehole will be drilled at _____ in the _____ District in the Region.

It is meant to serve the needs of the people and as such is the PROJECT OF THE COMMUNITY. The community is responsible for:

1. The drilling of the borehole;
2. The installation, and
3. The operation and maintenance of the borehole.

The PROJECT will drill the borehole in the best location, keeping in mind sanitation, availability of water and the distance from the center of the community. The PROJECT has the right to select the actual drilling site.

The PROJECT is responsible to drill a borehole, which yields water at the time the pump is installed. The PROJECT accepts no responsibility, financial or otherwise, for a borehole that goes dry after the pump is installed.

THIS AGREEMENT WILL LOSE IT'S BINDING FORCE, AND WILL THUS BE NULL AND VOID, IF EITHER THE PROJECT OR THE COMMUNITY DOES NOT FULFILL ALL THE POINTS AGREED UPON HEREIN, UNLESS IT IS AMENDED BY A WRITTEN DOCUMENT BY THE PROJECT.

The PROJECT will keep the original of this agreement while the COMMUNITY will receive a copy of it.

On behalf of the Rural Water Development Project and the Community, we hereby give our full approval and consent through the signing of this agreement.

_____/_____/_____

Date

COMMUNITY REPRESENTATIVE	COMMUNITY WITNESS
PROJECT DIRECTOR	PROJECT WITNESS

CHURCH OF CHRIST
RURAL WATER DEV. PROJECT
PO BOX AN 6017
ACCRA - NORTH