

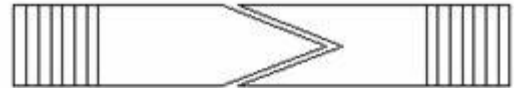
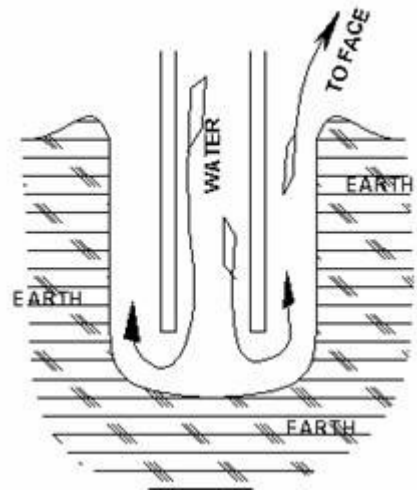
## Wells

### *Poking Holes*

I put down a garden well through a technique known as “jetting”. Jetting is what happens when you push a gushing water hose against the ground and it begins to dig its way in. Water erodes the soil directly in front of the blast, and washes it back out of the hole around the hose, and into your face and shoes.

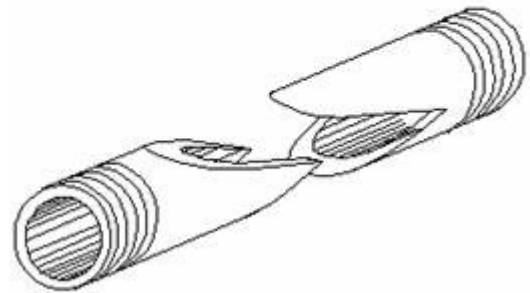
With a handful of fittings from a hardware store and a few simple hand tools, I was able to connect the end of the garden hose to a six-foot piece of ½” galvanized pipe, and then add other bits and pieces to the drill string as the work progressed.

By cutting a short piece of pipe (usually called a “nipple” – I didn’t name it) with a hacksaw as shown, and coupling either piece to the end of the pipe, the process was considerably faster.



It helped to repeatedly raise the pipe a couple feet and force it downward into the hole. This caused the inertia of the water in the pipe to exert tremendous force against the bottom, and also helped the sharp edges of the pipe to cut.

In addition, I would twist the drill string clockwise as it struck the bottom of the hole and return it slightly counter-clockwise as I raised it. This would help the bit cut, while insuring that none of the pipe fittings twisted loose. A large pair of vice-grip pliers made an excellent handle.



One other tip: Don’t drop any tools down the hole. It’s OK to be a klutz, as long as you know you’re a klutz and take the time to compensate. I made an anti-klutz shield from a piece of heavy plywood with a drill-string-sized hole in it. By setting the plywood up on some blocks, I allowed room for the mud and water to escape to somewhere besides my shoes.

There is a story about this well for the amusement of those who would considering me a nut or a liar, the amazement of those into weird, or the interest of those of mystical experience. This has nothing to do with anything technical, so the none-of-the-aboves can skip this.

When I was considering the site for this well I was assuming I’d have to go down a significant distance. A couple hundred feet in one direction there was a century-old hand-dug well that went down 65 feet before striking water. About a hundred and fifty yards in another direction, there was a well that went down 45 feet, and produced plenty of water.

In choosing a spot for this well I first considered consulting a “water witch” as my dad had tried in the past, but that seemed a little too occult for my tastes. So I figured I could just pray and ask God where He put the water (for real). I tend to push it with almost anybody, and in all fairness that includes God. So I figured that if He’s really God, he could put the water wherever He wanted to.

“OK God, I’d like it near that tree, not too far from the door of this shack”. I struck water at six feet, but the day was young and so was I, so I continued to a depth of twenty eight feet – six hours and a sore back later. I became suspicious about the value of the other twenty-two feet, when everything

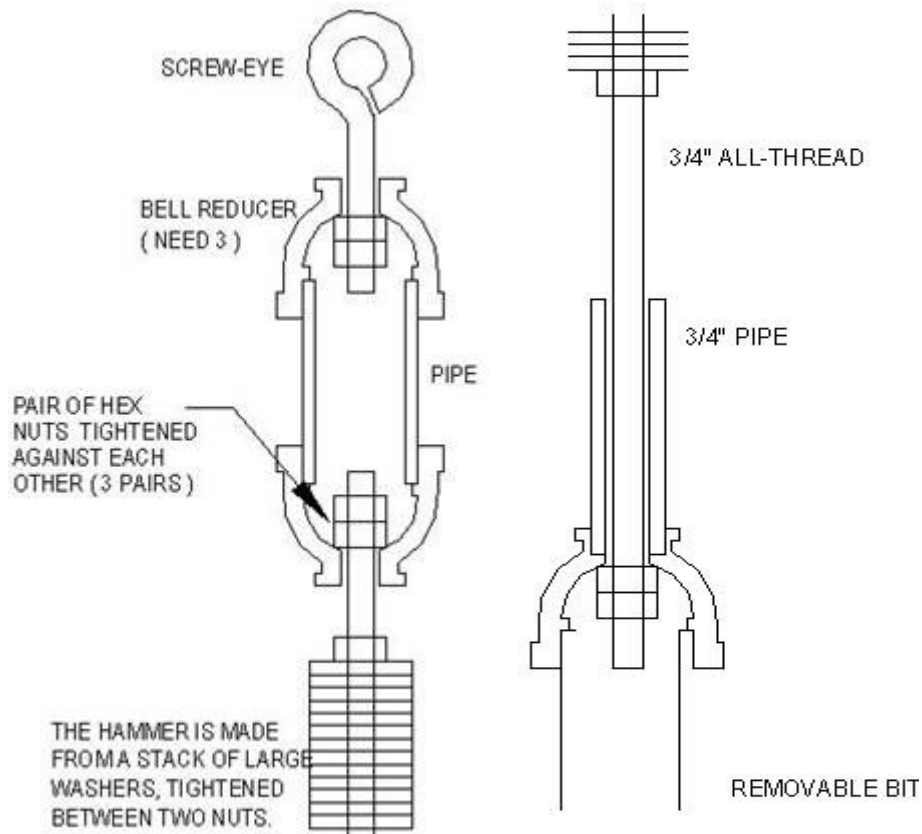
below the six foot level was solid – albeit soft – decomposed granite.

It turned out that this layer of soft rock had trapped a stream of surface water that I was able to trace to a mild seep into the side of a gully a little distance off. The only evidence of this seep was a type of plant normally found near streams or ponds. With the combination of a 12V bilge pump and the hand pump working simultaneously I was never able to pump it dry while filling a 55 gal. drum, during an entire Southern California summer. Thanks God. Survival itself is not life – a rock can “survive”, but life is a platform, for so much more.

#### *A Little Bit More*

It's nice to be able to put down a well when you have an unlimited supply of pressurized water, but it makes a little more sense to learn how to do it in places where water has to be imported in buckets.

A drop-bit consists of a cutting-end, connected to a hammer-end. The whole thing is then dropped down the hole on a rope or cable. As the cutter hits the bottom, the hammer lands on top of it and gives it another kick. The hammer portion is then raised and lowered repeatedly to drive the cutter into the rock or soil. This hammer action also works in the up-direction, to free the bit when it gets stuck in the bottom of the hole.



Periodically, the assembly is withdrawn, and the section below the 1-1/4" coupler is removed and emptied.

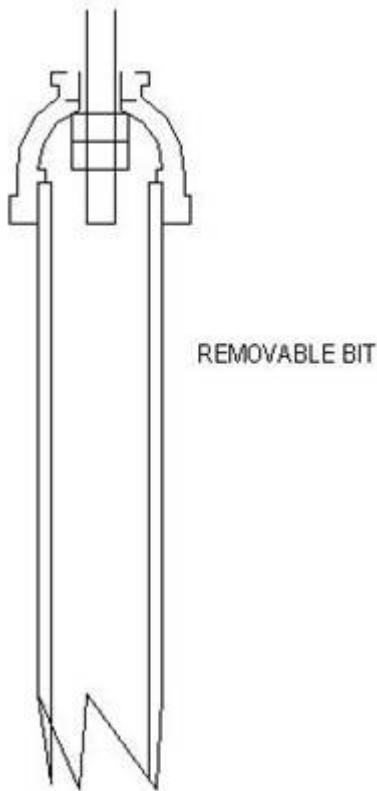
Although I have produced a bit that basically works, I feel there is room for a lot of improvement. This assembly was made from off-the-shelf hardware available from most home-improvement stores. The photo shows what I've developed so far. Note the spare bit above and to the left of the hammer assembly.



The bit is considered "dry" because a continuous stream of water is not being forced down a drill-string. Sometimes however, a half-gallon or so might be poured down the hole to soften the bottom. It is helpful at such times to pour the water down the rope, so it does not fill the bottom with mud washed from the sides of the hole.

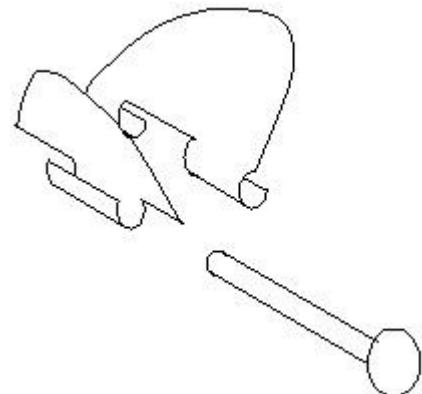
You will find that different soil/rock conditions will need different cutter sections. Some will produce a nice core from a round empty cutter, and others will require a pair of flaps to trap loose soil or mud. In some cases you might do cutting with one bit and soil removal with another.

For a basic cutter, cut four teeth in the bit at the bottom.



I made a bit for removing loosened soil and thick mud by threading a carriage-bolt through the bit and a couple of sheet-metal flaps, a couple inches above the bottom.

The flaps wrapped around the bolt the same way hinge pieces wrap around their pin.



A different form that could be helpful for getting out fine sand and mud, after you've found the water table, is shown here.

This mud bucket is lowered on its own rope.

Make no mistake: This well is a lot of work, and could certainly be improved. It does however, make poking a hole in the ground possible.

During the process, be fanatical about regularly checking the status of all joints, so you don't wind up with a half-drilled well being blocked by a half-there drill assembly. I didn't learn this lesson the easy way.

Although individual household storage may be practical at any level of development, it would be important for the village to own the source of water and the means of distributing it.

With the source of water secure, a village-wide plumbing system could be developed. Optimally however, each residence should have storage for both potable and non-potable water. Such distributed storage would increase accountability and awareness for the conservation of this most precious and limited commodity. There should also be some provision for the collection and recycling of grey-water for agricultural applications. Bottom line: Use every drop wisely.

Such care and concerns may be unthinkable in our current paradigm of plenty, but they will ultimately concern us all, as they currently concern most of the world.

