

Tools and Materials

Steel tube: 12.5cm (5") in diameter and 91.5cm (3') long

Truck innertube or leather: 12.5cm (5") square

Pipe coupling: 15cm to 2.5cm (5" to 1")

Small tools

Repeatedly jamming this "bucket" into the well will remove sand from below the perforated casing, allowing the bucket to settle deeper into the sand layer. The casing prevents the walls from caving in. The bell is removed from the first section of casing; at least one other section rests on top of it to help force it

down as digging proceeds. Try to penetrate the water bearing sand layer as far as

possible: 3 meters (10') of perforated casing embedded in such a sandy layer will

usually provide a very good flow of water.

Be sure to try your sand "bucket" in wet sand before attempting to use it at the bottom of your well.

Source:

Explanatory Notes on Tubewells, Wendell Mott, American Friends Service Committee,
Philadelphia, Pennsylvania, 1956 (Mimeographed).

Ram Auger

The equipment described here has been used successfully in the Ban Me Thuot area of Vietnam. One of the best performances was turned in by a crew of three inexperienced mountain tribesmen who drilled 20 meters (65') in a day and a half.

The deepest well drilled was a little more than 25 meters (80'); it was completed, including the installation of the pump, in six days. One well was drilled through about 11 meters (35') of sedimentary stone.

Tools and Materials

For tool tray:

Wood: 3cm x 3cm x 150cm (1 1/4" x 1 1/4" x 59")

Wood: 3cm x 30cm x 45cm (1 1/4" x 12" x 17 3/4")

For safety rod:

Steel rod: 1cm (3/8") in diameter, 30cm (12") long

Drill

Hammer

Anvil

Cotter pin

For auger support:

Wood: 4cm x 45cm x 30cm (1 1/3" x 17 3/4" x 12")

Steel: 10cm x 10cm x 4mm (4" x 4" x 5/32")

Location of the Well

Two considerations are especially important for the location of village wells:

(1) the average walking distance for the village population should be as short as possible; (2) it should be easy to drain spilled water away from the site to avoid creating a mudhole.

In the Ban Me Thuot area, the final choice of location was in all cases left up to

the villagers. Water was found in varying quantities at all the sites chosen.

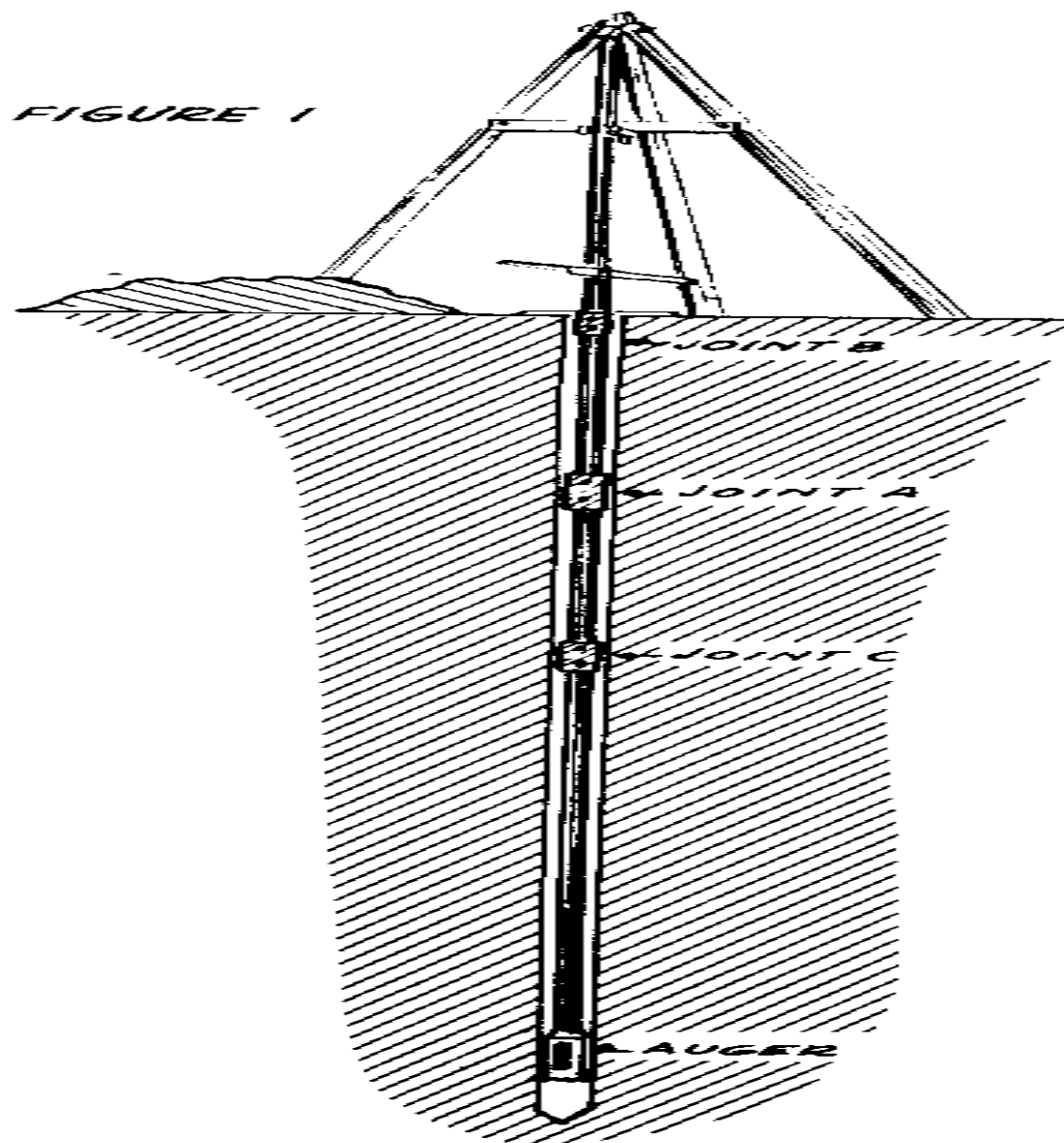
(See "Getting Ground Water from Wells and Springs.")

Starting to Drill

A tripod is set up over the approximate location for the well (see Figure 1).

Its

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legs are set into shallow holes with dirt packed around them to keep them from moving. To make sure the well is started exactly vertically, a plumb bob (a string

with a stone tied to it is good enough) is hung from the auger guide on the tripod's crossbar to locate the exact starting point. It is helpful to dig a small starting hole before setting up the auger.

Drilling

Drilling is accomplished by ramming the auger down to penetrate the earth and then rotating it by its wooden handle to free it in the hole before lifting it to repeat the process. This is a little awkward until the auger is down 30cm to 60cm (1' to 2') and should be done carefully until the auger starts to be guided by the hole itself.

Usually two or three people work together with the auger. One system that worked out quite well was to use three people, two working while the third rested, and then alternate.

As the auger goes deeper it will be necessary from time to time to adjust the handle to the most convenient height. Any wrenches or

other small tools used should be tied by means of a long piece of cord to the tripod so that if they are accidentally dropped in the well, they can easily be removed. Since the soil of the Ban Me Thuot area would stick to the auger, it was necessary to keep a small amount of water in the hole at all times for lubrication.

Emptying the Auger

Each time the auger is rammed down and rotated, it should be noted how much penetration has been obtained. Starting with an empty auger the penetration is greatest on the first stroke and becomes successively less on each following one as the earth packs more and more tightly inside the auger. When progress becomes too slow it is time to raise the auger to the surface and empty it. Depending on the material being penetrated, the auger may be completely full or have 30cm (1') or less of material in it when it is emptied. A little experience will give one a "feel" for the most efficient time to bring up the auger for emptying. Since the material in the auger is hardest packed at the bottom, it is usually easiest to empty the auger by inserting the auger cleaner through the slot in the side of the auger part way down and pushing the material out through the top of the auger in several passes. When the auger is brought out of the hole

for emptying, it is usually leaned up against the tripod, since this is faster and easier than trying to lay it down.

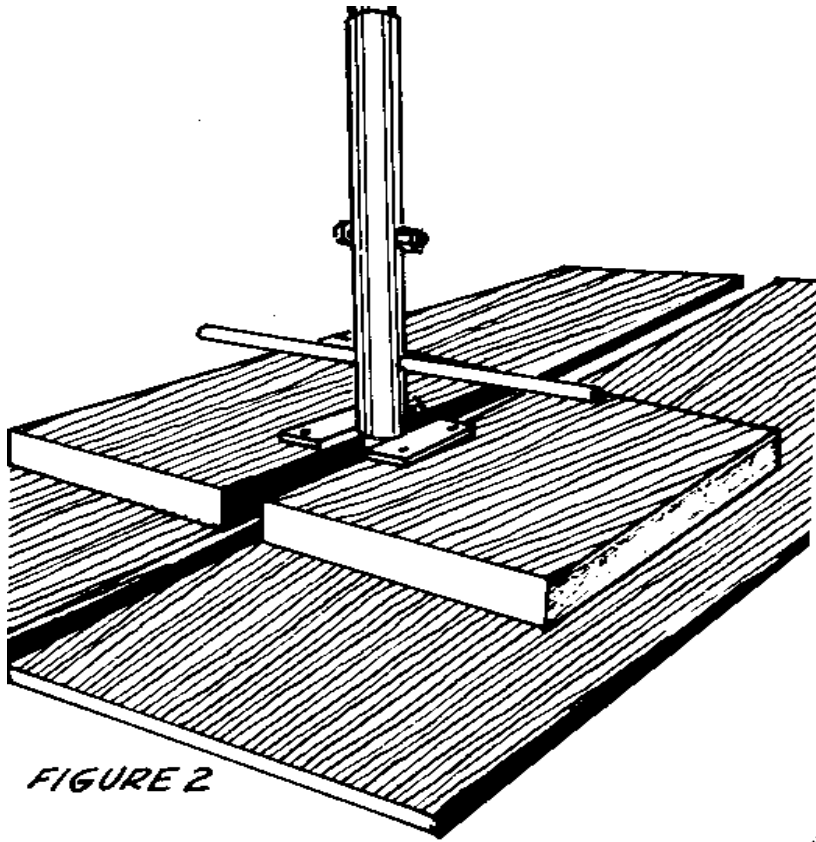
Coupling and Uncoupling Extensions

The extensions are coupled by merely slipping the small end of one into the large end of the other and pinning them together with a 10mm (3/8") bolt. It has been found sufficient and time-saving to just tighten the nut finger-tight instead of using a wrench.

Each time the auger is brought up for emptying, the extensions must be taken apart. For this reason the extensions have been made as long as possible to minimize the number of joints. Thus at a depth of 18.3 meters (60'), there are only two joints to be uncoupled in bringing up the auger.

For the sake of both safety and speed, use the following procedure in coupling and uncoupling. When bringing up the auger, raise it until a joint is just above the ground and slip the auger support (see Figures 2 and 3) into place, straddling

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*FIGURE 2*

the extension so that the bottom of the coupling can rest on the small metal plate. The next step is to put the safety rod (see Figure 4)

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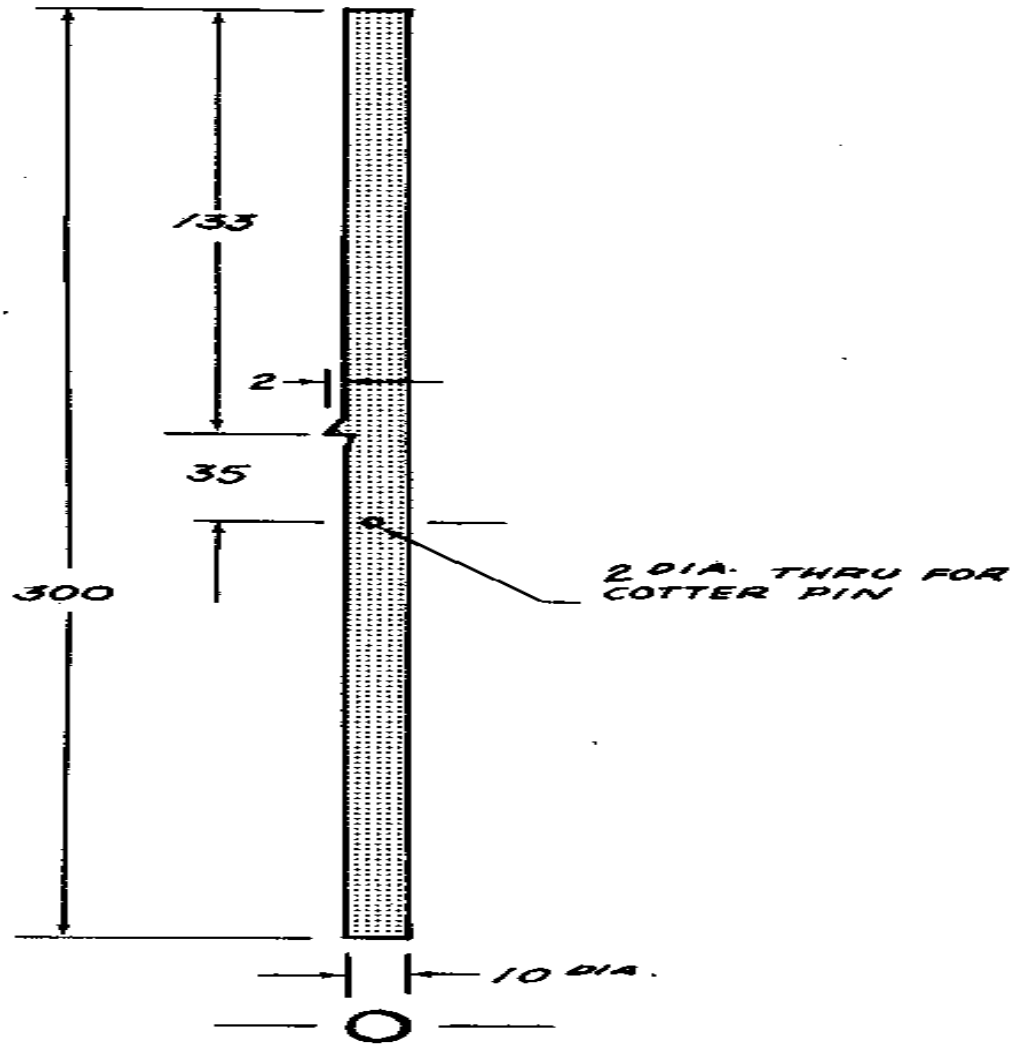


FIGURE 4 SAFETY ROD
MATERIAL: MILD STEEL

through the lower side in the coupling and secure it with either a cotter pin or a piece of wire. The

purpose of the safety rod is to keep the auger from falling into the well if it should be knocked off the auger support or dropped while being raised.

Once the safety rod is in place, remove the coupling bolt and slip the upper extension out of the lower. Lean the upper end of the extension against the tripod between the two wooden pegs in the front legs, and rest the lower end on the tool tray (see Figures 5 and 6). The reason for putting the extensions on the tool tray

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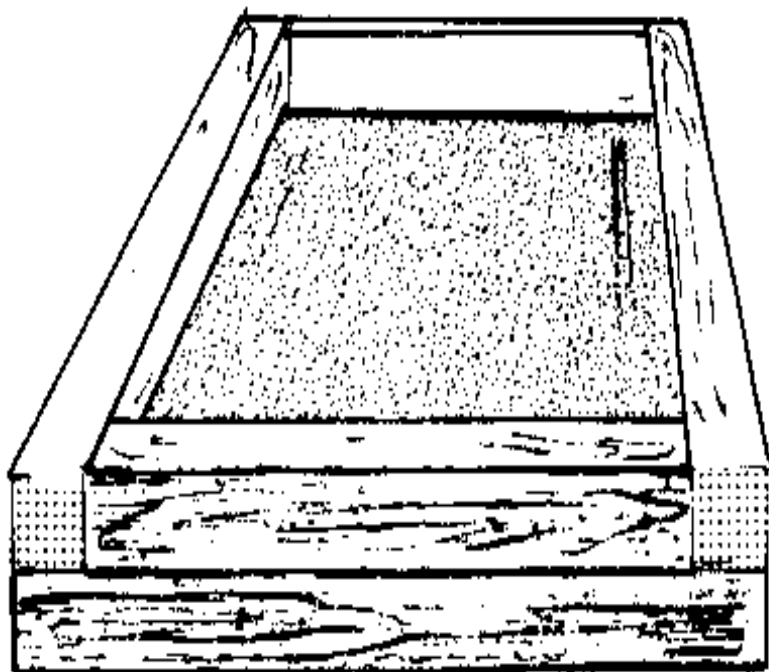


FIGURE 5 TOOL TRAY

is to keep dirt from sticking to the lower ends and making it difficult to put the extensions together and take them apart.

To couple the extensions after emptying the auger, the procedure is the exact reverse of uncoupling.

Drilling Rock

When stone or other substances the auger cannot penetrate are met, a heavy drilling bit must be used.

Depth of Well

The rate at which water can be taken from a well is roughly proportional to the depth of the well below the water table as long as the well keeps going into water-bearing ground. However, in village wells where water can only be raised slowly by handpump or bucket, this is not usually of major importance. The important point is that in areas where the water table varies from one time of year to another the well must be deep enough to give sufficient water at all times.

Information on the water table variation may be obtained from already existing wells, or it may be necessary to drill a well before any information can be obtained. In the latter case the well must be deep enough to allow for a drop in the water table.

Source:

Report by Richard G. Koegel, International Voluntary Services, Ban Me Thuot, Vietnam, 1959 (Mimeographed).