A Circular Dipping-tank for Sheep.

In the following article, Mr. E. J. van Meerten, Lecturer in Engineering, Grootefontein School of Agriculture, describes the method of construction of a circular dipping-tank for sheep, the types and quantities of material preferably to be used for it, and its advantages on the sheep farm.

The dipping-tank here described can be built of concrete, stone or brick. When concrete is used, an essential will be a set of forms that are not easy to construct, so that anybody desiring to build a tank will probably use either stone or brick. Ordinary good, well-burnt building bricks can be used. The illustrations show the tank built in brick, with a cobble bottom and a cobbled out-slope.

Preliminary.

Let two short posts, illustrated in Fig. 3, be planted, each 6 feet away from what will be the centre of the tank. These posts may stand say 2 feet above the ground surface. Secure on top of these two posts a piece of flooring board or one of 3 in. by 4½ in., and drill a ¾-in. hole through the middle of this crosspiece. From the centre of the hole drop a plumb line to the ground surface and drive a short peg where the point of the plumb bob touches the ground. Attach a cord loosely to this peg and measure off along the cord a distance of 3 ft. 6 in., where a 6-in. nail is attached. With this nail, and keeping the cord taut, describe a circle around the centre peg. This circle gives the outline of the excavation for the tank. Also, from the centre peg, measure off a distance of 10 feet in the direction that the out-slope will take, and draw a straight line from the peg to the point that will be the middle of the top end of the out-slope. This line will be the centre line of the out-slope. Draw two other lines, each 13 inches from the centre line, and parallel to it; then draw two lines, each 17 inches from the centre line and also parallel to it.

Excavation.

Excavate along the circle to a depth of 21 inches, keeping the side of the excavation vertical. Then excavate till a depth of 5 feet from the surface is reached, but let the diameter of the pit become less until at the depth of 5 feet, the diameter is not more than 5 feet. To ascertain that the excavation has been done correctly, drop a plumb line from the hole in the cross-piece overhead, to the bottom of the pit, and drive a peg into the ground where the point of the plumb bob touches. With this peg as a centre point, and the help of a piece of cord and nail as before, the desired diameter at the bottom of the pit can be obtained. At the same time the sides of
the pit can be trimmed down from where the diameter of the pit decreases towards the bottom.

Outslope Excavation.

For the excavation of the outslope, excavate between the first two parallel lines mentioned, starting at the top end of the outslope, and gradually increasing the depth towards the tank pit, finishing at a point 12 inches above the bottom of the pit. Then trim off the sides of the excavation up to the two outside parallel lines, making the sides slanting, so that at the tank end the top of the outslope excavation will be along the outside lines, but at the bottom it will be at the sides of the trench already dug. The bottom of the outslope excavation gradually widens out until at the top end it has a width equal to that between the outside lines.

Cobbling the Pit Bottom.

Let the bottom of the pit be made fairly level, and lay a bed of cobbles, not necessarily larger than coconuts, to be rammed down with a light sledge hammer. Let the bottom of the outslope excavation also be cobbled in this manner.

Building the Sweep.

The sweep used to get the correct slope of the bottom portion of the wall is illustrated in Fig. 3. The centre pole is a 7-ft. piece of \( \frac{2}{3} \)-in. piping, or long enough to reach from the bottom of the pit to the crosspiece overhead. The temple part is made of ceiling boards, the one against the pipe being 4 ft. 6 in. long. The width of the temple at the bottom is 2 ft. \( \frac{1}{2} \) in., and at the top 3 ft. \( \frac{1}{2} \) in. This top width is maintained for 15 inches down the outside of the temple, and then decreases to 2 ft. \( \frac{1}{2} \) in. at the bottom. The temple is secured to the pipe by means of two or more strips of hoop iron.

Erecting the Sweep.

Slip a large washer over the peg in the bottom of the pit, and put the pipe through the hole in the crosspiece overhead, and on the peg in the bottom. It may be necessary to gouge out the hole a little, to make the pipe slip through easily. See that this pipe stands truly plumb; it can be made so by slightly moving either the peg at the bottom or the crosspiece overhead. When the pipe is plumb, the temple can be attached to it.

Building the Tank and Outslope.

The brickwork can now be started. The cobbled floor can be grouted in right away with cement grout of 1 cement to 3 sand, this grout being well worked into the spaces between the cobbles. The wall of the tank is intended to be of 4\( \frac{1}{2} \)-in. brickwork only, which will be sufficient. If it be desired to make a 9-in. wall, allowance must be made for this when the excavations are being marked out. It is essential that the bricks be thoroughly soaked in water before they are laid. Otherwise they will absorb too much moisture out of the mortar, and cause leakage later on. The mortar to be used is cement mortar of 1 cement to 4 sand. This sand must be absolutely clean.

Brick-laying.

Lay the bricks as guided by the outside edge of the sweep, but do not let the bricks be laid hard up against it. About a quarter of an inch should be allowed between the bricks and the sweep. As soon as the first brick of a course is laid, let a pencil mark be made on the sweep opposite the top of the brick. All the other bricks are then laid with their tops to this pencil mark. If this is done for every course of brick that is laid, the courses are kept level without the use of a spirit level, which is awkward with a curved wall. It will be necessary to fill in whatever space is left between the outside of the brickwork and the side of
the excavation with earth, rammed while the work proceeds, as it will be impossible to fill in properly after the whole tank has been built.

The cobbled bottom of the outslope should also be grouted in with cement grout, and as soon as the brickwork of the tank reaches the outslope, the sides of the outslope should also be built. It is better to do it this way than to build the tank first, and the outslope later. Let the width of the bottom of the outslope at the tank be 16 inches, or say 16 inches, to allow for half an inch of plaster on each side, so as to finish up with 15 inches, although half an inch more or less either way will not make any difference.

Brickwork Dimensions.

The brickwork is continued up to about three inches from the surface, in 4½ inch width, but from there it should be increased to 9-in. work. It would even be satisfactory to start with 9-in. brickwork at 6 inches below the surface. When the brickwork has been taken up to 3 inches below the surface the next course is corbelled to the inside. In other words, the bricks are gathered about 1½ inches towards the inside. The next course is again gathered in another 1½ inches. The course after this is brought back again 1½ inches, as shown in Figures 2 and 3. The object being to round off the top of the tank to prevent injury to the sheep as they are put into it, and also to prevent undue splashing of the dipping fluid.

The sides of the outslope are also made 9 inches thick from about 6 inches below the ground surface, and taken up to the same level as the top of the tank. From a point about 4 feet 6 inches or 5 feet measured from the centre of the tank, the sides of the outslope are gradually increased in height as shown in Fig. 2, to form two little brick walls 2 feet or more high, running right up to the drying pens.

The Outlet Gate.

The outlet gate is shown in Fig. 2. Figure 1 shows the position of the gate, two gate brackets only being shown. These brackets are pieces of wagon tyre with holes drilled through them for the top bar of the gate to swing in. These brackets should be set in concrete, a gap being left in the brickwork during construction, to be filled later with concrete. Near the top of the outslope, at the tank end, a stop bar is built in to prevent the gate from swinging into the tank. This stop bar is just a length of round or square iron, not necessarily thicker than half an inch.

Figure 4 shows the gate. It is made of stout galvanized sheet iron, with numerous half inch holes drilled through the lower portion, and mounted on a frame of strap iron. On one side, at the top, there is a handle or lever, weighted with a ball which is there to keep the gate against the stop bar when the sheep are in the tank. The gate will be 1 foot 10 inches wide at the top, 1 foot 6 inches at the bottom, and 2 feet long.

The outlet gate should be flush with the inside of the tank, as otherwise sheep are liable to get jammed in trying to get out before they should. In building the tank this point should be kept in mind and the gate put flush with the inside of the wall of the tank.

Finishing the Tank.

The brickwork at the top of the tank should be widened out about 2 feet all round to form a sort of border, and beyond this the ground surface should be cobbled as far as convenient. The whole tank, outslope and brick side-walls should then be plastered. The plaster inside the tank or wherever the dipping fluid will touch, must be cement plaster of 1 cement to 3 sand. The outside of the brick wall can be plastered with 1 cement to 5 sand. At no point must any brickwork be exposed to the weather, as in time it may
-disintegrate, especially through rain or frost. Plastered bricks will not be affected in this way.

**Drying Pens.**

At the top end of the outslope there will probably be the two-way gate to the drying pens. These pens can be made as large as may be desired, but in any case the floor of the pens should be flagged with flat stones, or else cobbled, and the floor should slope towards the dipping tank. Along the side nearest the tank the floor should have a gutter, half round or rectangular in cross section, not more than 3 inches deep, and not more than 6 inches wide. This gutter connects to a sump built outside the drying pen, near the tank. This is just a brick sump, 12 inches square and 18 inches deep. The inlet to the sump should be protected with quarter-inch mesh wire screening to prevent dirt from getting into the sump. The outlet from the sump is near the top, and is a 2-in. pipe leading back to the tank. This pipe need not enter the tank at a very low point; just under the rounded off top will do; and the pipe should be put in place while the tank is being built, not after it is finished.

![Fig. 3](image1)

![Fig. 4](image2)

**Advantages of Cobbled Bottoms.**

Cobbled bottoms are suggested for the tank and the outslope as this is cheaper than concrete. The bottom of the tank can also be made of bricks, plastered over with cement plaster.
If bricks are used for the bottom of the outslope, and these are plastered over, it will be necessary to lay down strips of bar iron to afford the sheep a grip while climbing up the outslope, as a smooth plastered surface will make this difficult for them.

This difficulty does not exist when cobbles are used. It will not be necessary to put cement plaster over the cobbles as long as the spaces between the cobbles are well filled. The cobbles should be quite clean before the cement grout is put on, and, for this reason, it is advisable to pour some water over the cobbles to wash off any dirt that may be adhering to them. When the water has completely soaked away, the grout, made up fairly sloppily, is put on and worked into the spaces between the cobbles with a trowel or a bundle of thin wire or sticks, tied together to make a small round broom. Such a floor becomes quite watertight, and it is much cheaper than a concrete floor, especially when the stone for the concrete floor has to be broken by hand.

Materials Required.

The materials required for the building of the above-described tank are:— Bricks, 1,000; cement, 7 bags; cobblestones, 1 load; sand, 1 load. The cost of construction will depend on the local prices of the materials and of labour, but should not exceed £12.

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