

The Household.

Cisterns.

In compliance with the request of a correspondent, we give a brief account of the method of constructing rain water cisterns. No one who knows the real value of these reservoirs of soft water would be content to remain without them; and yet we know many houses, otherwise well supplied with domestic conveniences, altogether deficient in this respect. The value of soft water is not confined to its utility in washing: it is usually far more wholesome as a beverage, both for man and beast, than much of the hard well or spring water that is exclusively used by many families for drinking. We do not hesitate to say that pure rain

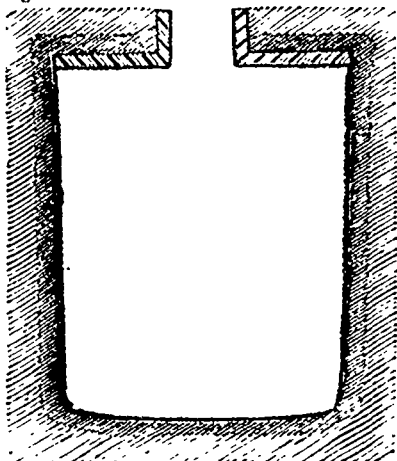


FIG. 1.

water, properly filtered, is the best for all domestic purposes; and with a little trouble an abundant supply may usually be secured. By having the cistern large enough, the longest drought will fail to deprive a household of the essential comfort of good water, even when streams, and springs, and wells have all failed. Many trust to the yield of melted snow in winter, and in summer to a few tubfuls caught in a shower, or at most to the scanty quantities retained within the narrow limits of a trough or barrel. This need not be the case; for in almost every locality a good sized cistern may be readily and inexpensively constructed. Where the soil is suitable, that is, where it is neither sandy nor gravelly, but a tenacious clay, good cisterns may be made by simply digging a hole in the ground of sufficient dimensions, and plastering the bottom and sides with cement. The

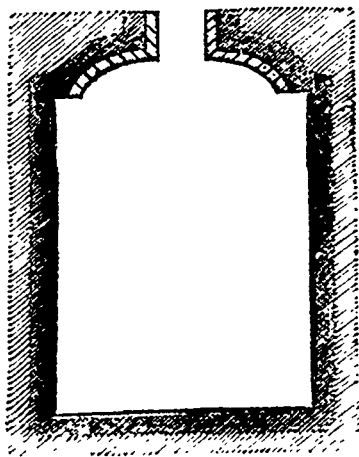


FIG. 2.

top may be covered with planks, upon which a coat of mortar should also be laid, and the whole roofed over with a sufficient depth of earth to exclude the frost. Fig. 1 of the accompanying illustrations represents this form. The cement is made by mixing in proper proportion sharp sand and "water-lime." This "proper proportion" varies according to the sharpness of the sand and the quality of the lime, and can only be satisfactorily ascertained by actual trial. The cement

and sand should be well mixed while dry, and water added to small quantities, only when it is wanted for immediate use; for good cement will set very quickly. In the construction of cisterns especially, frost should be carefully avoided; and this can best be insured by choosing for the work the warmer periods of the year. Cement should not be exposed to any frost for, at least, three months after it has been applied. Some recommend but one coat of cement, and others are in the habit of applying two or more. Much will, no doubt, depend upon the particular circumstances of the case; but an experienced engineer of Baltimore, Mr. S. Wilkinson, writing to the *Bermuda Telegraph*, recommends but one coat, and that not more than a quarter of an inch thick. If too thick, it is liable to crack in setting. Where a crack does occur, Mr. Wilkinson's practice is to "mix into a thick paste some sand and cement and apply it with a brush." By this means all leakage may be prevented.

An improvement on the flat covering of planks by an arched roof of brick, as shown in Fig. 2. This will not require a great number of bricks, adds very little to the expense, and is much more firm and durable. Care should be taken in every instance to prevent the entrance of surface water, and to guard as much as possible against the admission, through the supply pipe, of dirt or leaves or other impurities.

Some persons contend that the presence of lime cement tends to impart a hard quality to the water. This may be the case to a certain extent, if water is admitted before the cement is properly set; but we should not think there can be any great force in this objection. The employment of wood cisterns entirely precludes the possibility of any such effect, and they are on this account, as well as for other reasons, preferred by some people. But such cisterns are scarcely so well adapted for holding water for drinking purposes, as the wood is very liable to impart an unpleasant flavor to the water. To make a wooden cistern, take well seasoned one and a half inch planks, six or eight feet long, six inches wide at one end, and six and a quarter at the other; joint the edges; with these staves form a tub six or eight feet in diameter, with a bottom in the large end, made of one and a half inch lumber. Hoop enough to hold it firmly together when rolled into the hole. Fig. 3 represents a cistern of this description. The hole for its reception should exceed it slightly in dimensions, and should have a soft bed of mortar clay at the bottom, three or four inches deep. Upon this mortar bed place the tub, and work the bottom well into it. Then fill the space between the tub and the bank with clay, just moist enough to be packed down solid with a pounder. Cover the whole with plank and earth.

Such are some of the cheapest kinds of cisterns; but we would recommend, in all cases where it can be done, that they should be constructed with stone or brick. These materials, both in forming the bottom and walls, may be laid in common lime mortar; but if it can be afforded, it is still better to lay them in cement, thus preventing, with the addition of the coating of cement over the whole, the possibility of leakage.

The last improvement which we would recommend, and a very important one it is where the water is intended for drinking, is the construction of a filter within the cistern. This is efficiently done in the manner represented in Fig. 4. A single brick wall is built up the middle of the cistern, dividing it into two compartments. Spaces are left between the bricks at the bottom of the partition, to allow the water to flow from one side into the other. Close to the bottom of one compartment a filter is constructed by laying over a frame of scantling and boards (not close of course) a coarse woollen or other cloth, and on this a layer of gravel; over which should then be laid alternate layers of sand and charcoal. This forms an efficient filter. The water will percolate through it readily, pass through the openings at the bottom of the wall, and rise on the other side to a level with the

fluid on the receiving side. The water thus filtered is perfectly pure, and furnishes the most wholesome beverage that can be used.

A simpler method of constructing the filter, in which the porous wall itself is made to answer the purpose without any apparatus below, is recommended by Mr. Wilkinson, he says:—

The best filter is a wall of old bricks across the cistern, of four inches, or the width of a brick, laying up the filter-wall in cement mortar, but without plastering on either side. Such a filter will operate efficiently for ten or fifteen years, and should it ever require to be cleansed, all that is necessary is to change the suction pipe to the receiving side of the cistern and pump out the water rapidly, which will cause the water to flow back from the filtered into the unfiltered side, and it will carry with it all the sediment in the pores of the bricks, and effectually cleanse the filter, making it as good as new."

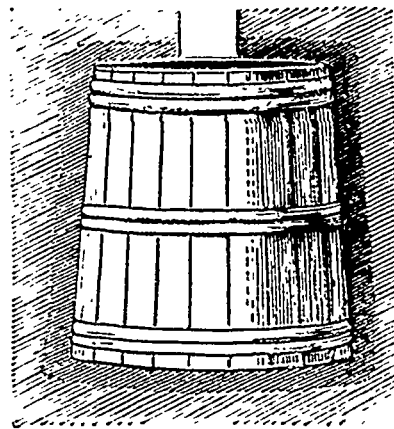


FIG. 3.

Such a contrivance may answer very well to separate mechanically all solid matter from the water, but lacks the chemical influence of the charcoal in neutralizing organic impurities. We would strongly recommend the construction of soft-water cisterns for stock. They combine several very important advantages—among others, they utilize the water from the roofs of the barn buildings, and probably thus prevent the washing away of some valuable manure; their position is necessarily in the most convenient place for watering the stock; by being constructed of sufficient dimensions they are less liable to fail than wells or springs; and the water they supply is the purest and most wholesome.

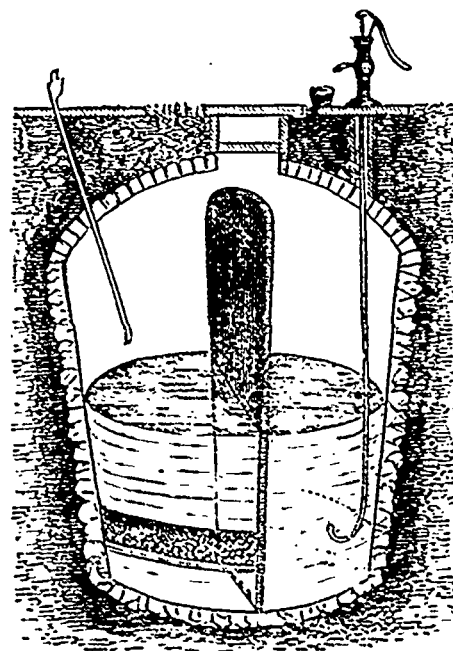


FIG. 4.

We give below, in round numbers, an estimate of the capacities of cisterns of various dimensions. A cistern five feet in diameter will hold a little over five barrels to each foot of depth.

One of	6 feet diameter,	6 bbls. to each foot of depth
7	9	"
8	11	"
9	13	"
10	15	"