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CISTERNS OR WATER SOFTENERS FOR THE FARM HOME?

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If the average housewife were asked to name some of the things she would like to have, an unlimited supply of soft water would undoubtedly be one of them. The advantages of soft over hard water are so obvious that the only possible argument would be over the method of getting the soft water.

HARD AND SOFT WATER

Hard water probably got its name from the fact that much hard work was necessary when certain water was used for cleaning purposes. Much more soap was needed with some waters than with others, and even then the clothes were not white. Hardness in water has come to mean its ability to destroy soap.

Rain water, when it leaves the clouds, is practically pure water; in fact, it is actually distilled water. As it falls to earth it picks up some foreign matter in the form of various gases and perhaps dust or smoke particles. When it reaches the earth, it either runs off or soaks into the ground. If this water falls on roofs and is conducted to and stored in cisterns, it is practically free from hardness but may be quite dirty due to the dust and smoke it has washed out of the air and off the roof. Rain water caught in the country will be cleaner than that caught in the city.

Water is the greatest of all solvents. When it percolates through the ground, it is bound to dissolve and absorb some of the material over which and through which it has passed. If the earth formation happens to be limestone and the water stays in contact with it for some time, the water will become very hard. When soap is added to hard water, the dissolved limestone is settled out in the form of an insoluble curd which may make a ring around the bathtub or leave one's hair harsh and sticky. The harder the water the more soap needed to soften it.

There are a number of ways of softening water, but for domestic purposes the only practical ones, beside the use of soap, are the use of chemicals such as sal soda, borax, tri-sodium-phosphate, or perhaps other things depending on conditions or the use of a zeolite softener. Zeolite or, as it is sometimes called, green sand is a mineral which has the property of exchanging its sodium for the dissolved lime in water. When the

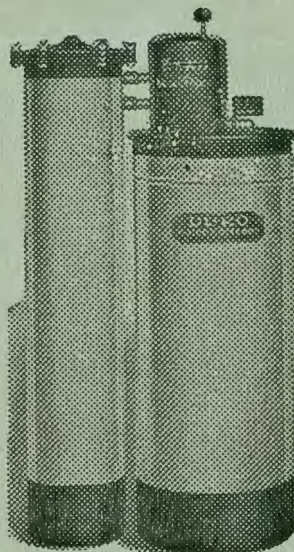


FIG. 1. HOUSEHOLD SOFTENER

zeolite has taken on all the lime it can hold, it must be regenerated by the use of a saturated brine solution which usually passes through the softener in the direction opposite to the flow of the water. The principle of softening water by the zeolite process is known as that of "base exchange." The zeolite is high in sodium and low in lime while the water is high in lime and low in sodium. When the two are brought together, the lime in the water is exchanged for the sodium in the zeolite. When salt water is passed through the softener, the zeolite takes on sodium and gives up lime which is flushed out and run to waste. Water softened by the zeolite process is somewhat higher in sodium than it was before, but for all household purposes the added sodium is of no consequence. The frequency of regeneration depends on the hardness of the water, the amount used, and the size of the softener. The capacity of a softener is rated in grains of hardness removed, and ranges from a few hundred grains in the very small softeners to 80,000 or more in the larger ones. A size suitable for the average home might be 30,000 grains. Assuming that 50 gallons of water having a hard-

ness of 30 grains per gallon are used each day, the softener would have to be regenerated every 20 days. Since there is no advantage in using soft water to flush the toilet, water the lawn, etc., it is common practice to soften only the water that is to be heated.

Both natural and synthetic zeolites are available. The synthetic type has a larger capacity than the natural zeolite but is more easily damaged by neglecting to regenerate at the proper time. The user should know the type of zeolite in his softener and be governed accordingly. The natural mineral looks like green sand while the artificial type closely resembles coarse white salt. The synthetic mineral costs about one third more than the natural type but will soften about two and one half times as much water.

The purpose of a softener is to remove hardness from water, not mud or other matter in suspension. A softener is not a filter and should not be used for that purpose. The removal of iron from water calls for entirely different equipment and a different process. A water softener will not remove iron in solution.

CISTERN OR SOFTENER

For those wanting soft water the question is whether to catch the water while it is soft or to soften it after it has become hard. There are many points to be considered on both sides, and a few of them will be mentioned.

The cost of a softener will probably be somewhat higher than that of a good cistern.

The maintenance and cleaning cost of a cistern will be somewhat lower than the operating cost of a softener.

Small softeners may have to be regenerated so often that the job becomes a nuisance.

A softener requires water under pressure while a cistern does not.

The mineral in a softener will be ruined if neglected.

Children have never been drowned in softeners, but they have been in cisterns.

The supply of cistern water depends on rainfall, but a softener will function as long as the well holds out.

Softened water usually costs more than cistern water, but is probably worth it because artificially softened water will be clean and free from odor and color while cistern water may not be.