

THE FARM WATER SUPPLY

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AMONG the factors which keep us healthy, or which, if not carefully guarded, may cause sickness, nothing is of greater importance than the family water supply. This is especially true on farms, for it is generally found that municipal water supplies are purer than individual wells, due to care in construction and to watchfulness in guarding them. Our bodies are over one-half water, and it is of the most vital importance that this water which must be continually replenished be pure. If, in the course of events, it becomes contaminated with disease germs, then one who drinks such water may contract the disease caused by the particular kind of disease germ which is in the water.

It should be understood that water is never impure insofar as bacterial or germ content is concerned, unless there is some source of contamination to produce such results. Almost all diseases are produced by certain kinds of germs and these germs never generate spontaneously. When water is impure therefore it is an indication that there is some outside source from which the impurity is being derived.

Classification of Wells.

Wells may be divided into two classes, namely deep wells and shallow wells. This difference does not depend so much on the fact that the bore is of such depth from the top to the bottom, but rather by "deep well" is meant one which passes through some impervious stratum or layer of soil or rock and taps a subterranean water supply. Such water has been brought for a considerable distance under ground. Since such soil formation does not allow direct percolation from the surface the water which is obtained from such a well has slowly passed through the soil for miles in many instances. By "shallow well" is meant one which is sunk merely a very little below the level of surface water, known more technically as the "water table," and into this hole so constructed water from the near vicinity is allowed to seep. Water found in such a well, therefore, has come from the immediate neighborhood and almost always from within a radius merely of a few feet. It thus follows that water which is found in deep wells will be quite thoroughly filtered from any bacterial contamination which may have been in it. Water from shallow wells, since it has been filtered through comparatively a few feet rather than miles of soil, may be highly contaminated. Because of the fact that deep well water has percolated through much soil it will have had more opportunity to dissolve out certain soluble minerals, and, therefore, is likely to be harder than water derived from shallow wells. In consideration of the above facts, if a deep well be properly cased so that seepage cannot gain entrance through the sides by means of a leaky joint or a rusty hole, water from such deep wells may be expected to be disease free.

Dangerous Shallow Wells.

Much difficulty is found with the so called shallow wells. These many times are merely holes dug in the ground into which seepage of all kinds finds its way from the adjacent soil. In a large percentage of cases no attempt is made in construction to keep seepage water outside of the well either by use of an iron pipe, by concrete construction or brick wall set in mortar. Many farmers believe that the only way they can obtain a sufficient water supply by using the shallow well is to allow water opportunity to enter through the sides by seepage.

It should be understood that water in

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a shallow well will be pure only when it has been filtered through considerable soil. Contamination generally finds its way into the water which is just below the surface of the ground, and the soil below this level removes such contamination. It follows therefore that the logical point of entrance for water into the well is at the bottom and that in digging and constructing such a well this point should be borne in mind. In order that the water shall not be roily as it comes into the well at the bottom one should place a few inches of coarse sand or fine clean gravel at the bottom of the hole. From the above discussion it will also be recognized that in order to keep out seepage from the sides of the well the well must be thoroughly and tightly walled up by some method. As one stands by the side of an old well on a hot summer day and listens to the continual dripping of the water as it trickles down the sides of the well from the surrounding soil it may remind one of a clear and purring spring. But under no conditions should one allow the poetry of the feeling to overcome him. It is very likely that such trickling is produced by the water seeping in from some near-by toilet, septic tank or kitchen sink.

Curbing Around Well.

In order that in case of heavy rains or possible flood the water may not flush over the sides of the well hole and wash down into the bore it is also important that a curbing with embankment be placed around to divert such water and also to prevent the direct return of water pumped out from the well, and which in many cases is allowed to run off from the platform into the soil a few inches from the well and which from thence seeps directly back into the well hole. The return of such water to the well is just as dangerous as the return of any other surface water to enter the well.

It is important also to remember that a tight cover must be placed over the well. It is better also if this cover is made of two courses of boarding, one layer placed at angles with the other in order than when wear occurs and cracks form, the holes, which will eventually be produced, may not allow solid matter or other kinds of contamination to fall directly through them into the water below. Such a cover also will keep frogs out and many kinds of insects which deposit their eggs in the water or on the sides of the well, and the larvae of which pass through the first stage of their life in water. It is unpleasant to pump up tadpoles, earth worms, and insect larvae of various kinds in the water. It must be remembered, too, that where the opportunity is given for such comparatively large animals to find their way into the water it is a very simple matter for plants as small as germs to find their way also.

The water from the well should be clear and not too sparkling, and unless it is in a locality where sulfur compounds are naturally found in the soil, one should always view with suspicion the so-called "sulfur water." It is worth remembering that as organic matter decomposes in many instances it gives off the same gas that is indicative of rotten eggs and that is therefore called "rotten egg gas." Sulfur in this form is an indication of contamination and very many of our so-called "sulfur water wells" are pools of filth as shown by laboratory examination. Also as organic matter undergoes bacterial decomposition it gives off a gas called carbon dioxide. This is the same gas that is used under pressure to give the sparkle and fizz to soda water, and while a small amount is normally present in all water if there be sufficient to produce sparkling, then there is a possibility that the sparkle is caused by rotting organic matter which in turn indicates contaminated water. A clear water is not a pure water under all conditions by any means.

Contaminated Water.

As before stated water will not be contaminated with disease germs unless there be disease germs in the immediate vicinity, which in turn may contaminate such water. Therefore it naturally follows that not all water found in badly constructed wells is contaminated with disease germs. The danger, how-

ever, in the use of such water, lies in the fact that it is impossible for any human being to tell how soon contamination may find its way to the near vicinity of such wells, and in turn find its way into the water. It is only an ordinary measure of safety, so to construct the well that the chances of contamination may be as few as possible; then the water will be kept pure even though there be some cause for contamination not far away. On very many farms we find fever of various kinds appearing annually, and upon careful examination we find that it is produced by drinking water. The germs are taken into the body and produce the disease. The materials from the body during such disease pass to the family toilet and from thence the germs find their way into the well. This slow passage of the bacteria from the toilet or septic tank to well may require sometimes as long as one year so that during the next season the water being contaminated carries a recurrence of the disease. The most important American diseases which may be carried in water are typhoid, dysentery, diarrhoea and summer complaint. It is not intended that the reader shall understand that these diseases are carried by the water alone, but the statement is made that one of the most important agencies bringing about such dissemination is the family water supply.

College Records.

The records of the Agricultural College show that the water of fully one-half of the shallow wells in the state is contaminated with sewage germs. Therefore, it is unfit for human consumption. If one is in doubt as to whether or not

the water supply in his particular well is safe, he may readily have it examined by using a clean bottle of about four ounces capacity and a cork, boiling them both carefully for ten or fifteen minutes. Water should be pumped from the well until one is certain of not obtaining a sample which has been standing in the pipe. The spout of the pump should be clean and the hands of the one taking the sample should have been washed just previously with strong soap suds and water. Handle the bottle just as little as possible before taking the sample. The sample taken as outlined above may be sent to the State Board of Health at Portland, or to the Bacteriology Department of the Agricultural College for examination. These tests are made free for citizens of the State of Oregon.



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