ature at which curing is carried on upon the bacteria which are in the curd. Believing as I do that bacteria are the acute agents in the curing of cheese, as well as in the production of most flavors, temperature has then an important bearing on the flavoring of cheese. The curing of cheese goes on well at temperatures ranging from 65 to 70 degrees, and, indeed, very often at higher temperatures. But when we have higher temperatures the gas forming organisms and filth organisms present can outmultiply the lactic and other groups, getting the upper hand and preventing proper curing.

This certainly happened in the case I have cited as occurring in the Dairy School last winter. In consequence of this higher temperature and the predominance of the filth organisms we may find variable conditions such as gassy cheese—heaving and cracking—foul flavors, softened areas or a poorly cured cheese. High temperature then forces the growth of filth organisms to a greater extent than it does the other bacteria in cheese and thus they obtain the upper hand in many cases with bad consequences. Cure cheese then at a temperature below 77 degrees anyway.

PURE WATER FOR FARMERS AND DAIRYMEN.

An address by FRANK T. SHUTT, M.A., chemist of the Dominion Experimental Farms, at the Convention of Butter and Cheese Association of Western Ontario, at London, Ontario.

Your directors, in inviting me to this convention, have asked me to address you this afternoon on the subject of a pure water supply for the farmer and dairyman, and I am very pleased to avail myself of the opportunity to speak to you on what appears to me, from an experience of many years, as a matter of great and, indeed, vital importance.

We have, as an agricultural people, been paying considerable attention of late years to improving our methods of farming, with the endeavor to make our business more profitable. We have, I may say, acquired a considerable amount of knowledge concerning these principles which underlie and teach us what good farming is—the manuring and tillage of land, the composition and relative values of feeding stuffs, the requirements of plants and animals. We have not, however, as yet awakened to a realization of the importance to ourselves, our farm animals and for use in the dairy, of using water free from pollution.

Now, I am by no means an alarmist. I speak only of that I know. The analyses of hundreds of samples of well waters from Canadian farm homesteads convince me that the evil of contaminated water is a lamentably common and widespread one. Not that I am making any wholesale condemnation of farm wells, but this I do say, that over fifty per cent. of the samples sent to our laboratories for examination have been pronounced as dangerous or suspicious.

Let me at the outset say that there is no necessity for this state of affairs. The natural waters of Canada as found in lake and stream and spring are of the purest. They are unsurpassed in the world for quality and wholesomeness. We have ample data on this point. How then does it come about that such a large number of wells in rural parts are seriously polluted? What is the nature of the contamination?

Briefly, it follows from the altogether too common practice of sinking the well, looking only to convenience, in the neighborhood of some source of pollution, as, for instance, in the barn yard, in the stable, or one or other of the farm buildings, or it may be situated dangerously near the pig pen or the privy. Near the back door where the household slops are thrown out is another favorite place, and I may add we scarcely ever find any precautionary measures, such as a drainage system to prevent this back-door slop water from soaking into the ground.

What is the result of all this? It is that a large proportion of liquid manure, excrementitious and waste matter finds its way into the well. Indeed, I have repeatedly found the well to be acting as a cesspit, and its water really to be a liquid fertilizer, so charged was it with manurial matter. This, then, is the form of pollution we have to guard against.

We may now enquire as to the danger that exists in drinking water charged with this polluting matter. First, there can be no doubt but what water containing drainage from the barnyard or privy acts as a *direct poison* upon the system. The action may be slow, it may be, and usually is, insidious, unnoticeable, but there is no doubt in the minds of sanitarians who have studied this question but that such matter is the frequent cause of diarrhœa and indigestion, of sick- headache, and a general lowering of the vigor and tone of the system—making its victim susceptible to "catch" any disease there may be about. In other words, it may, and frequently does, undermine the constitution. But, further, water so contaminated offers all the most favorable conditions for the development of disease germs once they gain an entrance to the well—and they frequently do gain an entrance by the drainage of the privy containing the dejecta of patients suffering from infectious diseases. This is the way, the most common way at least, in which typhoid fever spreads. I could cite any number of authenticated cases where the spread of typhoid has been directly traced to such a polluted water supply. I am firmly of the belief that in this healthy climate of ours many a life has been sacrificed by the use of polluted water. I might say a great deal more regarding the evil effects upon health of impure water, but I do not wish to unduly dwell upon this phase of the question. Be assured, however, and I say it with all emphasis, that many an outbreak of fever in the country parts, in villages and upon farms, and much impaired health is directly due to the use of bad water. Sooner or later the result comes, it is inevitable. We may not recognize the cause, for it may not come upon us suddenly, but examination shows only too conclusively where the trouble has originated.

Now, what is bad for man is bad for beast, and especially so for dairy cows. Pure, wholesome milk can only be obtained from animals in good health. Is there anyone who can gainsay the statement that good health and impure water do not go together? Whatever affects the system of cows must affect the milk, for milk is from the blood, and the blood is largely from the water the cow drinks. Lack of thrift in animals is, I believe, often a common result of an impure water supply. It is no use in this connection urging the argument that the cows like the water. Cows should not be allowed, as they often are, to drink of the pools of black, stagnant water that have gathered from the manure pile.

Another word in this connection. I have more than once been able to trace an off flavor in cheese soon after making, to bad water. Whether this has been *through* the cow or by washing the cans with polluted water I am not always prepared to say, but this I will say, and say most emphatically, that impure water should not on any account be allowed in the making of cheese or butter, nor in the cleansing of dairy utensils. It is no use preaching and practising what is commonly termed cleanliness so long as the water contains pernicious and polluting material. Last summer I was able to trace the cause at factories of bad flavored cheese directly to impure water in three instances, and no doubt there were other factories having trouble in this respect that did not apply to me for help.

In conclusion I would give some advice, based on a large knowledge of the subject.

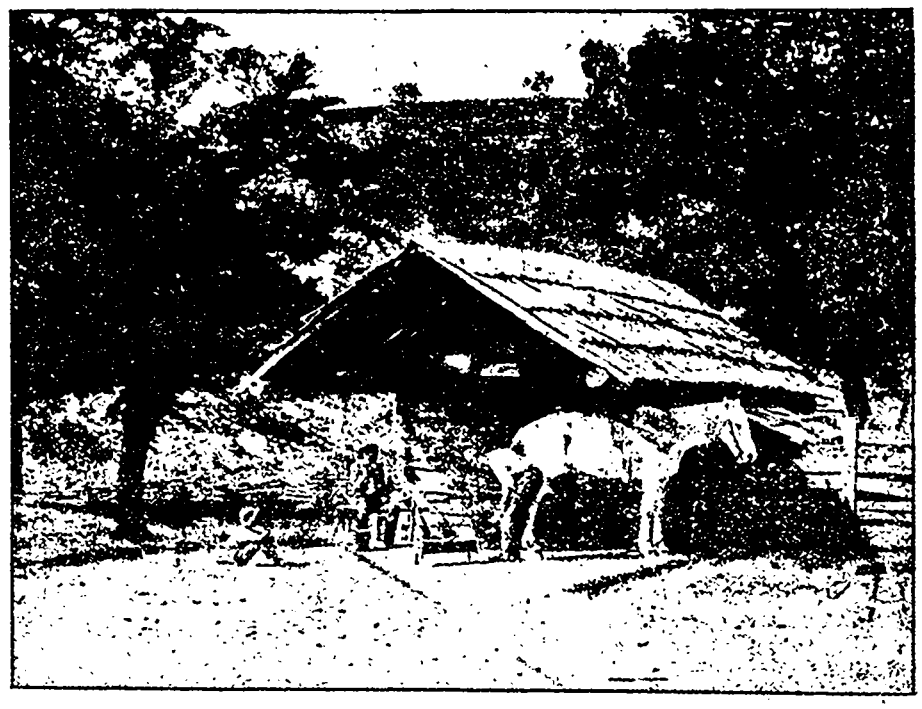
1. Do not judge of the quality of a water by its appearance only. Many a clear, brilliant, sparkling water has been found to be reeking in filth. Of course, any water that is offensive either to taste, smell or sight should not be used.

2. Tests of a popular character, such as one often sees accounts of in the newspapers, are valueless. All farmers and dairymen who have reason to suspect their water supply should place themselves in communication with the Chemical Department of the Experimental Farms at Ottawa.

3. Never sink a well in the barnyard or under a farm building containing animals. See that the well is at a safe distance from all possible source of contamination.

4. Keep surface water out by lining the well to the ground water line with brick or stone work, laid in cement.

5. Protect the well by a top project-



THE VILLAGE BLACKSMITH.

By H. W. LONGFELLOW.

Under a spreading chestnut tree
The village smithy stands;
The smith, a mighty man is he,
With large and sinewy hands;
And the muscles of his brawny arms
Are strong as iron bands.

His hair is crisp, and black, and long,
His face is like the tan;
His brow is wet with honest sweat,
He earns whate'er he can,
And looks the whole world in the face,
For he owes not any man.

Week in, week out, from morn till night,
You can hear his bellows blow;
You can hear him swing his heavy sledge,
With measured beat and slow,
Like a sexton ringing the village bell
When the evening sun is low.

And children coming home from school
Look in at the open door;
They love to see the flaming forge,
And hear the bellows roar,
And catch the burning sparks that fly
Like chaff from the threshing-floor.

He goes on Sunday to the church
And sits among the boys;
He hears the parson pray and preach,
He hears his daughter's voice
Singing in the village choir,
And it makes his heart rejoice.

It sounds to him like her mother's voice,
Singing in Paradise;
He needs must think of her once more,
How in the grave she lies;
And with his hard, rough hand he wipes
A tear out of his eyes.

Toiling—rejoicing—sorrowing,
Onward through life he goes;
Each morning sees some task begun,
Each evening sees it close;
Something attempted, something done,
Has earned a night's repose.

Thanks, thanks to thee, my worthy friend,
For the lesson thou hast taught;
Thus at the flaming forge of life
Our fortunes must be wrought;
Thus on its sounding anvil shaped
Each burning deed and thought.