ference of opinion as to the permanency of this plan. The following by a writer in the *Country Gentleman* on this topic will be of interest:

In the good old days of our forefathers, when land was comparatively new in this country, such articles as fertilizers were unheard of—in fact, they were not needed, and soils produced abundant and paying crops without them. These same large crops, however, were sapping the very life blood from mother earth, but at the same time she was strong and healthy, and the comparatively small drafts upon her made but little impression. A drop of water will wear away a stone in time, and to a certain extent such proved to be the case with the soils and crops. Our forefathers, though, did not experience this, but it was left for those who came after them to suffer the consequences of their neglect.

The first indication of a decline in the productive capacity of our soils was probably most noticeable in the case of clover. Previously ready "catches" and large crops had been the rule, but later on difficulties in getting even a stand began to be experienced. The intelligent farmers realized at once that something was wrong either with their soils or their methods, and they set about therefore to locate the causes and apply the remedies. One point which especially caught their attention was the readiness and vigor with which plants grew on those parts of the field which had been covered with the droppings from animals. They reasoned naturally that the manure returned something which had been taken away from the soil, and the loss of which it was beginning to feel and in fact to show. They, therefore, began to use all the barnyard manure available, and with good results for a time. But barnyard manure did not entirely fill the bill—first, because they could not get enough of it, and second, for the reason that it was lacking in something. For example, when they continued to put heavy doses of it on potatoes they got the most luxuriant growth of vines imaginable, but when they dug for the tubers their hopes were blasted—small in size, few in number, and not of the best quality tell the whole story. This state of affairs indicated that while stable manure was good as far as it went, it did not go quite far enough.

A few of our neighbors were congratulating themselves upon their wonderful results with clover. They simply sowed this crop, got a fine stand, and for a while never failed to gather a fine lot of potatoes from the sod. The clover acted like a fertilizer all by itself, and they continued to sow it without using anything else on their land. By and by, however, even the old reliable clover began to show a little of that "tired" feeling, and seemed to be in need of some stimulant. After experimenting a while, the farm doctors found that land plaster (which is a form of lime) was a splendid tonic for clover; hence the cry arose that "clover and plaster were good enough fertilizers for any land." Subsequent experience, however, failed to confirm even this, and it was necessary to look into this subject further. The agricultural chemists—the men whom we might justly term "soil and plant doctors"—took the matter in hand and solved the whole problem. They found that the earth contains certain food ingredients which the plants feed on. In its virgin condition, the supply of these nourishing substances is abundant, which accounts for the heavy crops which are always gathered on new lands. Continued cropping, though, diminishes these food ingredients until the land in time fails to produce profitable crops; then it becomes necessary to resort to artificial means to restore them.

Thanks to the work of the experiment stations, the means for becoming familiar with the correct use of artificial fertilizers are quite good, and any farmer, with the expenditure of a little time and trouble, can soon ascertain in what manner, and which of the missing ingredients, to apply to advantage. The aim, however, should be not to put on just so much plant-food every year, but by a systematic effort to build up the productive capacity of a soil to its former condition when in a virgin state. While clover in some cases has been the means of exhausting soils, it will at the same time be a valuable agency in restoring the fertility. We now know that this crop has the faculty of gathering nitrogen, the most costly of the three so-called essential fertilizer ingredients, the other two of which are phosphoric acid and potash. If these latter two are supplied to the soil in cheap forms of plant food, like bone or phosphate and potash, the clover in turn will furnish the nitrogen; and by sowing this crop at regular intervals, it will assist in the restoration of the land.

HOW CAN BACTERIA BE EXCLUDED FROM MILK?

Long before he was told the reason, the practical dairyman learned by experience that cleanliness, thoroughly carried out, enabled him to secure his milk in a satisfactory way. The desired result can, however, be much easier accomplished if we know the sources of bacterial infection. Washing the udder to prevent dislodgment of dust particles, steaming the pails and cans to destroy lurking germ life, rejecting the fore milk, keeping the stable free from dust during the milking, are practical methods that have a rational scientific basis.

Where these methods are conscientiously carried out, good results are to be obtained with ease. Private dairies that are engaged in supplying the best quality of milk are following such methods with success. For factory purposes, such scrupulous care as is practised in milk dairies would perhaps be considered impractical, but if our factory milk was handled with equally great care the hundreds of thousands of dollars that are annually lost in this state alone, on inferior dairy products, would, for the most part, be saved.

Effect of Chilling on Bacterial Growth of Milk.—Suppose that the greatest care has been taken to secure the milk in as clean a manner as possible. This will reduce the number of bacteria in the same, and yet, if no pains are taken to chill it, the advantage gained will be largely lost. The temperature of the milk as it comes from the cow approximates blood heat, and, therefore, the conditions are most favorable for bacterial growth. At 80° F. a single organism will form 120 new individuals in four hours, while the development of the same germ would have been so retarded at 50° or 55° F. that but little increase would have taken place. The secret, then, lies in early cooling. If the milk is allowed to cool naturally it loses its animal heat so slowly, especially in a large volume, like a canful, that the bacteria that are contained in it are able to multiply in a vigorous manner. To check this development the milk should be cooled as soon as possible. An early diminution of the temperature is much more efficient in checking growth of germ life than even a longer exposure applied later.—*Prof. Russell, in Hoard's Dairyman.*