

all these advantages, there is a possibility of producing an excess of humus in the soil for profitable purposes, the percentage of available nitrogen required for most crops being very small.

In addition to the production of humus, this method has many other advantages over bare fallowing. The land is turned to profitable account, no crop being lost; the surface soil becomes enriched by accumulations from the subsoil and the atmosphere, and maintained in an insoluble condition, so that they cannot be washed away by the rain.

#### The Summer Fallow.

Most of the mistakes made in fallowing have arisen from an improper conception of its classification in agriculture. Every means of increasing the productiveness of the soil is usually regarded as a department of manuring, although in a strict sense a manure is that which supplies plant food directly to the soil. Many of the so-called fertilizers do not fertilize; some merely gather and retain the soluble plant food already in the soil, others only unlock it from insoluble combinations, rendering it available for the crop. The latter effect being produced by tillage, fallowing may be regarded as a process of manuring by which a fertile soil, aided by atmospheric influences, is forced to surrender its locked-up stores of fertility. However, within these bounds, the effects of tillage are as variable as the character of the different classes of soils. The stiffest clay contains at least 20 per cent. of sand—indeed, pure clay is just as barren as pure sand—and the cultivation of a clayey soil has the tendency of further disintegrating the minute fragments of rock of which it is composed, thereby improving its mechanical texture and increasing its absorptive and retentive powers. But clay soils are too cold and stiff, and contain only mineral food for plants; they require sand to destroy their excessive tenacity, and organic matter (humus) to make them more friable and to supply nitrogen to the plant. Small quantities of lime and other bases are also necessary, not only as sources of plant food, but also for their physical and chemical actions in the soil. Hence it will be seen that the loams are the most productive soils, and should be firm enough to support the vegetation, loose enough to allow the rootlet fibres to extend, open enough to admit air freely and allow the surplus water to drain away, and close enough to retain sufficient moisture. Now there is not a field operation of husbandry, whether tillage, manuring or drainage, but should subserve to these ends. If even one of the most unimportant elements of fertility is lacking, or exists in excess, the soil will be as barren as if it is water-logged, or contains its fertilizing elements locked up in insoluble combinations. We have seen that the tillage of clayey soils tends to set free the mineral constituents of their composition; the tillage of vegetable matter tends to make its nitrogen available, that is the oxidation of ammonia and organic matter into nitric acid.

Let us now take a more practical view of the subject. The reasons usually assigned for the necessity of bare fallowing are that it cleans the land and gives it a rest. That the soil re-

quires cleaning scarcely ever admits of doubt; but the question of rest is more complicated. If the soil craves for rest, it must have been overworked, not in the sense of being over-tilled, but, owing to a mismanaged system of cultivation, rotation, or manuring, its fertility has become exhausted; and the necessity for cleaning is usually proportionate to the inefficiency of the tillage. In such cases a bare fallow may make up for the lack of sufficient tillage in previous seasons; but we shall see that the wastefulness of the one extreme is only equalled by the unprofitableness of the other. When a soil contains all the elements of fertility, the amount of tillage required each season, providing no manure is supplied, is that which will provide a sufficiency of plant food for the use of the crop. The question now arises, What becomes of the excess of plant food produced by the excessive tillage of the fallow? In clay or clayey loam, and especially if lime is present, most of the surplus food will be retained by the absorptive power of the soil; but where organic matter is present, a class of valuable salts called nitrates is produced, which will in a wet season, especially if the soil is porous, be almost completely washed away in the drainage water. The whole question of summer fallowing therefore resolves itself into this, that it can only be carried on with safety in a clay soil and in a dry season.

From these facts the conclusion may also be drawn that where weeds abound fertility should be produced by regular and thorough cultivation; whereas in fields free from these pests the soil can be more permanently enriched by a regular application of manure with less tillage. It will also be seen that the coarser manures should be applied to the stiffest soils, and the finer to those which have sufficient porosity.

#### Shearing Twice a Year.

This question has been agitated on both sides of the line; and, like many other agricultural questions, its enthusiasts have gone to the extreme. The arguments sound very well in theory, but what the farmers are most concerned in is how it will work in practice. Between the middle of July and the middle of August, when the second shearing should take place, is just the time when the farmer has not a single day to lose without risk in the harvested condition of his crop, and the procuring of help is usually out of the question. Again, the average farmer has not yet that accommodation for his sheep, which would be indispensable, incident to the necessity for early lambing and early shearing, say in March. Extra attendance would be necessary, and in case of thoroughbreds, possibly also considerable nursing, for two weeks after lambing and shearing, especially if the weather is damp and the accommodation inadequate; but the question of time here favors the other side of the argument, as the usual time of shearing and lambing interferes with the spring work. We do not doubt the profitableness of shearing twice a year in cases where sheep husbandry is made a specialty; but the small farmer should not enter rashly into the enterprise.

Leaving the farmer to make his own calcula-

tions with regard to accommodation and climate, let us show the results of a few figures. The lamb of a medium woolled breed dropped in March will clip at least 3½ lbs. of wool in July, and being lambs' wool, it will bring about two cents a pound more in the market than other wools. Under a good system of management this lamb will shear very nearly as much the following spring, say in March, as if it had not been clipped the previous summer. The reasons are obvious. In the first place the wool will grow closer after the first shearing, and under a less burdensome fleece, the lamb will thrive better both during the hot weather and along through the autumn and winter months, the perspiration from the body not being so profuse. Experiments have proved this. Now let us suppose that a farmer has 20 sheep, and from this basis let us compare the merits of the two systems. Under the existing plan of clipping once a year, ten shearlings shorn in May would produce about 9 lbs. of wool (unwashed) each, or a total of 180 lbs., which at 18c. would bring \$32.40. Under the other system these as lambs shorn in July would clip 3½ lbs. each, or a total of 70 lbs., realizing at 20c. a pound, \$14. At the second clip in March they would produce say 8½ lbs. each, or 170 pounds in all, which at 18c. would bring \$30.60. Adding this amount to the \$14 we get \$44.60, or a difference of \$12.20 in favor of shearing twice a year. Every farmer can easily try the experiment for himself by shearing an early lamb or two this summer, and comparing the results with other lambs next spring.

The U. S. Government has spent \$25,000 to introduce tea culture in the Union, and the enterprise has proved a disastrous failure. This should serve as a warning against attempting to raise products in a country in which they are not adapted.

A prevalent error amongst farmers during this season, is the eating of curd. It must not be supposed that it is as good as the cheese which is made from it; for it is almost entirely indigestible, while nearly the whole of the best made cheese is digested, although the inferior classes do not contain a large percentage of digestible matter. As food the curd is the most valuable part of the milk, but it requires the action of rennet before it is fit for use. All the constituents are in the best condition for assimilation in the new, warm milk.

Many farmers who keep native stock and a few thoroughbreds, have the habit of giving their best feed to the latter, allowing their "scrubs" to put up with any kind of food and accommodation—shifting for themselves, as the saying is. Barring the fact that it is unprofitable to feed any animals, "scrubs" or pure breeds, which do not come up to a certain standard of production, it should be remembered that if these conditions were reversed for a few generations, the natives would vastly surpass most of the existing thoroughbreds for the dairy, while the latter would degenerate to be worse than the "scrubs." The shortest and cheapest way to attain the best results is to improve the natives. They have the right foundation for our climate and conditions.