

THE SCIENCE OF SUMMER TILLAGE

The belief that cultivated land needed an occasional rest was doubtless responsible for the practice of "summer fallow"—a practice that is nearly as ancient as agriculture itself and which is still followed by the non-progressive farmers in every community.

The Fallow Field.

The fallow field was a familiar division of the old-time farm and the manner of treatment given this fallow field was a pretty good index of the disposition and intelligence of the farmer. But do not get the idea that this practice was confined to "old fogies" or to the less intelligent farmers in the community. On the contrary, it was taught by the agricultural experts, and in many agricultural bulletins you may still find "summer fallow" in the regular schedule of crop rotation.

The practice of summer fallow varies not only with the disposition and intelligence of the in-

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increased yield was due to this natural fertilizer coupled with the theory of weed fertilization in the practice of summer fallow. No one seemed to realize that weeds, being voracious feeders, take more from the soil while growing than they can possibly give back. No one seemed to remember that the principle of compensation—that you can't get something for nothing—applies to soil culture as well as to trade.

Aside from the eradication of weeds and a slight improvement in the tilth of the land owing to a very small addition of humus from the weed crop, the old process of summer fallow is of little or no value in farm management. In the light of modern scientific methods it is difficult to realize how the old-time farmer came to believe that a crop of grain

shelf with the other dust-covered curios—it is useful only as an index of agricultural progress.

Summer fallow, however, had some value depending on the soil conditions. If a field had become foul with noxious weeds, a plowing in mid-summer before the growth had time to mature would make the cultivation of the next year's crop a much easier task. The yield was likely to be somewhat greater because of the destruction in mid-season of all plant growth, resulting in a slight accumulation of plant food in the soil. If the summer plowing was timely and had been well done, it would perhaps result in a larger and better distributed supply of moisture in the subsoil.

Crop-sick land doubtless was benefited to some extent by the summer fallow. The change in plant growth and the exposure to the elements would naturally assist in clearing the soil of toxic poisons. The theory that the old practice of turning under a crop of weeds benefits the land by adding plant food is, to say the least, questionable. That it adds a slight amount of humus to the soil may be true, but with most soils the game is not worth the candle. This brings us to the subject of cover crops, green manure and humus, each of which will be fully discussed in another place.

Summer Tillage.

We, therefore, will pass to the discussion of summer tillage, a process totally different from summer fallow but which, owing to a lack of definite knowledge of the principles involved, is often confused with summer fallow, many careless writers using the terms interchangeably. The student of scientific tillage is, therefore, cautioned to scan carefully whatever he reads about summer fallow and summer tillage, keeping in mind always the radical difference.

While the essential scientific principles underlying the theories of summer tillage are old, their application is comparatively new. Coming as it did in response to the call of the semi-arid west, the prevailing idea is that summer tillage applies only to the regions of insufficient and unreliable rainfall. Although its application to the conditions of the more humid sections has not been fully proved, yet from results of the application of the principles in the semi-arid sections it seems reasonable to predict that the practice will prove of great value under any and all conditions of soil and climate, especially where fertility has become depleted.

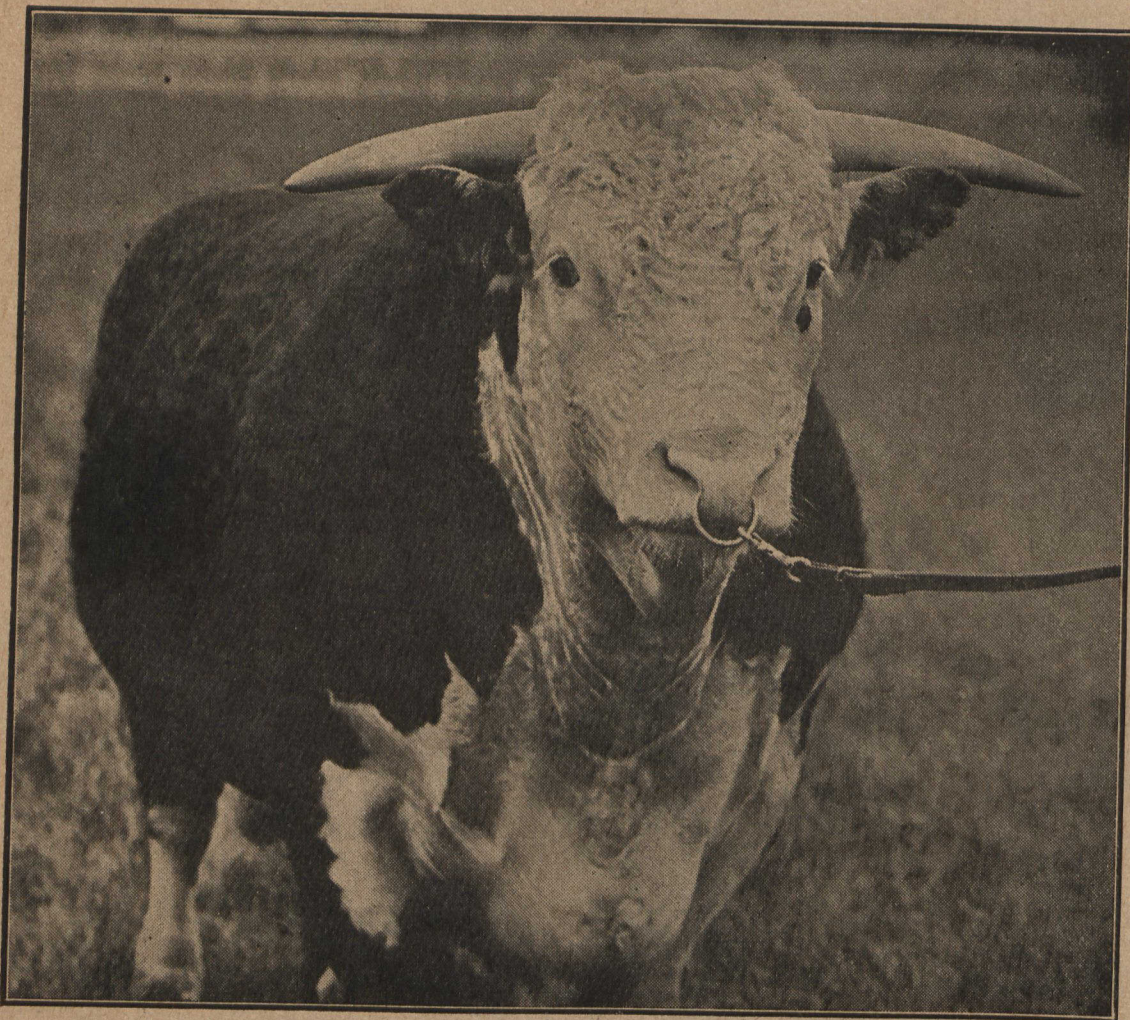
Advantages.

That readers may observe and understand the wide difference between summer fallow and summer tillage we will state briefly the objects sought to be obtained by the latter. First, an increased yield far above what is considered a good crop, not only every second year as is popularly supposed, but when the system has once been applied and the moisture of the soil and sub-soil got under control a bumper crop may be expected each year as long as the water content can be kept at the optimum, providing always that the work in the preparation and tillage of the soil is properly done. Second, the insurance of the crop against failure through drouth. Summer tillage when properly carried out under reasonably favorable conditions is an absolute guaranty against crop failure in drouthy seasons. This is brought about by the storage in the soil of a large amount of the annual precipitation, which is so held that it is made available not only to the plant when needed, but becomes so thoroughly charged with plant food in solution that it becomes possible to carry a crop through a long period of drouth with much less water than would otherwise be required.

Conditions.

The foregoing are the primal objects of summer tillage, but these objects can not be attained by haphazard methods. There are certain conditions that must be carefully observed and their meaning understood if good results are to be secured. The storing and conservation of water is of vital im-

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A TYPICAL "WHITEFACE"

dividual farmer, but with the custom of the community. Here is a farmer who is convinced that his land is tired and needs a period of rest, so he allows his field a complete vacation—abandons it for a year or two to a riot of weeds and native grass; here is another, a shade more thrifty, who lets a field lie fallow but uses it as a pasture for his sheep and young cattle. The grass and weeds are therefore kept closely cropped. Here is another who has a field infected with some persistent weed; being thrifty and something of a thinker as well, he not only pastures his fallow field but plows it in midsummer to destroy the obnoxious weeds by exposing their roots to the summer sun before they have had time to seed. His neighbor did the same, but this field had not been pastured, consequently a rank growth of weeds was turned under before they had time to seed. The result was a slightly increased yield in the next year's crop in both cases. The conclusions, however, regarding the cause of this increased yield were totally different. The first one concluded that the result was due to the rest given the land and the further fact that grass and weeds were kept down. The other was sure that the result was owing to the turning under of the crop of weeds—that this acted as just that much manure and the

was harder on his soil than a crop of weeds. But he did believe it, and many still believe it, in a sort of unthinking way.

A complete revolution in the methods of handling the fallow field has taken place within the last ten years. Clean cultivation intelligently applied, has superseded the old method. This practice has become known as summer tillage and is as different from summer fallow in object, principle, and practice as success is from failure.

Summer Fallow.

Before going further into the subject let us clearly understand what was claimed for summer fallow and what advantages, if any, it had over constant cropping.

The theory that land under cultivation, like a tired work animal, needed a period of rest, failed under the test of investigation. It was found that an exhausted field under certain conditions might require extra food—manure, or an application of some mineral substance in which the soil seemed deficient, in order to secure normal yields, but to allow it to rest for the mere sake of resting was on a par with the practice of planting potatoes in the moon. We, therefore, will put the "rest" theory on the