

recently been making investigations, and not a man of them has been able to discover a cow which produced cream. Is this the fault of science? No; the practical men have been frauds—that's all. There is not a dairy authority in the world to-day who favors the boom system of making butter records. Because we refuse to straddle these bubbles, endangering our life by hasty precipitation, we are dubbed the advocate of "serub" stock. Perish, ADVOCATE, rather than sink into such depths of degradation!

The latest of all is the oil test boom. Costly instruments have been manufactured for testing milk and cream, which have been thrust upon our dairymen as the last thing required to perfect our co-operative systems of cheese and butter making, and large numbers of these instruments have been sold. In our July issue, we pointed out some scientific objections to the oil-test, and since we wrote, scientific authorities have found the system to be a delusion, if not exactly a fraud. Our Model Farm experts were probably the first to introduce the oil-tests into Canada and a bulletin has recently been issued from that institution in which the comparative merits of the leading milking breeds have been investigated on the basis of the oil-tests. This bulletin has also been published by leading weekly papers, and the misleading results have therefore had a wide circulation amongst our farmers.

We have pointed out some other agricultural booms, some of which appear to be on the verge of collapse. We hope our readers will take warning, and spend their time in the study of those principles by means of which the existence of the boom will become a relic of the dark ages of agriculture.

Over-Stocking Cows at Exhibitions.

Amongst the many vicious practices which we see creeping into our leading exhibitions may be mentioned the growing habit of permitting cows to remain unmilked for 24 to 36 hours before leading them into the ring to be judged. Under all circumstances, the objects are mercenary, and the agony inflicted upon the victims is often intense. It is one of the basest forms of cruelty to animals, predisposing the sufferers to many forms of disease, and condign punishment should be meted out to the owners. If the cow is for sale, the object is either to give her the appearance of being a good milker, or, if she has not recently calved, to make her appear to maintain her flow for a considerable length of time. If a prize or an award is the object, then the exhibitor hopes to influence those judges who are really sensible enough to think that the yield of milk has something to do with the merits of the animal. Some judges are somewhat squeamish about the contour of the udder, and the over-stocking iniquity is a sort of cheap bribe for them.

If this obnoxious practice is not speedily brought to a halt, it will give rise to deleterious consequences not yet dreamed of. Many of the most disastrous iniquities of our day have had smaller beginnings than this. Special methods of feeding, drenching and drugging have been discovered, which unnaturally and abnormally increase the milk secretion for such vile purposes, and in some instances the innocent sufferers have been known to remain for weeks under such treatment without milking, thereby causing serious and permanent injury to the udder.

Stock-Raising and Grain-Growing in Relation to Soil Fertility and Exhaustion.

NO. III.

Before entering the scientific phase of the question, the word *fertility*, so broadly used by the theorists, requires definition. When they assert that the manure made from the produce raised on the farm is capable of maintaining and even increasing the fertility of the soil, the exact meaning attached to this word is very relevant to an intelligent understanding of the question. A short time ago we asked one of the exponents of the new theory if he and his school did not mean *productiveness* instead of *fertility*. He replied that the words were exactly synonymous. This explanation may be quite satisfactory to the disciples of the new school, but it will not do for the intelligent public. We do not wish to wage war upon words, but will draw attention to two distinct conditions which may exist, one of which we call fertility and the other productiveness, and if we do not use the proper words, we desire to be corrected; any quibbling, however, on this point cannot alter the facts or conditions involved in the issue.

By fertility we mean the store of plant food in the soil, and as the soil contains many constituents of plant food, each must be considered separately. However, as those chiefly lacking are ammonia, phosphoric acid and potash, these constituents may be taken as illustrative of the whole. By applying these in about the same quantities as those removed by the crops, the fertility and productiveness of the soil may be maintained; but it must be distinctly understood that the *fertility* cannot be maintained without supplying those constituents removed by the crop, whereas the *productiveness* may be maintained, and the fertility at the same time reduced. By applying an excess of the requirements of the crops, the fertility will be increased. The productiveness may be increased at the expense of fertility. Now it is plain that fertility and productiveness can only be synonymous terms when the productiveness is caused by the application of those constituents removed by the crops.

Let us illustrate: Farmer A may maintain or increase the productiveness of his soil by the application of manures or fertilizers, while Farmer B may accomplish exactly the same results by other means, viz., drainage, summer-fallowing, thorough cultivation, a judicious rotation of crops, etc., and such applications as lime, plaster and salt, which may have little or no direct effect, so far as the direct requirements of the crops are concerned, but they aid in making the plant food already in the soil more available, thus *increasing* the productiveness, and *reducing* the fertility. The difference between these two methods is, that Farmer A and his successors maintain the productiveness of the land for ever, while Farmer B can only maintain it for a greater or less period of time, depending upon the natural resources of his soil. When B's farm comes to that stage in which its productive capacity, whether in this generation or in the next, is reduced below the profitable basis, then it may be laid down as a general rule that, in countries where land is moderately cheap, it will be wiser for him to leave the farm and purchase land in a newer section than to restore its fertility.

It is now in place to ascertain the respective influences which stock-raising and grain-growing

have, (1) upon the fertility of the soil, and (2) upon its productiveness. The main point in which we clash with the views entertained by the manure hobbyists is this, that we regard the loss of fertility as being based entirely upon the quantity of plant food sold off the farm, other conditions being equal, the form of the sales—beef, grain, or milk—having nothing whatever to do with the problem. On the other hand, the position of our opponents is this, that the state of fertility is based upon the quantity of stock kept on the farm; or, in other words, the quantity of manure supplied by the stock. One stockman, a leader in this new school of practical theory, holds that he doubled the fertility of his farm in eight years, using no foods or manures other than those made on the farm, from which we take the liberty of drawing the inference that purchased foods or fertilizers are not profitable investments on stock farms from a fertility standpoint. If they are profitable, the professors of the new school should have said so, instead of leaving farmers in the dark as to whether an exhausted farm could be brought up to its highest state of fertility by stock-raising in a sufficiently short period of time. We have it on the authority of another genius that stock-raisers are permitted to purchase foods, but not fertilizers, none but grain-growers requiring the latter. The professors should hold a conclave and settle these points.

Succinctly, then, their motto is this: More stock, more manure; more manure, more grass; more grass, more stock. While our motto is: More manure, more grass; more grass, more stock. In other words, they commenced their first book of lessons at the wrong end. In this proverb sense, manure simply means plant food, and their theory would be perfectly sound if this plant food came out of other people's land instead of their own. It is downright stupidity and absurdity to talk about increasing the store of plant food by drawing it out of one's own soil—especially when only one-fourth of the quantity is returned.

We stated that the exhaustion of fertility was based exclusively upon the quantity of plant food sold off the farm, the form of the sales having nothing to do with the question. However, the following questions are pertinent to the issue: In our ordinary system of husbandry, in what form—grain, beef, or milk—is the greatest quantity of plant food sold off? In an intensive system of husbandry, the soil being raised to its maximum capacity of fertility and productiveness, in what form would the greatest quantity of plant food then be sold? These questions require a scientific solution, and with the aid of a balance-sheet, we undertake to put the question to rest. The balance-sheet, when not manipulated as is done by the manure theorists, is the great settler of all agricultural problems.

If we can now show in which of the above forms the most plant food is sold off the farms, it can be decided, beyond any possibility of cavil, who is the greatest land robber, the stock-raiser, the dairyman, or the grain-grower. Of course, it is desirable, which some of the theorists will not deny, to sell off as much plant food as possible, provided always that the business is profitable and that due returns are made to the soil. This is not the point at issue; the trouble lies in the sufficiency of the returns, and the calculations which prove the quantity of plant food in the total sales can, by striking a difference, prove what remains—or settle the sufficiency of the returns.

(To be continued.)