AGRICULTURE

FERTILIZERS AND CULTURE IN THE ORCHARD---BETTER FRUIT.

Yields Often Greatly Influenced by Proper Fertilization — Color in Apples Dependent on Maturity and Sunlight and Average Size on the Number of Fruits on the Tree

Dr. J. P. Stewart, experimental pomologist of the Pennsylvania experiment station at State College, Pennsylvania, in a recent address discussed the use of fertilization and cultural methods in apple production. His deductions were based on six years' work in ten experiments located in the leading apple sections of Pennsylvania, and involving ten different soil types and 2,219 trees. The trees ranged from 10 to 40 years of age and have produced over 1,700,000 pounds of fruit since the work started. These experiments have shown:

1. That in some orchards the yield can be greatly influenced by proper fertilization, the most important elements of which have been nitrogen and phosphates. With all other conditions uniform the gains from such fertilization have run as high as 17 times the amounts of fruit produced on the adjacent checks or untreated plots, and net profits have been as great as $420 per acre on a single season. Under these conditions tillage and cover crops have not been the equivalent of fertilization. The gains from the former have averaged about 100 bushels per acre annually, while the latter without fertilization was giving 452 bushels.

2. In the absence of nitrogen, as a rule, applications of phosphates and potash have not been profitable. On some soils and in the presence of sufficient nitrogen, however, moderate amounts of these minerals are often profitable. Neither has had any material influence on color. On size, the influence of potash has been favorable.

3. Nitrogen has had greater influence in increasing yield than any other element. It also has materially decreased color. This is due primarily to delay in maturity and may be overcome by later picking, which is advantageous in Pennsylvania with such varieties as Baldwin. The delay in one locality in 1911 was three weeks.

4. Contrary to a prevalent notion, growth and fruiting are not antagonistic, unless either occurs in abnormal amount. The best growing plots, as a rule, have been the best fruiting plots.

5. Manure has usually proved profitable, doubtless because of its nitrogen content. In most cases where it has been beneficial, however, its net profits have been approached or surpassed by certain combinations of artificial fertilizers.

6. In a few orchards, however, no form of fertilization has yet produced a material response. This is considered to be due to the presence of other limiters, of which improper moisture supply is frequently important. The existence of such orchards emphasizes the need of local tests before making large and regular expenditures for fertilizers. Simple methods of making these tests and a good general formula for preliminary use were indicated.

7. In the long run any orchard that is actively producing and growing is likely to require fertilization, since the total plant food draft of such an orchard is quite heavy—more per acre for every constituent except phosphorus than is required by a 25-bushel crop of wheat.

8. Color in apples is essentially dependent on maturity and sunlight. Conditions increasing one or both of these factors such as late picking, light soils, open pruning and sod culture, increase color. Opposite conditions decrease it. Iron applications to the soil have not been shown to improve color.

9. The average size of apples is governed primarily by the number of fruits on the tree, after the number has passed a certain "critical point." This point is relatively high, the data showing that, even on trees up to 15 years of age, little or no correlation appeared until the number of fruits reached 1,400 or more per tree. Below this point, size can be markedly affected by moisture supply, cultural methods, manures and fertilizers—especially those rich in potash; and these factors may also co-operate in such a way as to materially raise the critical point.

THE DAIRY TRADE OF CANADA

Review of 1912 and Outlook for 1913—The Anomaly of Importing Butter and Exporting Cheese.

The year 1912 has developed some most remarkable features in the dairy business of Canada. For the first time in forty years, the exports of butter fell away to the small quantity of seventy packages, and during the year Canadians have imported a very large quantity, the total imports being in excess of 100,000 packages. Most of this imported butter came from New Zealand and the bulk of the imports were landed at Vancouver, but at other points there were importations of both New Zealand butter and butter manufactured in the United States. As a result of the necessity for these importations prices have been unusually high in Canada, and for about six months of the year Canadian farmers were obtaining prices that were equal to the cost of imported butter. This price was about 6 cents per pound in excess of the price that would have been available to them if we had been exporting instead of importing; but, in spite of this exceedingly high price of butter in Canada our production still falls short of the quantity necessary for home consumption. Importations from New Zealand are still going on, large quantities being brought into Canada from this country. From information we have relating to production, we believe that there has not been any smaller quantity of butter made in Canada this year than during the previous year. The increase in consumption is responsible for the changed conditions: that is, for the decline in our exports and the increase in our imports. We believe also that this increase in consumption will continue, and there is no evidence yet of any increase in production corresponding with the increase of our population. We are, therefore, strongly of the opinion that during the year 1913 Canada will import a much larger quantity of butter than during the year that is just passed.

The quantity of cheese produced in Canada during the past year has shown a falling off as compared with the production in this country during any year of the past fifteen. But the quantity manufactured still runs into large figures and our estimate is that there were 2,000,000 cheese manufactured in Canada during this year, of which 1,900,000 were exported or are in Canada awaiting export shipment. Prices were unusually high, the average of the season being the highest ever known since the introduction of the industry into this country; but in spite of these high prices there does not seem to be any sentiment in favor of an increase in production; and we do not believe that next year will see any greater quantity manufactured than during the past year.

Until recent years Canada was the only shipper of cheese in large quantities to Great Britain, but New Zealand is now making rapid strides in the manufacture of this article and during their season of 1911-1912 they shipped to Great Britain about 740,000 cheese. We are advised from that country that they are this year likely to have an increase of about 20 p. c. over the figures of last year. This large quantity of cheese from New Zealand almost monopolizes the British Market during the winter season, and Canadian cheese have, therefore, found a smaller outlet than formerly.

My belief is that the unnatural condition of exporting cheese and importing butter cannot continue, and that there must be a sufficient diversion of milk from cheese-making to butter-making to supply the Canadian demand for butter. This will mean a still further reduction of our export of cheese, but the change will probably come about slowly and I do not look for any great change during the coming year.

R. M. BALLANTYNE.

SOIL FERTILITY AND THE GROWING OF CROPS---KNOW YOUR OWN LAND

In the comparative leisure of the winter the farmer has an opportunity not only to plan the operations of the coming season but to consider whether or not his methods of farming are taking the fertility out of his soil. One should always bear in mind that hay and oats are not made out of nothing. Each ton of hay and each bushel of oats requires a certain amount of food material and the question of furnishing this food is just as important as the furnishing of food for animals.

When we know that one bushel of corn requires 1 1-2 pounds of nitrogen; one bushel of wheat 2 pounds of nitrogen; and one bushel of oats 1 pound of nitrogen, to produce the grain and stems or straw; and that one ton of timothy hay requires 20 pounds of nitrogen, we must realize that the amount of nitrogen that is taken from the soil of an average farm is no inconsiderable quantity. There is little wonder, therefore, that our richest soils become impoverished by constant cropping if no means are taken to return to the land that which has been taken out of it.

Without going into a discussion of the question of the maintenance of the fertility of the soil, we will state some important facts, and make a simple calculation.

"One ton of average fresh manure contains 10 pounds of nitrogen; one ton of clover hay 40 pounds of nitrogen. Two-thirds of the nitrogen is in the grain, and one-third in the stalks of corn or the straw of oats or wheat." These facts tell how much nitrogen can be returned to the soil in a ton of manure and by plowing under a ton of clover.

Supposing an acre of oats yields 50 bushels of grain, then 50 pounds of nitrogen will be taken from the soil. If the grain is sold the acre of land will be poorer in nitrogen by 50 pounds. To replace this amount will require five tons of fresh manure, or the plowing under of 1 1-4 tons of clover.

In the case of land in hay from year to year, supposing an acre produces 2 tons of timothy hay, the crop takes 40 pounds of nitrogen from that acre. To replace this loss would require 4 tons of fresh manure.

We trust our readers will ponder carefully over these simple facts, and ascertain for themselves if they are maintaining the fertility of the lands they are cropping.

COW TESTING MAKES PROFITABLE DAIRYING --- U. S. EXPERIMENTS.

Cow testing work represents one of the best and easiest ways of making dairying more profitable and desirable, says Hoard's Dairyman.

This is a conclusion reached by the Nebraska Experiment Station in bulletin 129, giving the results of one year's work of the Douglas County Cow Testing Association. Twenty-one herds, comprising some 435 cows, were entered. The ten most profitable cows gave during the year a product worth $1,032.88 more than the value of the feed consumed. The ten least profitable cows returned in all only $57.82 more than the value of their feed, and when the other items of expense are considered these cows caused their owners a decided loss.

The best cow in the lot gave $4.17 for every dollar's worth of feed consumed, while the poorest gave only 55 cents for each dollar's worth of feed.

The author of the bulletin truly says: "It seems hard to understand just why so many farmers have been slow to adopt a system of keeping records and testing the milk sufficiently often to enable them to discover and weed out of their herds the cow that generally consumes about as much feed as any cow in the herd but produces only enough butterfat to pay for a fraction of the feed consumed."

As the above sentence indicates, the bulletin under consideration—as others of a similar nature—is written from the butterfat standpoint. In view of the growing importance of the market milk business and the unrest among market milk producers, a notice of some facts in the bulletin from that viewpoint may be pertinent.

The bulletin gives a picture of a Holstein bull which heads a herd of pure bred Holstein cows that produced an average of 10,029 pounds of milk and 406.7 pounds of butter during the year of the test. If the butter was in amount one-sixth more than the butterfat, those cows averaged to produce milk containing close to 3.50 per cent. of fat. Three cows in the test exceeded 12,000 pounds of milk per year averaging 3.50 per cent. of fat. The poorest cow in the test produced 1797 pounds of 2.82 per cent. milk.

The production of the five best herds was 8,263 pounds of milk per cow. The production of the five poorest herds averaged 5,444 pounds of milk per cow per year. The product of the better herds was 50 per cent. more than the product of the poorer ones, while the difference in the expense of keeping them was trivial. If it costs $120 per year to keep a cow producing 4,000 quarts of milk, the cost per quart is three cents. If it costs $10 less to keep a cow producing 2,760 quarts, the cost per quart is four cents.