Spraying with a Gould Pump in the orchard of F. W. McConnell, Colborne, Ont.

sent them as far as Boston and Montreal with complete satisfaction.

It might be of interest to mention that last season was my best. Some idea of the heavy yield I obtained may be gained when it is stated that within a distance of about eight inches on a branch, enough berries could be picked to fill one's hand. Also one berry, the largest I ever grew, was four inches in circumference. I attribute this exceptional yield to the cool weather of the spring and the abundance of rain throughout the summer.

I cannot give the names of all the varieties with which I have experimented, as these number about sixty; but I can give the names of thirteen which I can confidently say will give good results under the conditions described.

These are: Soutar Johnny, Plunder Green, Hit or Miss, Stella Yellow, Postman White, Haunham's Industry Red, Careless White, Stockwell Green, Clayton Red, Lord Dudley Red, Lancashire Lad Red, High Sheriff Yellow, Golden Purse.

It would be hard to draw any comparison between these varieties, but I believe that Postman White, Haunham's Industry Red, and High Sheriff Yellow have given me the most satisfaction. As I would like to see more engaged in this branch of horticulture, I will give any further informtaion that I can to anyone who is interested.

Further Facts on Fertilizers*

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IN continuing the discussion on fertilizers, I have but one aim, namely, to give information to the tiller of the soil. Referring to Mr. Emslie's statement, "I still maintain that the theory of plant excretion, in its bearing on soil fertility, was long ago discredited," and also to Mr. Innes' statement that "the use of fertilizers is no longer baffling," let me give a few quotations. Bul. 77, "Soils," U.S. Dept. Ag., 1911, p. 3: "The action of fertilizers on soil is a much contested question, but the weight of evidence is against the assumption that their effect is due altogether to the increase of plant food." Also (referring to plant excretions), Bul. 87. 1912, p. 69: "The results of these investigations show clearly that the soil contains compounds beneficial to plant life as well as compounds injurious to proper plant development," and further, "The knowledge that harmful organic compounds exist in soils, plays so prominent a part in plant life, is of fundamental significance in soil fertility and gives a breadth of view to the subject, which, in its horizon, can not be compared with the restricted vision imposed by the purely mineral considerations." In Bul. 194, p. 108, U.S. Dept. Ag. (Lipman), is this statement: "Future research will teach how the bacterial flora is affected by crop rotation. We shall learn many an instructive lesson to turn to good account in crop production . There is for each soil a condition of highest bacterial efficiency."

Quoting from Mr. Innes: "Most certainly the value of a fertilizer which is primarily a source of plant food does not depend on its own biological characters." It certainly does depend upon its bacterial flora. What would a load of stable manure be worth if sterilized? Very little. And its value does not depend on its so-called "food." Mr. Innes does not seem to appreciate the fact that there is a number of species of bacteria (other than those on legumes) that extract nitrogen from the air, and increase the nitrate contents of the soil. The biological characters are of the utmost importance.

Also Rep. O.A.C. Exp. Union, 1911, p. 45 (Prof. Harcourt): "I would strongly advise using these (artificial fertilizers) in a small way at first so as to demonstrate whether they can be used with profit or not." In Farmer's Bul. 245, U.S. Dept. Ag, 1907, p. 16. "The fertilizer requirements of different soils and crops in different seasons are so little understood that we are not yet in a position to make positive recommendations that are of general application."

These quotations are from soil experts and show clearly that excretions of plants are highly important factors in soil fertility, and that the problem of fertilizers is by no means a settled one, as Mr. Innes seems to think.

Mr. Emslie raises the point that the Geneva test is an isolated case. In a sense it is, because there has been none to compare with it. Life is too short to obtain many such. There is none in America on orchards, aside from this, that is worth much. But I should prefer one experiment where all the conditions were guarded than one hundred of the average tests.

SOME TESTS

But let me give you a few results that are not isolated cases, taken from Bul. 67, U.S. Dept. Ag., 1910:

Oats—One thousand four hundred and eighty-three tests, for over forty years, twenty-five different States, twenty-three kinds of fertilizers, arranged singly, in combination of two and of three or more. Cost of fertilizer taken into account but not cost of applying: average loss per acre when fertilizers applied singly, two dollars forty-six cents; when in combination of two, loss one dollar sixty-five cents per acre; in combination of three or more, loss is six dollars fifty-four cents; organic fertilizer (tankage, etc.), loss five dollars fourteen cents per acre. Price of oats estimate at forty-seven cents per bushel.

Hay—One thousand two hundred and sixty-three tests, arranged as for oats, and at nine dollars a ton; fertilizers singly, loss per acre, one dollar ninety cents; in twos, loss one dollar forty cents; in threes, loss twenty dollars seventy-two cents; organic fertilizer (tankage, etc.), loss five dollars fifteen cents.

Alfalfa—Forty-two tests, price ten dollars a ton; average loss per acre for three or more, sixteen dollars forty-eight cents.

Rye—Fifty-four tests; one fertilizer.

(Concluded on page 92)

*This article was written for publication in the March issue, and, therefore, is not intended as a reply to the article on fertilizers that appeared in that issue.—Editor.