In British Columbia there is a large quantity of fish offal produced and there are also on the shores of that province large amounts of seaweed that could be collected. In these two substances we have those elements which would be necessary to increase the fertility of the bench soils I have just referred to. In the fish waste there are notable quantities of nitrogen and phosphoric acid, in forms which could be made readily available, while in the seaweed there is an excellent store of potash. By utilizing these materials which now go to waste in large amounts every year, representing thousands of dollars of plant food; by the intelligent application of these materials, I say, the light soils of British Columbia to which I have referred might be made to produce much more than they do now, especially when we consider the very favourable climatic conditions that prevail in that province.

By Mr. Carpenter:

Q. Is there a sufficient quantity of fish waste available?—A. I am informed that there are hundreds of tons of fish offal from the canneries that is more or less wasted every year. The same is more or less true of the Maritime provinces. On both the east and west coasts of Canada there is room for economy in this matter.

British Columbia, like Ontario and the Eastern provinces, also contains certain soils known as muck soils. These are rich in humus and nitrogen, but need thorough drainage and an application of lime or wood ashes to make them productive for farm crops generally. We are now conducting a series of experiments towards the improvement of these soils. Eventually they will prove very valuable.

DETERMINATION OF AVAILABLE PLANT FOOD IN SOILS.

With reference to the question put by Mr. McMillan a moment ago, I may say that until lately, soil analysis consisted in a determination of the total quantities of the constituents of plant food present. In other words, we ascertained the quantity of nitrogen, potash and phosphoric acid, which were dissolved by a hot strong hydrochloric acid from the soil. Through the recent investigations, however, of an eminent English chemist, Dr. Bernard Dyer, and the results he has obtained, we now have a method whereby we can ascertain, approximately, the amounts of plant food more or less immediately available for crop use. Dr. Dyer found that the sap exudations of plants had a solvent effect on the plant food in the soil, and that this effect might be stated in terms of citric acid. He expressed this by saying that the sap had an acidity which was equal to that of a one per cent solution of citric acid. This was the result of very extensive research. Dr. Dyer examined over 100 plants in more than 20 different orders, and his conclusion was that a one per cent solution of citric acid would represent the solvent action of the sap exudations on the mineral constituents of the soil. He, therefore, said, if this be so, we treat our soils with a solution of one per cent of citric acid and from that solution obtain the potash, nitrogen and phosphoric acid dissolved out of the soil, we shall have determined the amounts that are more or less immediately available for plant use.

This work I have begun in connection with my other analyses of soil, and in the report now in press will be found the results of the treatment of certain soils by this method. I intend as far as possible in the future to use this method in conjunction with the other methods of chemical analyses, which, hitherto, have only ascertained the total amounts of plant food. One interesting result in this connection I might briefly draw your attention to. It relates to some data that we have obtained that show the "total" compared with the "available" plant food in soils at different depths. These data result from the examination of a soil, of which samples were taken at successive depths of 6 inches. A soil was sent from British Columbia by the Provincial Department of Agriculture, consisting of three samples, the first represented the upper 6 inches of soil, the second a depth between 12 inches and 18, and the third a depth between 18 and 24 inches. We found that the "total" potash varied from 22 to 25 in the three soils. In other words, the "total" potash was fairly uniform in amount throughout the soil to a depth of 24 inches, but on making a determination of the available potash,