

Agriculture and Colonization.

sufficient quantities for plant requirements. The benefit from salt seems to lie in that it sets free potash which is one of the essential constituents of plant food, and in this way acts indirectly as a fertilizer. It has also some beneficial effects on the mechanical conditions of soils.

NATURALLY-OCCURRING FERTILIZERS.

Our work on the naturally-occurring fertilizers of Canada has been continued during the past year. These include the accumulations or deposits found in the various parts of Canada, and comprise swamp muck, peat, marl, gypsum, marsh, river and tidal muds. The samples received have all been examined and in the report now in press their composition and value is stated. I have on former occasions discussed at length the value and the best methods of using these fertilizers which are designated as naturally-occurring fertilizers, so perhaps it will be unnecessary to-day to re-traverse the ground. One or two new substances closely related, however, have been examined, to which I might briefly call attention.

Bracken Fern.—The first that I might mention is the bracken fern. In many parts of Canada, and especially in British Columbia, large tracts of land are covered with an enormous growth of bracken fern. The question has naturally arisen as to the amount of plant food which these ferns take from the soil, what value they have as fertilizers when ploughed under; and thirdly, what value when used as a litter. We have found for this latter purpose they can be used to advantage. The air-dried bracken fern has a considerable absorptive capacity for liquids. A sample of the air-dried bracken fern from British Columbia was analysed and showed that it contained mineral matter or ash to the amount of 135.6 pounds per ton. Of this 136 pounds, 30 $\frac{1}{2}$ pounds consists of potash and about 8 $\frac{1}{2}$ of phosphoric acid. Of nitrogen contained in the humus of vegetable matter of the fern, there were nearly 26 pounds.

You will notice that it is somewhat exhaustive in its character. It contains a large amount of plant food, in other words, and therefore should not be allowed to grow wild. Its growth must impoverish the soil. Where it is found, it certainly will be advantageous to cut it and dry it and use it wherever there is liquid manure to absorb. When the manure which has been absorbed in it has rotted the fern litter, the plant food which the latter contains throughout its tissue is set free, and this, as I have already shown, is present in somewhat notable quantities.

Moss Litter.—In connection with that matter of absorbents, I wish to mention that we have during the past year instituted a research into the absorptive capacities and the composition of moss litter. Undoubtedly you are aware that in the older countries moss turf has been used for many years in stables. In fact, throughout Europe, I think it has been recognized as possessing a high value for absorbing liquid manure as well as for absorbing the gases which are liberated in stables. In fact, there is quite a large business carried on in the manufacture of this material in Sweden and Holland, and in other European countries. The manufacture of moss litter is extremely simple. The bogs which are covered with the moss which forms the litter are denuded of the material which lies on the surface, and the moss allowed to dry in the atmosphere under the influence of the sun and wind. It is then teazed by a machine provided for the purpose consisting of a revolving cylinder with a tooth roller. The teazed and dry material is then baled under pressure just the same as hay is baled. I shall not go into particulars further than to say that the samples which were examined were sent at the instance of Mr. Wilmot, a member of the House of Commons, and were obtained from bogs in several districts in New Brunswick. Our analysis of the material showed that the moss litter contained from one-half to three-quarters of 1 per cent of nitrogen. That was the principal element of fertility that it contained. With respect to the absorptive capacity,—and of course the value of any sample is directly dependent upon its absorptive capacity,—we found that it varied all the way from 900 to 1,800, that is to say, that 100 pounds of the moss litter could absorb from 900 to 1,800 pounds of water or liquid manure. The samples examined showed considerable variation in absorptive capacity. As a litter it has been found useful, as I have already mentioned, not only in keeping the stables dry, but also free from odour.