## THE ROYAL SOCIETY OF CANADA

6

considered as the outcome and natural sequence of this Canadian work. Copies of this paper and the larger number of the reports and bulletins of the Experimental Farms, which give fuller details of the work, are still available for those interested in the subject.

## Value of Science in Agriculture

It may serve to emphasize our contention that practical agriculture is influenced for good by scientific research and, further, bring home to us the benefit that is accruing therefrom if we recite one or two concrete examples of the applications of scientific discovery to the practice of farming.

One of the most interesting and basic in its influence is the appropriation of nitrogen by the leguminosae. The ancients were aware that clover in some way enriched the soil, for we find it recorded in Roman literature that a crop, say of a cereal, produced a larger yield when following clover than when following a nonleguminous crop, say of grain. This fact practically lay dormant for ages: it received no application in general farming; its significance for centuries was not realized. Probably one reason for this neglect or oversight was the difficulty frequently met with on certain classes of soils in getting a "catch" of clover, and we may here remark that following the discovery of why the legumes were soil-enrichers came the knowledge of those conditions favourable for their growth.

Chemistry was the first of the sciences to be applied to explain farming operations and to furnish the explanation of how plants and animals assimilate their food and to make clear the original sources of this food. During the nineteenth century, say from the time of Liebig, who may justly be styled the father of agricultural chemistry, chemists in England, in Germany and in France were very busy in analysing soils, crops and animals and thus as analytical methods were evolved and multiplied there accumulated a vast number of data from which theories were evolved to explain the part taken by the soil, by water and the atmosphere in plant nutrition. The larger . number of the earlier theories have passed away, having been shown by subsequent work that their premises were faulty, or from the fact that the data from which they were drawn were inaccurate. With the improvement of analytical methods the data became more and more accurate.

The analyses of plants revealed the chemical elements of which they were composed; of these elements nitrogen was one. Analysis further showed, in connection with the problem we are discussing, that not only were the legumes richer in nitrogen, weight for weight