CONTRIBUTIONS OF ROTHAMSTED TO SOIL CHEMISTRY

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It seems inadvisable to treat this subject too narrowly; therefore, reference will be made not only to contributions which have dealt with soil chemistry in a strict sense, but also to activities which are quite as much plant physiological or agronomic. Moreover, it is necessary to consider the work in the light of the knowledge of the time. As is well known, many phases of soil science and plant nutrition are approached today very differently and are looked upon in a light quite different from that which prevailed a few decades ago. Despite this fact, we are certainly not justified in thinking of the early work at Rothamsted as being outmoded. No more so than are we justified in so considering the work of other scientists of previous years, such, for example, as Hilgard. The early researches at Rothamsted, as well as those of Hilgard, were not only good for their time, but much of them will endure permanently. In all probability, the work of earlier soil scientists appears no more out of date today than will the researches of the most advanced thinkers of the present time appear to the scientist of the future. Scientific truth is never fully attained; it is ever being sought but never fully realized; the search is an eternal quest.

One of the most far-reaching contributions of Sir John Laws was his development of a simple method for converting natural phosphate rock into superphosphate. This discovery, although actually made a few years before the Rothamsted Experimental Station was founded, is so linked with Rothamsted as properly to be regarded as one of the heritages we have derived from Rothamsted. The use of superphosphate has made successful crop production possible over large areas in many different countries where crop failure would otherwise have resulted. The agricultural value of superphosphate can scarcely be over-emphasized. This, of course, is too well known to require discussion.

The demonstration at Rothamsted that crop yields can be maintained at a high level by the application of artificial chemical fertilizer has had wide and important consequences. Contrary to the views prevailing at the time, the Rothamsted plot experiments have clearly shown that high yields of grain can be maintained by the application of purely chemical fertilizers, and that, too, without the use of any sort of later, the idea was widely held that organic manures was not primarily for plant nutrients. To be sure, the best evidence at the present time strongly indicates that organic fertilizers produce important effects other than by supplying nutrient elements. Nevertheless, large controlled culture experiments have also demonstrated that organic substances are essential constituents of the soil. The Rothamsted experiments have contributed largely to the ever-increasing use of chemical fertilizers throughout many parts of the world, and without chemical fertilizers crop yields almost certainly be seriously limited.

Another important contribution which was the demonstration that nonlegumes require combined forms of nitrogen and phosphorus. When these experiments were begun the theory of mineral nutrition had thoroughly saturated the thinking of Europe. The idea was that legumes and nonlegumes, secure their nitrogen from the atmosphere. In fact, one of the most important of the Rothamsted plot experiments was the demonstration that nonlegumes require combined forms of nitrogen and phosphorus. Nevertheless, large controlled culture experiments have abundantly demonstrated that organic substances as such are by no means essential constituents of the soil.

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