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SIR E. JOHN RUSSELL.

Agricultural Scientist.

(BY PROFESSOR R. D. WATT.)

Australia is fortunate indeed in having as one of its distinguished visitors in 1928 Sir E. John Russell, D.Sc., F.R.S., director of the renowned Rothamsted experiment station, Hertfordshide, England, who is to lecture in the capital cities of the Commonwealth under the auspices of the University Extension Board.

Rothamsted is the oldest and most famous agricultural research station in existence, and may be described as the Mecca of the agricultural scientists of the world. It was founded by Mr. (afterwards Sir) John Lawes and started active operations in 1843, when Lawes was joined by Joseph Henry Gilbert as chemist. In that year the famous field experiments were started which have been continued practically without intrruption to the present day. In one of the experimental fields wheat has been grown continuously on the same land for 85 years, on plots which have received various manurial treatments and no treatment at all. The practice of continuous wheat growing is, of course, not recommended, but the interesting facts remain that the unmanured plot has given an average yield of nearly 12 bushels per acre, and some of the liberally manured plots have averaged over 34 bushels per acre over the whole period.

FUNDAMENTAL AGRICULTURAL PRINCIPLES

From the beginning of the institution field work has been closely co-related with laboratory work, and the combined researches of Lawes and Gilbert, who were intimately associated in an unique partnership for 57 years, have been the greatest factors in elucidating the fundamental principles on which the practice of agriculture is based. It is indeed impossible to exaggerate the important part that Rothamsted has played in advancing agricultural science and agricultural practice in all progressive countries, and in postponing the evil day when the world's food supply will be insufficient to supply the demands of an ever-increasing population. As a single example, the invention of superphosphate by Lawes has put the whole world under a debt of gratitude, and not least of all Australia, where this fertiliser has enormously increased the yield of wheat and other crops.

After the almost simultaneous deaths of Lawes and Gilbert, the station was handed over to a trust, Sir John Lawes leaving the experimental fields and laboratories, together with £100,000, to ensure the continuity of the experimental work. The first director under the trust was Sir Daniel Hall, who is known to every agricultural student throughout the English-speaking world for his interesting and inspiring text-books. In 1912 he resigned to become the first chief of the Development Commission, to which were entrusted large sums of money for the promotion of agricultural research and kindred objects. He was succeeded by the subject of this sketch, Sir John Russell, who has proved in every way worthy to follow in the footsteps of such distinguished predecessors. Indeed, it is not too much to say that the volume and the diversity of the research work at Rothamsted in field and laboratory have increased at a much more rapid rate since he became director than during any similar period in its history.

SCHOOL AND UNIVERSITY TRAINING.

Edward John Russell was born at Frampton in 1872, and received his education at Aberystwyth College and Victoria University, Manchester, where his major subject was chemistry. Soon after graduation he was appointed a lecturer in this subject in his alma mater. He always had leanings towards agricultural chemistry, and when the opportunity came his way he accepted the position of head of the chemical department of the South-eastern Agricultural College at Wye, Kent. Naturally a great deal of his time was taken up with teaching and administrative duties, although he found and utilised opportunities to conduct original research, for which he had a strong liking and great capacity. By a grant from the Goldsmiths' Society it was made possible to employ a scientist for research in agricultural chemistry at Rothamsted, and Russell accepted the position, afterwards (as previously stated) succeeding Sir Daniel Hall in the directorship of the station. During the war Sir John Russell did invaluable work in various ways in stimulating increased production from the land in Britain, which, though less spectacular, was almost as important as the work of military commanders in the field, and it was for this work more than any other that he received the honour of knighthood.

Dr. East of Harvard said some time ago that the most important subject that could engage the brains and energy of man was the study of the soil, and this subject Sir John Russell has made peculiarly his own. He was one of the first people in England to engage in systematic soil survey work, and he has done much to place this subject on a proper scientific basis. He devised a simple apparatus for measuring the rate of oxidation in soils, from which many interesting deductions can be made.

SECRETS OF SOIL.

But perhaps his most spectacular research has been in connection with finding a solution for the puzzling phenomena connected with the partial sterilisation of soils. To most people the soil is a dead inert mass. Investigations started in the eighties of last century revealed the fact that any ordinary soil is literally teeming with minute living organisms, the most important being the bacteria. There are very many different species present in the soil, and most of them are useful, and some of them absolutely indispensable to the farmer. Now it had been noted by various observers that if a soil is partially sterilised either by heat or volatile antiseptics greatly increased fertility resulted. This was at first difficult to understand, as we would naturally expect the killing off of useful bacteria to have a detrimental effect. Many theories were put forward to account for the phenomena, but the one postulated and investigated by Russell, and since generally accepted, is that the partial sterilisation kills off the protozoa, which are the natural enemies of the soil bacteria, and probably used them as food. The removal of their enemies allows the useful bacteria which survived the partial sterilisation to increase much more rapidly than before, and to perform their useful function of preparing food-material for the higher plants. This discovery has not yet found much application in extensive agriculture, although it affords a reasonable explanation for many puzzling phenomena, but it has led to results of immense commercial importance to the numerous growers of fruit and vegetable crops under glass, not only in Britain but in every part of the world where the system is practised.

These few instances must serve as illustrations of the fact that Sir John Russell is absolutely in the front rank of soil investigators throughout the world. It is not every research worker, however, who can express himself in clear and simple language which the layman can understand. This gift Sir John Russell possesses in a marked degree. He is not only the author of the most learned text-books on the soil for the research worker —"Soil Conditions and Plant Growth"—but he has written books specially for farmers and for school children. He is also an extremely interesting lecturer both to technical and general audiences. In 1924 he was selected to deliver the Hitchcock lectures at the University of California, which form the subject matter of his book on "Plant Nutrition and Crop Production." The public of Sydney and the other cities where Sir John Russell is to lecture are fortunate in having the opportunity of hearing at first hand from this distinguished man the fascinating story of his own researches and others conducted at the historic Rothamsted Experiment Station.