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The Universities and Colonial Scientific Services.¹

THE unfortunate shortage of trained men at the end of the war, at a time when many of the Colonies were especially anxious for expert help in reorganisation and further development, led to various suggestions for the increase in the supply. Lord Milner, as Colonial Secretary, accordingly appointed a Committee in 1920 to investigate how the universities could best help in training men for the scientific services abroad and in securing the research necessary for the protection of the inhabitants of the Colonies against disease and for the development of their veterinary, agricultural, and mineral resources. The Committee consisted of Lord Chalmers as chairman, Sir Henry Birchenough, Sir John Rose Bradford, Sir Walter M. Fletcher, Prof. E. B. Poulton, Sir David Prain, Sir H. J. Read, Sir Stewart Stockman, and Sir Aubrey Strahan. The Committee has now issued its Report. It concludes that the universities can help mainly in two ways—in the fuller training of students and in the building up of a corps of advanced workers who would be available for the solution of especially complex problems.

The Committee's conclusion that the universities must impart to the students who desire to enter the Colonial services more than "book knowledge" will be universally approved, but the suggestion that some universities still give scientific courses without laboratory and practical instruction will be read with surprise. The Committee further insists that the men required must have "a training in the methods of research, and this involves post-graduate study." It concludes,

¹ Report of a Committee on Research in the Colonies. (Cmd. 1472.) 12 pp. 8vo. (His Majesty's Stationery Office, 1921.) 2d.

therefore, that the universities can assist most usefully and directly by encouraging post-graduate study, and for this purpose urges that an increase of research fellowships and studentships would be of primary importance.

The Report implies that appointments in the scientific departments of the Colonies should be restricted to men who have been through post-graduate courses, but this limitation would be attended by serious drawbacks, especially in tropical colonies. The men would begin their service later and would retire when older or with a smaller pension, and the men who have taken the extra years of post-graduate work would be lower in seniority than those who had joined the service at the end of the ordinary university course. The better-trained men would thereby be debarred, as a rule, from securing the head appointments, with probably much consequent jealousy and friction. The attempt to correct this evil by dividing the staff of a small department into two grades and restricting the upper grade to men who have had post-graduate training would lead to even greater difficulties.

The Committee's conclusion implies that the courses for university degrees do not include training in the methods of research, although that training is the essential of university education. Research training should be improved, not by lengthening the time at the university, but by earlier specialisation in the case of students requiring a professional scientific qualification. The universities provide for two sets of students, whose requirements are different. They have to teach the pedagogic methods and general principles, by knowledge of which teachers may widen the mental outlook of their pupils and inculcate habits of scientific thought. They must also teach students who intend to adopt science as a profession, other than in secondary education and medicine, how to use the methods by which the various sciences have achieved their present position and may be further advanced. Now that a four years' course for the honours B.Sc. is becoming the rule, the university science courses should provide training in the methods of research for at least two of the four years for students who require it; and men so trained should be able to give useful service in the ordinary research work required in most colonial departments. The desired increase in the output of men trained for research would be even better secured by encouraging the universities to provide further teaching in research methods in the course for the B.Sc. without adopting the principle that such training "involves post-graduate study."

The second problem which the Report considers is the provision of experts to solve the specially intricate problems that would be met with from time to time. The university staffs might be expected to help in such

work, men being seconded for service as required. The Committee, however, expects such problems to be so numerous that the universities could give adequate help only if their scientific staffs were greatly enlarged. To secure this increase the Report adopts Lord Milner's suggestion that research departments should be established at those universities to which the subject would appeal by local interests or environment. Lord Milner has promised that if the universities would endeavour to collect funds from local industries for such departments, the Colonial Office would support the appeals by testifying that the establishment of new chairs and the enlargement of the professorial staffs in the departments of science throughout the universities would be a great and permanent service to the Empire.

Sir Walter Fletcher, in a reservation appended to the Report, regrets that its proposals regarding appeals for such endowments are so indefinite. He remarks that it leaves untouched the practical questions as to "Who will make the appeal? What appeal? By what mechanism or in what modes? And on what occasions?" He says that no steady cultivation of university resources for the ends proposed can be effected without a general scientific staff, and recommends a special advisory committee in each of the departments of science concerned. Sir Herbert Read replies to this criticism, in a covering letter annexed to the Report, that the Colonial Office has already the help of adequate advisory committees, and that in some subjects there are, indeed, too many. Thus, dealing with tropical medicine there are the Tropical Diseases Bureau, the Tropical Diseases Research Fund Committee, the Advising Medical and Sanitary Committee for Tropical Africa, and the Schools of Tropical Medicine in London and Liverpool. Sir Herbert Read remarks that in this case the machinery should be simplified and not enlarged; but, despite this experience, the establishment of scattered research institutes is the system which the Committee recommends. Laboratories for special researches attached to university departments are subject to the risk of lack of continuity between the work of one professor and that of his successor. This drawback may be reduced by the establishment and endowment of research chairs to superintend such laboratories; but, even if the funds could be obtained, such chairs might soon outlive their usefulness owing to changed industrial conditions.

The establishment of these independent research institutes might prove an extravagant method of conducting much of the ordinary research necessary for colonial development. A central institution, which could call on the university staffs to help with special problems, might be a far more economical method

of organising this work. There is already such an institution—the Imperial Institute. The Report does not mention it, though reference is made to its work, for a letter by Lord Milner which is printed with the Report, illustrates the great economic value of scientific investigation by the discovery of the Udi coalfields in Nigeria, which was due to a survey organised by the Imperial Institute under a man whom it enlisted. The Imperial Institute is under the management of the Colonial Office, and its extensive laboratories, staff, and resources should be available for the investigation of problems connected with economic biology, geology, and mineralogy, in any part of the Empire which has not adequate scientific departments of its own. As the Committee was appointed to consider the relations of the universities to research, the Imperial Institute may have seemed outside its province. Its scheme is, however, attended by the danger of overlap of the kind which, as Sir Herbert Read remarks, has already developed not only between different independent departments, but also between all the proposed research institutes and the Imperial Institute, which was founded expressly to investigate the economic resources of the British Empire overseas.

A Monograph on Wheat.

The Wheat Plant: A Monograph. By Prof. J. Percival. Pp. x+463. (London: Duckworth and Co., 1921.) 63s. net.

PROF. PERCIVAL'S monograph fills one of the many great gaps in English agricultural literature by providing, for the first time in our language, a comprehensive account of the wheat plant, the most important of the cereal crops. Some idea of the magnitude of the work involved in the production of this book is derived from a statement in the preface that it is based on the study of what is "probably the most representative collection in existence," since it "includes all the races of wheats, numbering nearly 2000 forms derived from almost all wheat-growing regions of the world," whilst a brief glance at any section of the book is sufficient to convince the reader, especially perhaps the reader familiar with the crop, that this study has been peculiarly exhaustive.

Part I is devoted to the results of investigations on the morphology, anatomy, development, and growth of the wheat plant. When the importance of the crop is taken into consideration the existing literature on these subjects is singularly scanty, and the detailed accounts, covering some 140 pages, will save trouble to many future investigators. Further information on the cytology of the chief races of wheat and on the