

SOIL FERTILITY AND CROP PRODUCTION

MEETING IN DUBLIN

A JOINT meeting of Commissions 2 (Soil Chemistry) and 4 (Soil Fertility and Plant Nutrition) of the International Society of Soil Science was held in Dublin during July 21-31, 1952, under the auspices of the Irish Department of Agriculture, with Prof. F. Steenbjerg (Royal Veterinary and Agricultural College, Copenhagen) as chairman. The meeting was the outcome of a resolution passed at the Fourth International Congress of Soil Science, held in Amsterdam in 1950, when it was agreed that a need existed for a meeting to discuss as fully and critically as possible present techniques for the evaluation of soil fertility in relation to improved crop production. This was taken as the basis for the Joint Commission meeting, and some 148 soil scientists attended, representing universities, agricultural colleges, research institutes and government departments in many countries. The Vatican, the United Nations Food and Agriculture Organization, the Organization for European Economic Co-operation and the Mutual Security Agency sent observers.

Indoor sessions were held in University College, Dublin, during July 21-26, and were followed by a tour to places of agricultural and scientific interest in the south and west of Ireland during July 27-31. More than a hundred delegates joined in this tour. At the end of the meeting tributes were paid by various speakers to the Irish Department of Agriculture, for the success which attended the various sessions was in no small measure due to the fine work which the Department had done on the organization side of the meeting.

An introductory paper on the evaluation of soil fertility was read by Dr. E. M. Crowther (deputy director, Rothamsted Experimental Station). In his paper, which summarized many important aspects of the investigations on soil fertility, Dr. Crowther pointed out that the approach to soil fertility problems requires integration of several lines of investigation generally undertaken by separate groups of specialists. He listed these as the study of chemical, physical and microbiological characteristics of soil and of the physiology and biochemistry of plants; the characterization of soil and climatic conditions; the examination and improvement of farming systems; and the production and application of increasing quantities of better and cheaper fertilizers and liming materials. Dr. Crowther also stressed, as a priority need, the proper grading of laboratory tests for nutrients by proper field experiments.

The detailed work of the meeting was then divided between three sections. Section *A* dealt with laboratory techniques for assessing the nutrient status and nutrient-supplying potential of soils. This Section was divided into six different sessions. Section *B* dealt with plant and field techniques used in, and applicable to, the evaluation of soil fertility and was divided into two sessions. Section *C*, which dealt with correlation and general inquiry, was divided into three sessions. In all, eleven sessions were held. Each session was opened by a major review paper and two supporting papers dealing with important aspects of the subject-matter of the session. These papers were available in printed form in Vol. 1 of the Transactions of the meeting, and, consequently, it

was possible to dispense to a very considerable extent with formal reading of papers and to devote the maximum amount of time to discussion. While in some instances discussion was along the lines of prepared papers, in the great majority of cases it was of a spontaneous nature. This procedure proved most successful, and the meeting was characterized by very lively and valuable debates. More than fifty additional papers and a summary of the discussions will be published shortly in Vol. 2 of the Transactions.

In Session 1, on organic matter and nitrogen, which was under the chairmanship of Prof. H. J. Page (lately principal of the Imperial College of Tropical Agriculture, Trinidad), the major review paper was given by Dr. H. H. Lees (University of Aberdeen), who paid particular attention to the importance of assessing the activity of carbon and nitrogen in soils in relation to fertility studies. In the supporting paper, Dr. G. Drouineau (Antibes Research Station) summarized researches on nitrogen in the south-east of France, and in another supporting paper Dr. J. Tinsley (University of Reading) reviewed the methods for estimating the organic matter status of soils. Many valuable contributions were made to the discussion, and it is obvious that there has been a considerable reawakening of interest in this sphere of study.

A considerable amount of work has been proceeding on methods aimed at assessing the phosphorus status of soils, but the fact that much still remains to be done in this field was made especially obvious during Session 2, which dealt with phosphates, and was presided over by Prof. J. A. Prescott (director of the Waite Agricultural Research Institute, Australia). The major review paper, on evaluating the phosphorus status of soils, was given by Dr. E. G. Williams (Macaulay Institute, Aberdeen), particular attention being paid during this paper to modern concepts of fixation processes. Dr. Williams stressed the need for an adequate programme of field experiments in evaluating the phosphorus status of soils. In a supporting paper Dr. L. A. Dean (Bureau of Plant Industry, Soils and Agricultural Engineering, United States Department of Agriculture, Beltsville) dealt with the use of radioactive phosphorus in evaluating soil fertility, and described in particular the usefulness of the 'A' value method as an index of the phosphorus fertility of soils. Other aspects of the use of phosphorus-32 in the study of soil phosphorus behaviour were dealt with by Dr. G. Barbier (Station Centrale d'Agronomie, Versailles), and a considerable amount of the discussion which followed centred around the use of this technique.

Session 3, with Prof. T. Wallace (director of the Long Ashton Research Station, Bristol) as chairman, was devoted to a consideration of various aspects of the potash status of soils. A review paper on the availability of native and fixed non-exchangeable soil potassium was read by Dr. R. F. Reitemeier (Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville), in which various extracting techniques were appraised and the role of non-exchangeable potassium discussed. The role of clay minerals in potash fixation was dealt with by Dr. S. Henin (director of research, Laboratoire des Sols, Versailles),

and Dr. F. Alten (Hanover) discussed some fundamental aspects of the potassium nutrition of plants.

The recurring problems associated with the determination of lime requirements in the soil were fully discussed in Session 4, under the chairmanship of Dr. P. Bruin (acting director-in-chief, Agricultural Experimental Station and Institute for Soil Research, Groningen). This subject was introduced by Prof. S. Tovborg Jensen (Royal Veterinary and Agricultural College, Copenhagen), who examined important aspects, both practical and theoretical, of the determination of the lime requirement of soils, illustrating his remarks with the results of classical Danish experiments in this sphere. In a paper on a biological approach to soil acidity, Dr. E. J. Hewitt (Long Ashton) indicated the various factors associated with the soil acidity complex, and Dr. G. E. Smith (University of Missouri), in presenting a paper by Drs. Albrecht and Smith on soil acidity as calcium (fertility) deficiency, gave the basis of an approach which is gradually gaining considerable strength where the proper liming of soils is concerned. Though the work of this session indicated that a number of questions of outstanding practical importance still remain to be resolved in this sphere, it was clear that many of the seemingly conflicting ideas on lime requirement problems can easily be reconciled in terms of soil-type characteristics and plant requirements.

Session 5 (chairman, Dr. Henin) was a lengthy one and was devoted to consideration of methods for determining the magnesium and minor-element status of soils. The major review paper was read by Mr. W. Morley Davies (Ministry of Agriculture and Fisheries, Great Britain), and Dr. F. C. Gerretsen (Groningen) and Dr. E. B. Davies (Soil Research Station, Rukuhia, New Zealand) contributed supporting papers. These papers showed that much still remains to be done in the field of analysis of trace elements in soils, but considerable progress was reported by many of the delegates present. In this connexion the New Zealand approach, as outlined by Dr. Davies, where work on trace elements has been closely related to soil type, provides a very fine example of what the proper integration of research in this field can accomplish.

With Dr. R. K. Schofield (Rothamsted Experimental Station) presiding, Session 6, which was on the subjects of base exchange, nutrient balance and interactions, was notable for the attention which it focused on the importance of ion activity in evaluating soil fertility. This matter was fully discussed in the review paper by Dr. A. C. Schuffelen (Wageningen), and a paper on various aspects of the release and absorption of nutrients was presented by Prof. Wiklander (Royal Agricultural College, Uppsala). Prof. M. M. Elgabaly (Alexandria), in a supporting paper, discussed various aspects of nutrient element balance, pointing out the distinction which must be made between nutrient balance effects as determined in culture solution and soils. From discussions which followed, it was apparent that, with the development of new analytical techniques and a more thorough understanding of physico-chemical reactions, considerable advances in this field may be expected.

Session 7, presided over by Dr. Crowther, dealt with field experiments and pot culture techniques. Dr. F. Van der Paauw (Groningen), in a major review paper, outlined the methods in use for evaluating the nutrient status of soils by field experiments. This theme was further elaborated by Dr. H. L. Richardson

(Central Agricultural Control, Imperial Chemical Industries, Ltd.), who illustrated his discussion by results from an elaborate series of field experiments directed by him in China. The resulting discussions were particularly valuable. Dr. J. W. S. Reith (Macaulay Institute) directed attention to the necessity for basing the evaluation of soil testing methods on further field experiments carried out on soils belonging to well-defined series. Pot culture techniques in evaluating soil fertility were dealt with by Prof. E. von Boguslawski (Germany), and a discussion on this subject attracted considerable attention.

In present-day work the diagnosis of soil fertility through plant diagnostic methods has come to play a very important part. This approach was fully discussed in Session 8 under the chairmanship of Prof. Steenbjerg. Prof. Wallace, who has been responsible for much of the work in this sphere, outlined in a major review paper the various methods used, and pointed out the necessity for a thorough understanding of soil characteristics for proper application of these methods. Dr. W. A. Roach (East Malling Research Station) discussed the various factors coming into play in the diagnosis of mineral deficiency by plant analysis and plant injection. The discussion which followed showed clearly the extent to which reliance is now being placed on this line of approach in many countries. In concluding this session, Prof. Steenbjerg directed attention to the importance of discriminating between extreme physiological disorders as determined in sand and water cultures and those mainly of a threshold nature which are observed under field conditions.

The extent to which soil test data can be used to evaluate soil fertility needs on a broad basis was discussed in Session 9, Prof. H. Kuron (Germany) being in the chair. The major review paper in this session was presented by Dr. W. L. Nelson (North Carolina State College), who dealt with soil test summaries and their usefulness to various workers engaged in the agricultural research and extension services. The supporting paper in this session was contributed by Dr. H. Riehm (Augustenberg, Germany), who discussed the value of the results of several million soil tests which had been carried out in Germany. Another aspect of survey work was discussed by Dr. L. de Leenheer (Ghent), who dealt with the determination of productivity ratings for different soil types. This is an aspect of the investigation of soil fertility which is attracting considerable attention and which must play an increasingly important part if soil survey is to be of increased value to agricultural technology.

Session 10 was devoted mainly to the consideration of methods used in soils advisory services in various European countries and presented the first systematic attempt to bring together an account of the techniques used. Dr. Nelson presided over this session, which was opened by a paper from Dr. K. A. Bondorff (Lyngby, Denmark) on the evaluation of soil analysis. Papers were presented describing the methods used in almost all European countries, and these, when finally published, should prove a valuable reference for workers in this field.

Session 11 was devoted to a discussion on general correlation, with Dr. P. H. Gallagher (University College, Dublin) as chairman. Dr. Bruin, in this session, outlined the development of soil fertility research in the Netherlands, being supported by a paper from Prof. Steenbjerg on general questions affecting the

verification of chemical soil and plant analyses. These papers paid particular attention to yield curves and to various factors influencing the shape of such curves. The final supporting paper in this session was given by Prof. Prescott, who stressed the necessity for basing the solution of soil fertility problems on a full understanding of climatic and geochemical factors. In this connexion it would seem that the total analysis of soils may be considerably more important, especially where trace elements are concerned, than they are generally acknowledged to be.

The meeting was brought to a close in a session presided over by Prof. Steenbjerg, when certain proposals concerning international collaboration in the sphere of soil fertility were considered.

During the meeting a short tour took place in the adjoining counties of Kildare and Meath, where delegates inspected field experimental work, typical County Meath pasture land and peat bogs used for electricity generation. The tour, following on the indoor sessions, was designed to include experimental work relevant to the subject-matter of the discussions during the meeting, together with experimental work on liming problems, soil type characteristics in relation to phosphate and potash utilization, and trace element relationships, especially in connexion with livestock nutritional problems. During the tour an opportunity was provided of seeing some of the major soil series on which the agriculture of the country is based. A visit to an area in County Limerick where selenium toxicity is an important factor in livestock nutrition was of special interest. Visits to the Albert Agricultural College, Glasnevin, and Johnstown Castle Agricultural College were included; at the latter a day was spent examining the field experiments and the laboratories where routine soil testing is carried out on a considerable scale. An opportunity was also provided of seeing land reclamation and drainage units of the Department of Agriculture in operation.

T. WALSH

THE BRITISH COUNCIL REPORT FOR THE YEAR 1951-52

THE eighteenth report* of the British Council, covering the year ended March 31, 1952, again records a reduction in grants from United Kingdom funds, which for 1951-52 stood at £2,750,000, one-third being for work in the British Commonwealth, as compared with one-fifth four years ago. Of the Commonwealth expenditure, £365,000 came from the Commonwealth Relations Office and £523,000 related to the Colonies; of that sum, £80,000 from the Colonial Development and Welfare Fund was towards the welfare of overseas students in the United Kingdom. One section of the report gives a clear account of this important work among overseas students, of whom there are now more than five thousand from Colonial territories, as many more from India, Pakistan and Ceylon, and almost an equal number from other countries. For all such students the Council provides a programme designed to help them in their leisure time to meet people in Britain, to study the country's ways of life and modes of thought, and to help them to understand what has

* Report on the Work of the British Council for the Year ended 31st March, 1952. Pp. 104. (London: British Council, 1952.)

made and makes the British the people that they are. The London centre at 3, Hanover Street has a membership of more than eighteen hundred students representing a hundred and four countries, with an average daily attendance of two hundred and three hundred and fifty at the week-ends. The London hostels managed by the Council now accommodate two hundred and twenty men and thirty-five women out of more than two thousand five hundred Colonial students in London. Temporary residents at the Hans Crescent residence totalled nearly nine hundred in 1951, and permanent accommodation was found during the year for 1,071 overseas students, including 900 from the Colonies; for students outside London, the figures were 1,604 and 771, respectively. Accommodation in private lodgings was found for 538 overseas students in London and for 1,084 outside London. Some 2,600 students were met on arrival, and 5,504 attended Council centres.

The grants for work relating to foreign countries were reduced by 16.4 per cent to £1,862,000, and a further 9.0 per cent reduction in the estimates for 1952-53 brings the total reduction in five years to 42 per cent, the devaluation of sterling and rising prices abroad making the effective reduction in terms of work considerably higher. The Colonial Office Vote represents a reduction of 16.4 per cent since 1947-48, and the Commonwealth Relations Office Vote a reduction of 12.6 per cent on the peak year 1950-51. Together the reductions for 1951-53 have involved a diminution of 26 per cent in established posts, making 43 per cent since 1946-47. Expenditure in Latin America has been reduced by 41 per cent by closing the Council's own offices and reducing supply services. Except in Yugoslavia and in Germany, work in Europe has been substantially reduced, with the closure of all French provincial services and of the institutes at Turin, Venice, Valencia and Bilbao. The work in Egypt has been substantially reduced, and offices closed in Melbourne and Canberra as well as the institute at Aden, and three offices and centres in the United Kingdom have been similarly cut down. All supply services have been drastically reduced, notably expenditure on publications, lectures, books, periodicals and scholarships; about one-third of this expenditure is concerned with the sciences, including medicine and agriculture.

Work in the Middle East during the year has on the whole been encouraging. Although most of the twenty thousand volumes in the library in Cairo were lost by fire during the January riots, new premises for the British Institute and the Council's offices have been found, and reference is made to the part which the Council is playing in technical assistance throughout the Middle East, notably by bringing young men from the Middle East to the United Kingdom under its bursaries scheme or by giving assistance to the governments of those countries in placing their own nominees for training. Technical visits to Britain are also arranged for senior officers and specialists for short periods of study; and the Council's advice and help have been sought in recruiting British technicians to supervise training.

The present report includes a section dealing with the libraries of the Council, which now contain nearly nine hundred thousand volumes and are claimed to be the most far-flung network in the world. The Council's libraries in foreign countries are essentially special libraries, in which a high place is given to works on the English language and its teaching and