

## Twenty-five Years of Botanical Progress

THE Brooklyn Botanic Garden had the felicitous idea of marking the twenty-fifth anniversary of its foundation in part by the presentation and subsequent publication of a series of addresses dealing with progress in this period of time in different fields of botanical science. The series of addresses appears in vol. 4 of the *Memoirs of the Garden* (May 7, 1936), and will interest botanical readers everywhere.

The addresses were commendably brief, with the result that the most significant aspects in each field are usually thrown into prominent relief. Thus, Prof. C. E. Allen, dealing with cytology, after a brief reference to cytoplasmic structures, centrosomes and cell-wall, has a very penetrating analysis of the chief features of interest in chromosome studies in the twenty-five year period.

This pairs very well with Dr. Blakeslee's equally interesting review of the progress of genetics. Dr. Blakeslee finds that he is provided with about 0.7 seconds in which to discuss the twenty-five years work of each single geneticist, which produces the surmise that the so-called 'leaders of science' are rather 'pushed' than leading. "It is not the conspicuous spray which erodes the coastline of our continent but masses of water which surge forward with united front". Dr. Blakeslee regards us as passing, in 1910, from the Mendelism and 3:1 ratio period to that of "Brass Tacks—Genes and Chromosomes". The significance of three techniques are emphasized in this latter period; the aceto-carmin

method which has enabled the rapid study of the nuclei of large numbers of specimens, the production of mutation by radiation treatment and the analysis of chromosomal structure permitted by the salivary glands of fly larvæ.

Dr. Blakeslee decides that the last twenty-five years have brought us again to the species problem, and appropriately enough a contribution follows by Dr. Elmer D. Merrill, director of the New York Botanical Garden, who deals most temperately and justly with the species problem as seen by the experienced taxonomist.

Many other points of view are discussed in this entertaining volume; virus diseases are passed in review, the progress of ecological investigation, of forest administration and research, etc. In short, it is made clear that in the last twenty-five years progress in botany has passed beyond the grasp of any one individual. Let us hope that the result will be to make us all as reasonable in our demands as specialists as Dr. Merrill, who concludes that it is neither necessary nor desirable that all botanists should master the field of systematic botany. "Yet it can be maintained as a general truth that the individual investigator, no matter what his field, who has a reasonable knowledge of the names and relationships of the organisms with which he deals, is a better equipped individual for productive work within his own field, and that the teacher of botany who has the same knowledge is a better teacher".

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## Geology in Great Britain

PART I of the "Summary of Progress of the Geological Survey of Great Britain" for 1933<sup>1</sup> contains the usual annual reports of the Geological Survey Board and of the director and gives particulars of routine work carried out during the year under review. As in the succeeding year, there was some slowing down of normal activities on account of the immense amount of additional work involved in preparation for the transfer of the collections to the new museum at South Kensington. Nevertheless, thirty-nine maps were issued, together with five memoirs, which, with one exception, have already been noticed in our columns (*NATURE*, 134, 782; 1934); the remaining one, the Merthyr Tydfil memoir<sup>7</sup>, is reviewed below.

The old Museum of Practical Geology in Jermyn Street closed its doors to the public at the end of 1933. Sir John Flett contributes an interesting outline of its history from its opening in the year of the Great Exhibition of 1851 (see also *NATURE*, 134, 129; 1934).

Part 2<sup>2</sup> contains a series of papers on subjects of special interest. M. Macgregor and J. Pringle discuss the Scottish Millstone Grit in relation to that of the Pennines. The freshwater fauna of the Lower Coal Measures of Lancashire is described and the range of variation of its constituents demonstrated by W. B. Wright. The corresponding fauna in West Yorkshire

is dealt with by D. A. Wray and A. E. Trueman. A valuable synopsis of Coal Measure plants and their stratigraphical distribution is provided by R. Crookall. The results of a study of the Carboniferous rocks of Innimore Bay, Morvern, on the Sound of Mull, are recorded by M. Macgregor and W. Manson. The fossils of certain pebbles in the Peel Sandstones of the Isle of Man are shown by H. P. Lewis to be of Salopian age. W. Manson describes the Carboniferous and Old Red Sandstone strata passed through by a boring for water (340 ft. deep) at Stonefold Farm, Berwickshire, with petrographical notes by J. Phemister. Sir John Flett continues his investigations of the teschenite-picrite sills of the Lothians with a study of a thomsonized inclusion from the Blackness sill.

Part 1 of the "Summary" for 1934<sup>3</sup>, in addition to the usual information, records the transfer of offices, library and collections from Jermyn Street to South Kensington. The opening of the new Museum in July 1935 was recorded, with an account of the centenary celebrations, in *NATURE* (136, 75; 1935). Despite the strenuous activity necessitated by the change-over, and the employment of the equivalent of about one third of the field staff in the preparation of exhibits, all the normal departments of the Survey's work were carried on without

serious interruption. Maps issued during 1934 number forty-one, and there were published two memoirs, both of which are reviewed below (Ardnamurchan model<sup>6</sup> and Fife Coalfields, Area II<sup>8</sup>). Certain features of the year's work deserve special notice. The colour-printed maps include twelve of the London area on the six-inch scale; fifteen further sheets of the same series were in the press by the end of the year. Among new maps in progress, mention may be made of a series of economic maps of England and Wales on the scale of 16 miles to the inch. Two of the sheets, devoted respectively to the coalfields (exposed and concealed) and iron ores have since appeared. These indicate that the series is likely to be of great educational value, and teachers, in particular, should not overlook this authoritative guide to mineral resources. The most important innovation of the year, however, was the preparation of a series of eighteen descriptive handbooks under the general title of "British Regional Geology". Eleven of the handbooks have now been published and a separate account dealing with them will appear shortly in these columns.

In Part 24, Prof. J. de Lapparent (Strasbourg) contributes a most important study of the Carboniferous bauxitic clays of Ayrshire. These deposits contain boehmite and diasporite and it is shown that the conditions of their formation involved the hydrolyzing action of a tropical climate followed by subsidence and burial. It is noted that bauxites which remained exposed during their formation contain gibbsite. W. Edwards describes the Pleistocene dreikanter of the Vale of York, and points out that conditions suitable for such wind-faceting were widespread in Britain and Europe towards the close of the Pleistocene. The strata encountered in a boring (810 ft.) in Northamptonshire are described by B. Smith, the special interest being the discovery of an old floor of presumably Pre-Cambrian quartz-felsite beneath the Keuper Marl. Another boring (980 ft.) at Bushey, Herts, reached Devonian rocks beneath the Gault. The strata are described by F. H. Edmunds; the Palaeozoic fossils by C. J. Stubblefield; and the underground water by F. K. Sinclair. One of the most widespread of the fossil-bands of the North-West Province of the Lower Carboniferous is that characterized by *Cyrtina septosa*. It has now been discovered in the Midland Province of Derbyshire and is the subject of a paper by F. W. Cope. Palaeontological contributions include a critical examination by K. P. Oakley of a Wenlock coral which has been referred to the Polyzoa by certain authors; a description of a Downtonian eurypterid from Lanarkshire by Dr. L. Stormer (Oslo); notes by C. J. Stubblefield on types and figured specimens acquired from the late S. S. Buckman by the Survey; and an account by W. B. Wright of the large species of *Carbonicola* which characterize the base of the Middle Coal Measures.

The "Guide to the Geological Model of Ardnamurchan"<sup>6</sup> refers to a model, originally constructed for exhibition in the Royal Scottish Museum, which displays the complicated solid geology of the worn-down and long extinct volcano of Ardnamurchan. The horizontal scale is four inches to a mile, but as the highest peak, Ben Hiant, reaches only 1,729 ft., heights have been slightly accentuated by adopting a vertical scale of six inches to a mile. The guide is very fully illustrated and forms a readable introduction to the remarkably interesting features of a Tertiary volcano which is justly famous for the

perfection of its ring-structures and the variety and significance of its petrological phenomena. A detailed memoir on the area was published in 1930 (see NATURE, 128, 619; 1931).

The volume descriptive of the underground water supplies of Herefordshire<sup>6</sup> is one of a growing series which now covers the London area and twenty-eight counties. The usefulness and practical value of these memoirs has been especially emphasized by the droughts of recent years. As Herefordshire is a county that depends to a very considerable extent on underground resources for its potable water—whether as feeders of bores, wells and springs, or as contributors to the flow of rivers during dry periods—this latest issue should prove especially welcome. The main rivers are also discussed as sources of supply, and a selection of chemical analyses of the river- and well-waters suffices to show the principal types of water available.

The first edition of the memoir dealing with the Merthyr Tydfil district of the South Wales Coalfield was published in 1904 and has been out of print for many years. The progress of mining and geological research has made necessary a considerable amount of revision in the new edition<sup>7</sup>, particularly as regards the zoning of the Carboniferous rocks and the underground structure and correlation of the coal seams. The district includes a large part of the magnificent mountain range of the Fforest Fawr, the highest peaks of which, the Brecknock Beacons, lie just north of the area described. Bare cliffs and numerous river channels clearly display the higher strata of the Old Red Sandstone, together with the Carboniferous Limestone and Millstone Grit formations. The southern part of the region is in Coal Measures and includes the industrial centres of Merthyr, Aberdare and the upper part of the Swansea valley. Special chapters are devoted to economic minerals and to palaeobotany.

The second of the series of memoirs describing the economic geology of the Fife coalfields<sup>8</sup> deals with the central part of the county, comprising an area of about a hundred square miles, mainly occupied by strata of Lower Carboniferous age. The structure is complicated by numerous faults and intrusions of igneous rock, while the sequence in the southern part includes considerable thicknesses of lavas and ashes. The main structural feature is the Burntisland anticline, which separates the Cowdenbeath and Lochgelly coalfields on the west from the Kirkaldy coalfield on the east. More than 1,400 bore and shaft records have been collected to elucidate the relations of the formations. Much of the memoir is devoted to the coal-bearing strata of the Limestone Coal Group and the Productive Coal Measures.

The memoir describing the geology of the Orkneys will be generally welcomed because the official survey has only recently been completed and is of special interest on account of the wealth of new information regarding the Old Red Sandstone now made available. The first four chapters deal with the history of geological research, the topography and scenery, and the general geology of the islands which make up the group. The intermediate chapters provide more detailed accounts of the individual districts and islands, while the last three chapters are respectively concerned with fossil fishes, fossil plants and petrography. With the exception of a small area in the neighbourhood of Stromness, where an ancient granite-schist complex occurs, most of the islands are mainly built of flagstones and sandstones belonging

to the Middle division of the Old Red Sandstone. These beds were folded and heavily eroded before the deposition of those of the Upper division. The latter are restricted to Hoy and include ashy sediments and olivine-basalt. Five volcanic vents have also been detected in Hoy. The structure of the island-group is comparatively simple, consisting essentially of a central series of synclines passing over on the west into the broad and gentle West Mainland anticline and on the east into a series of minor anticlines. Faulting follows three directions, two of which are represented by the shores of Scapa Flow, where three important faults all throw down towards the sea. Numerous dykes of bostonite, camptonite and monchiquite traverse the Old Red Sandstone, but their age, as elsewhere in Scotland where similar dykes occur, is still undetermined. The memoir is provided with a bibliography, a glossary of Orkney place-names, and an excellent geological map in colour on the scale of 4 miles to one inch.

<sup>1</sup> "Summary of Progress of the Geological Survey of Great Britain and the Museum of Practical Geology for the Year 1933". Part 1. Pp. viii+93. 1s. 6d. net.

<sup>2</sup> *ibid.*, Part 2. Pp. viii+108+8 plates. 3s. net.

<sup>3</sup> *ibid.*, for the year 1934. Part 1. Pp. viii+85. 1s. 6d. net.

<sup>4</sup> *ibid.*, Part 2. Pp. viii+65+4 plates. 1s. 6d. net.

<sup>5</sup> Guide to the Geological Model of Ardnamurchan. By J. E. Richey. Pp. 49+9 plates. 1s. net.

<sup>6</sup> Wells and Springs of Herefordshire. By L. Richardson. Pp. viii+136+2 plates. 3s. net.

<sup>7</sup> The Geology of the South Wales Coalfield. Part V. Merthyr Tydfil. By A. Strahan, W. Gibson and T. C. Cantrell. Second edition. By T. Robertson; with a Palaeobotanical Chapter by R. Crookall. Pp. xix+283+6 plates. 5s. 6d. net.

<sup>8</sup> Economic Geology of the Fife Coalfields. Area II. (Cowdenbeath and Central Fife). By J. K. Allan and J. Knox. Pp. xi+207+2 plates. 4s. net.

<sup>9</sup> The Geology of the Orkneys. By G. V. Wilson and W. Edwards, R. C. B. Jones, J. Knox and J. V. Stephens; with Chapters on Fossil Fishes by D. M. S. Watson; Fossil Plants by W. H. Lang; and Petrography by J. S. Flett. Pp. xii+205+8 plates+a Geological Map (4 miles to 1 inch) in folder. 5s. net. (London: H.M. Stationery Office.)

## Educational Topics and Events

THE following scholarships for 1936 have recently been awarded by the Institution of Electrical Engineers: *Ferranti Scholarship* to W. E. Harper (University of Birmingham); *Duddell Scholarship* to P. Hargreaves (Lower School of John Lyon, Harrow); *Silvanus Thompson Scholarship* to L. S. Anand (North-Western Railway, India); *Swan Memorial Scholarship* to D. H. Thomas (Metropolitan-Vickers Electrical Co.); *David Hughes Scholarship* to W. H. Penley (University of Liverpool); *Salomons Scholarship* to E. F. O. Masters (City and Guilds College); *Thorrowgood Scholarship* to L. G. Leaton (Southern Railway Co.).

ARMSTRONG COLLEGE, Newcastle-upon-Tyne, has a Standing Committee for Research which distributed in 1934-35 grants amounting to £891. Its annual report, recently published, includes a series of informative notes by the recipients of these grants, which were in most cases for purchase of apparatus or material. The lion's share (23 out of 25) went to research in the natural sciences. One, made in connexion with a visit to the Massachusetts Institute of Technology for spectroscopic work, contributed to the establishment of valuable personal contacts with scientific workers in the United States. The visit included attendance at a conference on spectroscopy, an account of which was read before the British Association. Another grant was used largely in the purchase of Irish parliamentary reports for a study

of "British Imperial Policy in the Twentieth Century", which provokes the question: is it not 'up to' Governments, seeing that they stand to benefit from the products of competent disinterested research in the social sciences, to encourage it to the extent, at least, of placing such material gratuitously at the disposal of an investigator of the standing of a university professor of history.

THE Department of Business Administration at the London School of Economics, established a few years ago on the initiative of a group of business men for university men who were resolved on a business career, has had another successful year. An Advisory Council has recently been established to assist in maintaining the closest possible touch between training and current practice. The chairman of the Council is Major-General Guy P. Dawnay, and its membership includes Sir Harold Bellman, Sir Kenneth Lee, Sir Felix Pole, Sir Frank Spickernell and others who are prominent in different fields of finance, industry and trade and who are united in the determination to develop the Department as a centre of business training for graduates of British universities. Interest in the post-graduate course of business training extends beyond those industries represented on the Council, and an American business man has recently given £200 for a studentship for 1936-37 in the fields of investment or finance. The Leverhulme studentship of £200 is also open to competition. Some business firms have from time to time used the Department as a kind of staff college, and others have offered appointments to graduates subject to their first attending satisfactorily the Department's course. Great care is taken to admit to the course only those likely to make good in a business career. There is now apparent a demand among managers themselves for lectures on current problems, and in the winter months of 1936-37 a series of twelve such public lectures will be delivered by six members of the academic staff on matters of administrative organization, business finance, industrial production, distribution developments, marketing and public relations, statistical and accounting service.

A STUDY of education in Czechoslovakia was undertaken by the United States Office of Education two years ago. A report prepared by a specialist in comparative education, S. K. Turossi, on the basis of visits paid to a great number of types of schools as well as interviews with school authorities and examination of official documents, has been published as Bulletin No. 11 of 1935 (Washington: Government Printing Office, 25 cents). The establishment of a national system of public education was one of the first tasks confronting President Masaryk after the new Republic of Czechoslovakia was constituted in November 1918. The report indicates that the system is working well and contributing powerfully to the prosperity and well-being of the nation. Problems arising from multilingualism—Czechoslovak, Carpatho-Russian, German, Magyar, Polish, Rumanian, modern Hebrew and other tongues are used as languages of instruction—have been solved with remarkable success. Religion is a compulsory subject of study in all elementary, secondary and normal schools, the time allotted for it being, in general, two hours a week. Particular care is taken to exclude influences calculated to inflame racial or national animosity. In all secondary and elementary schools instruction is given in civics,