

umberland. The rocks are mostly of Lower Carboniferous age and the diversity of sediments affords many interesting problems. Of special interest is the famous Shilbottle coal, the most valuable Lower Carboniferous seam in the north of England. Chapters are devoted to the Whin Sill, glacial, and post-glacial deposits, and economic geology. Details of borings and sinkings made in recent years are given in an appendix, and there is a useful glossary of the local and mining terms of north Northumberland.

The Maryport memoir⁶ covers part of the West Cumberland coalfield and is the first systematic account of a difficult and intricate region. Most attention is given to the Productive Coal Measures, their correlation with the seams in other parts of the field, the complicated faulting of the strata, and the structural features of the adjoining concealed coalfield. The whole district has been heavily glaciated; exposures are few; and detailed mapping has been largely dependent on mining information. The remaining chapters deal with the Skiddaw Slates, the Carboniferous Limestone, the Whitehaven Sandstone series, the New Red Sandstone, glacial and recent deposits, and the economic geology of the district.

The memoir⁷ describing Sheet 77 deals with a region of great industrial importance, extending from Blackstone Edge Moors to Dewsbury, and embracing Huddersfield, Halifax, Batley, Brighouse, the southern part of Bradford, and some of the suburbs of Leeds. The region lies on the easterly dip-slopes of the Pennines, and, apart from the superficial deposits, the rocks all belong to the Millstone Grits and the Lower and Middle Coal Measures. The geology of these formations is fully discussed, and there are chapters on structure, glacial deposits, local fossils, and economic geology, special attention being devoted to the goniatite zones and to the occurrence of marine bands in the coal measures. Records of borings, a list of quarries, and a list of geological photographs (of which prints and lantern slides can be supplied) are given as appendices.

The district represented on Sheet 217 is an attractive residential and agricultural area in the Cotteswolds ranging from Cheltenham to Chipping Campden.⁸ Roughly, about half the region is in the Severn basin and about half in the Thames basin. Apart from the superficial formations, which are here of great variety and interest, and the concealed Palaeozoic floor, the rocks belong to the Lower and Middle Jurassic. Since the days of Murchison (who described the geology in 1834) the area has provided an attractive field for many active workers, including the late S. S. Buckman and the author of the memoir. Mr. Richardson has demonstrated, for the first time, the relationships of the Estuarine deposits of southern Northamptonshire and northern Oxfordshire to the marine Inferior Oolite of the Cotteswolds. The memoir is an admirable guide to the geology of a classical and much-visited region.

The next two memoirs belong to the county series in which the sources of underground water are recorded. The Worcestershire volume⁹ provides an excellent short account of the geology and structure of the county, and is illustrated with a clear map and several sections. The chief regional water undertakings are covered, and the supplies of the rural and urban areas are described in detail. Special attention is given to the waters of Malvern and Droitwich, and a comprehensive series of water analyses is provided by the county analyst, Mr. C. C. Duncan. The Gloucestershire memoir¹⁰ is of unusual interest because of the great variety of rocks that occur in this variegated and delightful county. As usual in this series, an admirable general introduction to the

geology is provided, with maps and sections. Detailed accounts of the water supplies of Bristol, Gloucester, and Cheltenham are given. The saline waters of Cheltenham originate in the Lower Lias, while the chalybeate springs issue from a superficial gravel in which there is an admixture of peaty matter. Other rural and urban district supplies are described with a wealth of detail, and numerous analyses and full bibliographies are added. Twenty-four memoirs on the underground water supplies of counties have been published to date.

¹ Summary of Progress of the Geological Survey of Great Britain and the Museum of Practical Geology for the Year 1929. Part 1. Pp. iv+100. 2s. net.

² *Ibid.* Part 2. Pp. iv+80+3 plates. 2s. net.

³ *Ibid.* Part 3. Pp. iv+89+8 plates. 2s. 6d. net.

⁴ Geology of North Ayrshire (Explanation of One-inch Sheet 22, Scotland). By J. E. Richey, E. M. Anderson, and A. G. MacGregor, with contributions from E. B. Bailey, G. V. Wilson, G. A. Burnett, and V. A. Eyles; Palaeontological Chapters by the late G. W. Lee and R. Crookall; and an account of the Soils and Agriculture by the late Prof. R. A. Berry, E. M. Melville, and C. Loudon, of the West of Scotland Agricultural College. Pp. viii+398+10 plates. 10s. net.

⁵ The Geology of the Alnwick District (Explanation of Sheet 6). By R. G. Carruthers, G. A. Burnett, and W. Anderson, with contributions by C. H. Dinham and the late J. Maden. Pp. vii+138+4 plates. 3s. net.

⁶ The Geology of the Maryport District (Explanation of Sheet 22). By T. Eastwood. Pp. viii+137+3 plates. 3s. net.

⁷ The Geology of the Country around Huddersfield and Halifax (Explanation of Sheet 77). By D. A. Wray, J. V. Stephens, W. N. Edwards, and C. E. N. Bromehead. Pp. vi+221+5 plates. 4s. 6d. net.

⁸ The Country around Moreton in Marsh (Explanation of Sheet 217). By L. Richardson, with contributions by A. E. Trueman, D. M. Williams, R. C. Gaut, and H. G. Dines. Pp. vi+162+6 plates. 4s. 6d. net.

⁹ Wells and Springs of Worcestershire. By L. Richardson, with contributions by Cecil Cooke Duncan and E. Brotherton. Pp. vi+219+1 plate. 4s. net.

¹⁰ Wells and Springs of Gloucestershire. By L. Richardson. Pp. vi+292+1 plate. 5s. net.

(London: H.M. Stationery Office.)

University and Educational Intelligence.

ABERDEEN.—The honorary degree of LL.D. was conferred upon the following, among others, at the graduation held on April 1: Sir Leonard Hill, Sir Frank Smith, Prof. C. R. Marshall, and Sir J. Arthur Thomson.

CAMBRIDGE.—The Appointments Committee of the Faculty of Economics and Politics will shortly proceed to appoint a University lecturer in statistics, the duties to begin on Oct. 1. Candidates are requested to communicate with the Registry of the University not later than May 1.

The General Board has made the following grants from the Worts Fund: £100 to the Zoological Station at Naples; £45 to Miss W. Lamb, of Newnham College, for the continuation of her excavations at Thermi; £45 to Dr. E. B. Worthington, of Gonville and Caius College, towards the expenses of the Cambridge Expedition to the East African Lakes; £45 to Dr. L. S. B. Leakey, of St. John's College, for archaeological, palaeontological, and geological investigations in East Africa; £45 to G. Bateson, of St. John's College, for anthropological work in New Guinea; £30 to R. T. Wade, of Clare College, towards his expenses in connexion with visits to museums in Europe to study fossil fish; £20 to P. W. Richards, of Trinity College, towards the expenses of a botanical expedition to the Sierra Nevada; £15 to I. H. Cox, of Magdalene College, for geological exploration in Baffin Land.

It is proposed to confer the degree of Sc.D. *honoris causa* upon Prof. J. S. Haldane, honorary professor and director of the Mining Research Laboratory in the University of Birmingham.

EDINBURGH.—At the meeting of the University Court on Mar. 23, a letter was read from Sir Alexander

Rodger, formerly Inspector-General of Forests, India, intimating that he desired to present a prize for the best student in forestry graduating in 1931, 1932, and 1933. The Court gratefully accepted this gift.

The intimation of a gift to the University from an anonymous donor of £5000 towards the cost of furnishing the new Masson Hall, directs attention to a movement that is on foot to remove the present hall from George Square to a new site at West Mains Road, where it will be capable of accommodating about one hundred resident students in addition to the staff. Plans have been prepared and the building will be proceeded with as soon as the necessary funds are available. The estimated cost of the new building is £50,000.

Prof. James C. Brash has been appointed by the curators to the chair of anatomy in the University, to succeed Prof. Arthur Robinson, who is resigning at the end of the current academic year.

LONDON.—Miss G. K. Stanley has been appointed, as from Aug. 1, to the university readership in mathematics tenable at Westfield College.

It has been resolved to institute a university chair of experimental pathology tenable at the Cancer Hospital (Free).

The Petrie Medal for distinguished work in archaeology has been awarded to Sir Arthur Evans.

APPLICATIONS for Beit junior memorial fellowships for medical research can now be received. They should be sent at latest during May to Prof. T. R. Elliott, Beit Memorial Fellowships for Medical Research, University College Hospital Medical School, University Street, W.C.1.

A SPECIAL course of seven lectures on "Internal Combustion Engines and Lubrication" will be given by different specialists at the Sir John Cass Technical Institute, Jewry Street, Aldgate, London, E.C.3, on Mondays and Thursdays from April 13 to May 4. The course has been specially arranged for those engaged in the technical branches of the petroleum industry.

A LIMITED number of agricultural scholarships for students who propose to take up posts as agricultural organisers, teachers or lecturers in agriculture, etc., are being offered by the Ministry of Agriculture and Fisheries. Form No. A.472/T.G. and particulars can be had from the Secretary of the Ministry, 10 Whitehall Place, S.W.1. Completed forms are returnable by, at latest, June 15. The Ministry also invites applications for some research scholarships in agriculture and veterinary science. Applications must be received not later than June 15 on Form 900/T.G., which, with a copy of the conditions attached to the scholarships, may be obtained from the Secretary of the Ministry.

NOTICE is given by the Institution of Electrical Engineers that the triennial award of the Coopers Hill War Memorial prize and medal will this year be made for a paper on one or other of the following subjects:—The use of electricity in public works; hydro-electric power developments; electrification of railways; electricity in agriculture; electricity in mines; long-distance telephony (excluding wireless); long-distance telegraphy (excluding wireless); overhead lines in rural districts; extra high-voltage underground cables and their protection; Empire wireless communications. The competing essays, which must be written specially for the occasion, must reach the Secretary of the Institution of Electrical Engineers, Savoy Place, W.C.2, by Oct. 1 next at latest.

Birthdays and Research Centres.

April 14, 1867.—Prof. J. C. McLENNAN, F.R.S., professor of physics and director of the Physical Laboratory, University of Toronto.

In collaboration with one group of associates, I am determining the spin moments of the nuclei of several types of atoms with the object of gaining information of a definite character regarding the structure of such nuclei. With another group, studies are being made of the optical and electrical properties of metals at the lowest temperatures with the object of elucidating the phenomenon of superconductivity. With a third group, problems in spectroscopy are under investigation, involving not only gases but also solids and liquids. I am also directing a special investigation on the heating effects produced by very short radio waves, another on the products obtainable with mixtures of certain gases subjected to irradiation by high speed electrons, and still another on auroral phenomena.

April 17, 1863.—Prof. GEORGE GRANT MACCURDY, curator of the anthropological collection at Yale University and director of the American School of Prehistoric Research.

I am at present engaged on (1) a small volume to be called "The Coming of Man"; (2) Director's Report, *Bulletin* No. 7, the American School of Prehistoric Research, for 1930; (3) article on archaeology and prehistory for a new encyclopædia.

Societies and Academies.

LONDON.

Optical Society, Feb. 12.—T. Smith: Modern optical glass as exemplified by the list of the Parsons Optical Glass Co., dated September 1926. The optical positions ($\mu \nu$) of the glass types catalogued by the Parsons Optical Glass Company and the relations between the dispersions for several segments of the visible spectrum are exhibited graphically. A knowledge of the refractive indices of any glass for three wave-lengths is sufficient to specify the index for the whole of the visible spectrum, and a knowledge of two indices is almost sufficient. In particular, the partial dispersive ratios are almost functions (nearly linear functions) of ν only. This implies that there are no glasses suitable for making apochromatic telescope objectives of large relative aperture. The graphs show that the general standard of accuracy of the measured indices is high. A new graphical method of interpolating refractive indices for glass is obtained.—J. Guild: On the fixed points of a colorimetric system. The paper discusses the significance of the constants which enter into the specification of colour on the trichromatic system, and suggests certain fundamental considerations of a metrological character which ought to govern the choice of such constants in a standard reference system. Various proposals which have been put forward from time to time are discussed in the light of these considerations, and the basis of the system which has been adopted at the National Physical Laboratory is explained.

Royal Meteorological Society, Feb. 18.—L. J. Sutton: Note on haboobs. This note is a revision and extension of a paper which appeared in the *Society's Journal* in 1925 on the severe dust storms which occur in the north and central Sudan, chiefly during the rainy seasons. The statistics, which are drawn mainly from the records of Khartoum, include