

finding water, yet to get the best results proper study of the stratigraphical geology of the district is essential. Mineral and hot springs and the causes of the mineralization and the elevation of temperature are considered at the close of the book. Altogether the work is one that we may confidently recommend to all interested in hydro-geology. The absence of an index, however, is to be deplored.

## XII.—GLASGOW GEOLOGICAL SOCIETY.

THE Transactions of this Society for 1911–12 (vol. xiv, pt. iii, 1913) contain a paper by Professor J. W. Gregory on “The Polmont Kame and on the Classification of Scottish Kames”. The Polmont kame extends for a length of about  $4\frac{1}{2}$  miles, from Callendar Park, near Falkirk, to the south of Bo’ness High Junction Station. It is composed of water-worn gravel, has a general width of 10 to 40 yards at the base, rises from the adjacent ground from 10 to 50 feet, and slopes at angles of from  $15^\circ$  to  $25^\circ$ . It rests on the main Boulder-clay of the district, and was probably formed at the same time as the Boulder-clay of the drumlins to the north. The author regards the Polmont ridge as a marginal deposit, formed by the wash of water down an ice-slope, and not fluvio-glacial as in the case of eskers and certain of the Scottish kames; and he describes the Polmont kame as ‘glacieluvial’, a term suggested by Professor Phillimore.

Mr. G. W. Tyrrell gives an account of “The Petrology of the Kilpatrick Hills, Dumbartonshire; with notes on the Scottish Carboniferous Basalts”. He also describes some “Variolites from Upper Loch Fyne and Skye”. Mr. W. R. Smellie deals with “The Sandstones of the Upper Red Barren Measures to the east of Glasgow”, strata which overlie the Productive Coal-measures; he describes the mineral constituents of the rocks and the conditions under which they were deposited, and gives a good view of spherulitic jointing in sandstone.

Among other papers is one “On the Distribution of *Posidonomya corrugata*, Ether., jun., in the Carboniferous Limestone of the Glasgow District”, by Mr. Peter Macnair and Mr. H. R. J. Conacher.

## XIII.—BRIEF NOTICES.

1. THE JOURNAL OF THE WASHINGTON ACADEMY OF SCIENCES, January 19, 1913, gives the result of Dr. H. E. Merwin's investigations in searching for liquids of high refraction which would be suitable for the determination of minute grains under the microscope by the Becke or similar method. Mixtures of methylene iodide with tin and arsenic iodides and sulphur give liquids ranging from 1.764 to 1.868, and by dissolving arsenic sulphide in methylene iodide 2.28 may be reached. He also describes reliable melts which may be used in the same way: arsenic and antimony iodides dissolved in piperine, 1.68–2.10; sulphur with arsenic sulphide, 2.1–2.6; piperine with rosin, 1.546–1.682; rosin with camphor, 1.510–1.546.

In the same Journal, January 4, 1913, Dr. F. E. Wright describes a simple accessory to the vertical illuminator used in the microscope, which enables the observer to produce apertures of any desired size in any part of the field, and at the same time to eliminate disturbing rays.

2. IN THE AMERICAN JOURNAL OF SCIENCE, 1913, vol. xxxv, pp. 63-82, Dr. F. E. Wright discusses the methods available for producing oblique illumination in the petrological microscope, and recommends the use of either a sliding stop in the lower focal plane of the condenser, or placing the index finger below the condenser and observing the edge of the shadow cast by it. He proceeds to consider the utility of the method in the determination of relative refractive indices, and points out that the interference phenomena between crossed nicols in oblique illumination and in convergent light are precisely similar. Incidentally he draws attention to a useful field method of distinguishing between calcite and dolomite. The powdered mineral is placed in a drop of monobromonaphthalene between two glass slips and studied with a lens in oblique illumination. In the case of calcite the grains have coloured fringes.

3. IN THE PROCEEDINGS OF THE UNITED STATES NATIONAL MUSEUM, vol. xlv, Mr. G. P. Merrill describes the meteoric stone found in 1911 near Cullison, Pratt County, Kansas, and said to have fallen there on December 22, 1902. The mass, which weighs 10·10 kilograms, is now in the United States National Museum. It is so dense and fine-grained that it resembles a weathered boulder of a trappean rock, but an examination of a thin section at once revealed its true character. The meteorite has an interesting chondritic structure, and shows signs of brecciation. It probably formed part of a much larger mass.

4. CHILEAN BORATE DEPOSITS.—Mr. R. T. Chamberlin discusses "The Physical Setting of the Chilean Borate Deposits" (*Journ. Geol.*, Chicago, xx, p. 763, Nov.-Dec., 1912). He points out that throughout the extent of the great plateau, which rises from 12,000 to 13,000 feet above sea-level in Chile, Bolivia, and Peru, there are numerous lakes, saline marshes, and beds of former lakes, mostly with no outward drainage. The large lakes of Titicaca and Pampa Aullagas are well known, but there are many minor lake-flats, dry or nearly so, which escape notice. It is on some of these old lake-bottoms that the great borate deposits of South America occur; but it is significant that the lacustrine tracts which contain borax, mostly lie close to the volcanoes of the Western Cordillera. Away from the volcanoes, whether eastward over the central plateau, or westward down the long desert-slopes leading towards the coast where the nitrate beds abound, the borates rapidly disappear. They thus seem to be related to the volcanoes. The nitrates occur on open salinas at less elevations, 3,000 to 5,000 feet. The borax fields are located high up on the edge of the tableland close to the base of the big volcanoes. Both nitrates and borates are dependent for their accumulation and preservation upon the extreme aridity of the region.

5. ROTHAMSTED EXPERIMENTAL STATION, HARPENDEN. — In his Annual Report for 1912, the Director, Dr. E. J. Russell, remarks in connexion with researches on soils: "Our new conception is that the soil organisms may be divided roughly into two groups in their relation to the processes of food production: a useful group and a detrimental group. The latter are, speaking generally, more readily killed than the former. Conditions that are harmful to active life in the soil tend therefore to reduce their numbers, and lead to an increased activity of the useful bacteria. On the other hand, conditions favourable to active life tend to keep up the detrimental organisms, and therefore to reduce the useful bacterial activity. We have thus been able to render intelligible a number of obscure and paradoxical effects that have hitherto caused considerable perplexity. It has already been observed by practical men in various countries that certain soil conditions harmful to the growth of organisms were ultimately beneficial to productiveness: such are long continued and severe frost, long drought (especially if associated with hot weather), sufficient heat, treatment with appropriate dressings of lime, gas lime, carbon disulphide, etc. Further, it has been observed that conditions which are undoubtedly favourable to life, such as the combination of warmth, moisture, and organic manures found in glass houses, lead to reduced productiveness after a time."

---

## REPORTS AND PROCEEDINGS.

### GEOLOGICAL SOCIETY OF LONDON.

(i) *April* 9, 1913.—Dr. Aubrey Strahan, F.R.S., President, in the Chair.

The following communications were read:—

1. "The Variation of *Planorbis multiformis*, Bronn." By George Hickling, D.Sc., F.G.S., Lecturer in Palæontology and Demonstrator in Geology in the Victoria University of Manchester.

The writer gives an account of an investigation of the above-named Miocene Gasteropod, based on a suite of 532 specimens from a single block of stone. The shells of this type from the Steinheim deposits were formerly investigated by Steinmann, Hilgendorf, Hyatt, and others. Many species and sub-species were founded by those writers, who also constructed genetic series which were described as following a stratigraphical sequence. The specimens considered in the present paper include several of the species and sub-species of Hyatt. Since, however, these individuals were clearly all living together, and all the types appeared to pass one into the other by insensible gradations, it seemed doubtful whether they could properly be regarded as constituting more than a single species. Accordingly a study was made of the variation in height presented by the shells, which include every gradation between perfectly discoid forms and types with a spire the height of which considerably exceeds the diameter of the base. By sorting the whole of the shells into ten grades, according to height, it was shown that forms of mean height were