GEOLOGY AT THE BRITISH ASSOCIATION.

ABANDONING on this occasion the customary procedure of opening the proceedings with the presidential address, Section C plunged at the first meeting into the midst of its work with a long list of papers. The reason for this change was that Sir Archibald Geikie's address might be heard on Saturday by the visiting members of the French Association between their reception in the Town Hall and their entertainment at luncheon in the College Close. The arrangement proved highly successful, and the President's eloquent demand that geologists should be allowed to investigate the duration of geological time for themselves with data at their command, unhampered by the vague speculations in which the physicists have indulged, was listened to by a crowded audience, the platform being occupied by a distinguished group of British and foreign men of science.

As befitted their importance and local interest, the first papers taken on Thursday were those relating to Coal-exploration in Kent. Mr. R. Etheridge dealt at some length with the relations between the Dover and Franco-Belgian Coal-basins, without, however, adding much new information to what is already known. Prof. W. Boyd Dawkins, after once more reviewing the history of the discovery, gave some valuable data respecting the boring carried on under his supervision at Ropersole, eight miles north-west of Dover, where Coal-measures have been struck at a depth of 1580 feet, after Chalk, Gault, Lower Greensand, Wealden, Corallian, Oxfordian, Bathonian and Liassic strata had been passed through, and respecting other borings at Ottinge, Hothfield, Old Soar near Tonbridge and Penshurst, of which the first, at a depth of 730 feet, is in Kimeridge Clay; the second, at 800 feet, in Portlandian beds; the third, at over 700 feet, in Hastings Sands; and the last, at 1867 feet, in Kimeridge Clay. From these data, Prof. Dawkins concludes that the southern boundary of the concealed coal-basin ranges under the southern scarp of the North Downs for some distance to the westward of Dover, along the line marked by the Pembroke-Mendip anticline, and that to the south of this anticline the Palæozoic floor is probably composed of pre-Coal-Measure rocks.

The discussion elicited by these two papers was scarcely worthy of the subject, perhaps from the matter having lost its freshness through so much having been written upon it.

At the same meeting Mr. W. Gibson, of H.M. Geological Survey, contributed a short account of the results of his investigations among the Upper Carboniferous rocks of North Staffordshire, which have an important bearing upon the question of the coal-fields lying concealed beneath the Red Rocks of the Midland counties. Mr. Gibson showed that considerable areas of so-called Permian rocks in the region which he has examined are conformable to the Upper Carboniferous strata and cannot be separated from them. By working out the details of these strata he has been able to detect true Upper Coal-Measures farther westward than has hitherto been done, and has found evidence that on the north-west side of the North Staffordshire anticline the valuable coal-measures and ironstones do not uninterruptedly descend beneath the so-called Permian, but rise locally westward and are nearer the surface than might have been expected.

Another paper of stratigraphical interest was that of Mr. A. J. Jukes-Browne on a recent boring through the Chalk and Gault near Dieppe, which shows that the Folkestone and Wissant facies of the Gault extend southward as far as Dieppe, a distance of about fifty-two miles.

Owing to the lantern being available on two days only during the meeting, viz. on Friday and Monday, it became necessary to take all papers requiring this method of illustration on these days, and the usual grouping of the contributions according to subject was, in consequence, only partially possible. A Friday's session Dr. A. W. Rowe gave an account of the methods by which he has attained such magnificent results in the photo-micrography of opaque objects, illustrating his address by a representative series of views to demonstrate the value of this mode of research in the study of the minute structure of fossils. Dr. G. Abbott then discussed the formation of concretions; and Dr. H. J. Johnston-Lavis dealt with that thorny question the origin of oolitic structure, renewing the debate begun last year at Bristol and strongly combating Mr. Wethered's view that the structure was originally organic. Unfortunately, Mr. Wethered was not present to sustain his case, but there was nevertheless an instructive discussion. Prof. W. J. Sollas in a short note on a cognate subject, the origin of flint, stated that he had recently found the hollow casts of sponge-spicules in abundance in the chalk in the vicinity of bands of flint both in Oxfordshire and on the Kentish coast, thus sustaining the view that the silica of the nodules was derived from this source.

Mr. E. Greenly described at this session some remarkable funnel-shaped pipes of hard sandstone in the Carboniferous Limestone of Dwlbau Point, East Anglesey, due to contemporaneous erosion of an exceptional kind; and he also gave an account of the glacial phenomena of the same locality. Prof. P. F. Kendall had an excellent paper on extra-morainic drainage in Yorkshire, in which he claimed that numerous abnormal valleys in the Eastern Moorlands and in the hills west of the Vale of York must have been excavated by the drainage of lakes formed at the margin of the ice-sheet during the glacial period; and Mr. J. Lomas put forward some new ideas respecting the formation of lateral moraines and rock-trains in glaciers.

On Saturday, as already mentioned, the president delivered his address, which constituted the only business of the Section.

On Monday a long list of papers was taken, including several with lantern illustration. Prof. Sollas discussed Homotaxy and Contemporaneity, showing that Huxley's well-known contention could not be sustained and had led to much misunderstanding of the value of fossil evidence. Prof. W. W. Watts briefly described a smoothed and grooved surface of Mount Sorrel Granite underlying undisturbed Keuper Marl, and his paper led to one of the best discussions of the meeting as to the climatal conditions of Triassic times, most of the speakers agreeing that the surface in question had probably been worn by wind-driven sand, and that it afforded further evidence of desert conditions during the period. Another short paper of high importance was that of Prof. A. Renard on the origin of Chondritic Meteorites, in which it was shown that the rock-structure of certain of these extra-terrestrial fragments presented the familiar phenomena of dynamo-metamorphism. As the president remarked in the discussion, it is not often that the geologist can apply the principles of his science beyond the sphere he inhabits.

The local effects of coast-erosion were next described and well illustrated by Captain McDakin and Mr. G. Dowker, after which Mr. W. Whitaker presented the first fruits of the efforts recently made by the Council of the Association to obtain from the coastguards all round our shores, with the sanction of the Lords of the Admiralty, schedules of information as to the changes due to the action of the sea.

Mr. Vaughan Cornish then exhibited a series of photographs of Wave-phenomena, and discussed the relations between wave-forms in different substances, a discussion which was renewed at a later session. The eruption of Vesuvius in 1898 was described and illustrated by Dr. Tempest Anderson; while Prof. G. Platania contributed an account of the recent volcanic phenomena of Mount Etna; and an excellent day's work was concluded by a report by Prof. P. F. Kendall on the results obtained by a local committee, by the use of chemical reagents, as to the flow of underground waters in the limestone district of Craven in Yorkshire at the sources of the Aire. A committee of the Association was formed to continue these researches, and a grant of 50*l.* was obtained in aid of the expenses.

The first paper taken on Tuesday was that of Prof. W. Boyd Dawkins on the geology of the Channel Tunnel, in which, after indicating the conditions under which the proposed tunnel would have been made, it was stated that in the portion 2300 yards long already excavated on the English side, the Lower Grey Chalk was soft enough to be easily cut by machine and hard enough to stand without lining, and that five years' exposure had not sensibly affected its cut surface. It was generally conceded by the speakers in the subsequent discussion that the geological conditions were peculiarly favourable for the construction of the tunnel, and that, apart from the political question, no insuperable difficulty was likely to be encountered.

Mr. F. W. Harmer then read a carefully prepared paper on a proposed new classification of the Pliocene deposits of the east of England, in which he suggested the terms *Lenhamian* for the Lenham Beds, *Gedgravian* for the Coralline Crag, *Waltonian*, *Newbournian* and *Butleyan* for different portions of the Red Crag, *Icenian* for the Norwich Crag, and *Chillesfordian* and *Weybournian* respectively for the Chillesford and Weybourne deposits. The author considers the Red Crag to have accumulated in shallow inlets which were silted up one after another during a slow upheaval of the southern part of the area. In a

second paper Mr. Harmer discussed the meteorological conditions of North-western Europe during the Pliocene and Glacial periods, finding in the early glaciation of Scandinavia, and the consequent establishment of anticyclonic conditions over that area, a probable solution of the change in the direction of the prevalent winds which he believes to be necessary to account for the accumulation of the crag-deposits on our eastern coast.

A short paper by Rev. J. M. Mello on some palæolithic implements of North Kent, and the exhibition on behalf of Mr. B. Harrison of a collection of "eoliths" from the neighbourhood of Ightham, led to a brisk discussion, in which Sir John Evans, Prof. Boyd Dawkins and other speakers denied that the so-called "eolithic implements" showed proof of human workmanship, while Prof. T. Rupert Jones stated Mr. Harrison's view of the case and was supported by Mr. Allen Brown.

The chief paper of the final session on Wednesday was that of Mrs. M. M. (Ogilvie) Gordon on sigmoidal curves in the earth's crust. This admirably rendered discourse was supplementary to the work recently published by Mrs. Gordon in the *Quarterly Journal of the Geological Society* and in NATURE, and had for its object the general statement of the phenomena which are presented when rock-folds in two directions intersect each other and produce "crust-torsion," with particular reference to the earth-forms which have been thus produced in the Alpine mountain-system. The complexity of the subject seemed to daunt most of the speakers in the discussion; but Prof. Lapworth pointed out how well the results of Mrs. Gordon's field-work agreed with the theoretical deductions to be drawn from the study of intercrossing earth-waves.

As usual, some of the most solid work of the Section was embodied in the reports of the committees of research which were presented during the meeting, but of which lack of space forbids more than the bare mention. Among these were the reports presented by Prof. A. P. Coleman on Interglacial Beds in Canada; by Mr. P. M. C. Kermode on the Deposits containing Elk remains in the Isle of Man; by Prof. P. F. Kendall on Erratic Blocks; by Rev. G. C. H. Pollen on the Ty Newydd Caves; by Mr. H. Bolton on the Uphill Caves; and by Prof. W. W. Watts on Geological Photographs.

Short afternoon excursions, which have become an established feature of the Section's arrangements, were made during the week to the Ropersole Coal Boring, to the colliery works under Shakespeare Cliff, to the East Cliff and St. Margaret Bay, and to the Warren at Folkestone.

To sum up the proceedings of the week—the sessions of the Section were well attended throughout, and the papers, though without any especially salient features, maintained a good average both in numbers and quality. Some palæontological papers which might have found place in the Section were taken in Sections D and K, and this branch of geological science was in consequence scantily represented in the list.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Mr. W. L. H. Duckworth has been appointed to the University lectureship in physical anthropology.

Mr. R. G. K. Lempfert has been appointed Assistant Demonstrator in Experimental Physics.

It is proposed that McGill University, Montreal, be adopted as an institution affiliated to the University.

A NEW technical institute is to be erected, at a cost of 8450*l.*, in Carisbrooke Road, Liverpool.

THE sum of 25,000 dollars has been promised to Vassar College towards a biological laboratory on condition that an equal amount be raised for the same purpose by other means.

THE foundation-stone of a new technical college for Sunderland has just been laid. The college is to cost 25,000*l.*, and will, it is hoped, eventually be affiliated to Durham University.

DR. C. B. DAVENPORT, of Harvard University, has been appointed professor of zoology at the University of Chicago, in the place of Prof. Wheeler, who has gone to the University of Texas.

MR. H. B. KNOWLES has been appointed principal of the Swindon and North Wilts Technical School. Hitherto he has been teacher of physics and electrical engineering at the Bradford Technical School.

THE Technical Instruction Committee of the West Riding (Yorks.) County Council have consented to financially assist the managers of the district technical schools in forming reference libraries on the subjects of local instruction.

MR. EMERSON E. MCMILLIN has given the Ohio Academy of Science 250 dollars with which to carry on scientific investigations, and declared his intention of giving a similar amount annually if the money is wisely expended.

DARTMOUTH (U.S.A.) COLLEGE has recently received from Mr. E. Tuck, of New York, 300,000 dollars, to be used for the purposes of instruction, and Tuft's College has had bequeathed to it the sum of 60,000 dollars by the late Mrs. M. D. Goddard, of Newton, Mass.

THE regents of the University of California have accepted the plans designed by M. Bénard, of Paris, for their new university buildings, and some of the buildings will, it is stated, be begun next spring. The movement, as will be remembered, is mainly due to the generosity of Mrs. Phœbe A. Hearst.

AT a meeting held at Newcastle on Monday last, it was decided to make an effort to raise funds for the completion of the buildings in connection with the Durham University College of Science. Subscriptions amounting to 9500*l.* were promised at the meeting, and the sum of 100,000*l.* will, it is hoped, be raised by the end of the year.

IN connection with the Liverpool University College, Mr. W. Rathbone has made provision for the award annually of a Rathbone medal to the most distinguished third-year student. Mrs. George Holt and Miss Emma Holt (to whom the College has on more than one former occasion been much indebted) have each given the sum of 5000*l.* towards the physical laboratories of the institution.

AMONG recent appointments abroad we notice the following:—Dr. S. Avery to be professor of chemistry in the University of Idaho; Mr. H. B. Ward to be professor of zoology at Nebraska University; Mr. P. Field to be professor of mathematics in Carthage College; Dr. E. O. Sisson to be director of the histological laboratory in the recently consolidated medical schools of Keoduk, Iowa.

WITH reference to a recent note in this column respecting the admission of women students to the course of study at the Owens College which would qualify them for medical degrees and practice, we are requested to state that the resolution in favour of the course adopted was carried by a majority of nineteen, the voting being twenty-one for the resolution and two against it.

THE promoters of the Birmingham University scheme have recently received the munificent donation of 20,000*l.* from Mr. Charles Holcroft, and a number of large sums from other gentlemen, which bring the total amount promised to upwards of 315,400*l.* The total of over 300,000*l.* having been reached, the committee have secured the last 12,500*l.* which was offered by the friend of Mr. Joseph Chamberlain who prefers to remain anonymous.

SCIENTIFIC SERIAL.

American Journal of Science, October.—Explosive effect of electrical discharges, by J. Trowbridge, T. C. McKay, and J. C. Howe. The authors investigated the sudden increase of pressure in the gas, through which the discharge passes, by means of a vacuum tube provided with a manometer gauge. When spark-gaps up to 50 cm. were employed, with a maximum difference of potential of three million volts, they found that the explosive effect increased closely in proportion to the length of the spark, and began to diminish when the spark was longer than 50 cm. The air itself then becomes a fairly good conductor, and is strongly ionised.—Colour vision and the flicker photometer, by O. N. Rood. The author's flicker photometer reveals the fact that the curve of colour vision is not the same in any two persons supposed to have normal sight. Among five persons capable of sustaining Holmgren's worsted test, differences of colour values ranging from 1 to 14 per cent. were found.—Iodometric determination of gold, by F. A. Gooch and F. H. Morley. The authors investigate the effect upon the immediate evolution of iodine brought about by adding varying amounts of water to the gold solution before introducing the