

found himself in agreement with the opener of the debate. In his opinion it seemed to be quite possible that some barrier reefs and atolls had been formed during subsidence of the land but in the majority of cases there was very good evidence of recent elevation, and the Darwinian hypothesis would not hold good. Contrary to the statements that are usually made, the outer edge of the reef is seldom, if ever, precipitous, and the evidence tends to show that in most cases the reefs are growing seawards on the talus of their own *débris*. There is a great difference of opinion amongst geologists as to the origin of the Dolomites, and there is no evidence of any fossil coral reef more than a few hundred feet in thickness. In conclusion Dr. Hickson urged upon the combined Sections the importance of initiating some investigations upon the causes regulating the growth and destruction of living coral reefs.

Dr. Rothpletz (Munich) criticised the diagrams and explanation given by Prof. Sollas of the supposed coral reefs of the Dolomites. He did not consider them to be coral reefs.

Mr. Gilbert Bourne confined himself to a few criticisms of Prof. Sollas. It had been stated that reef-building corals flourished best where the breakers are heaviest on the edge of the reef. His own experience was that at these points only a few true corals grow, and that the gardens of coral described by Prof. Sollas were only to be found in quieter spots where the corals were sheltered from the force of the breakers, but bathed by a gentle and uniform current. Photographs of luxuriant coral-beds bore out this assertion. Nor did he agree with the statement that the rocks of which atolls were composed was formed by masses of coral flung over the edge of the reef by the waves. Dr. Guppy had shown that the large masses torn off at the edge of the reef tended rather to roll down the seaward face of the reef, and to form a talus slope. It had been said that soundings of lagoons invariably showed a filling-up and shallowing of the lagoon. On what evidence did this assertion rest? Probably no atoll had been so thoroughly surveyed as the one with which the speaker was personally acquainted, Diego Garcia. He had very carefully compared the soundings made by Captain Moresby in 1837 with those made by H.M.S. *Rambler* in 1885, and found that in every case the soundings were nearly identical, with the exception of a few channels in which, on the whole, the *Rambler* soundings showed greater depths. After referring to Semper's discovery, in the Pelew Islands, of atolls, barrier reefs, fringing reefs, and recent elevated reefs, all found in the same area, the speaker showed that the information just given by Prof. Rothpletz fully corroborated the assertions made over and over again by Murray and Agassiz, that the upward growth of submarine banks was largely due, not to coral growth, but to the accumulation of the calcareous skeletons of mollusca and echinoderms on those banks. Finally, he pointed out that while Prof. Sollas had revived the old theories of a Lemuria and an Atlantis, and had used the existence of the coral islands of the Indian Ocean as evidence of a previously existing continent, he had given no explanation of the fact that the tropical regions of the Atlantic Ocean, across which the old Atlantis was supposed to have stretched, are almost entirely destitute of coral formations.

Prof. Bonney replied to some of Dr. Hickson's criticisms. He cited Masamarhu as a case of a steep slope. He thought judgment on the Dolomites must be reserved. He asked, Was a growing reef ever found deeper than twenty-five fathoms? for that was a point of primary importance.

Sir H. Howorth confined himself to whether coral reefs are now in regions of upheaval or of subsidence. The Pacific islands consist of two regions, the Sandwich Islands, which are an old land surface, and the rest, which have very recently risen from the sea, and so are in an area of elevation, although atolls. This is fatal to Darwin's theory, which depends upon the correlation of reef-building and subsidence.

Mr. Stebbing pointed out that as the young coral animals might settle down on rising or sinking areas indifferently, so reefs might be begun on either, but that only those on an area of subsidence would be under favourable conditions for growth. He also stated that it could not be said that all naturalists who had recently lived on coral reefs were agreed, as Mr. Saville Kent endorsed Darwin's view.

Mr. H. O. Forbes stated that in the Keeling Islands in the Indian Ocean he had found undoubted evidence of elevation, both between two of the islets, and also in the constitution of Hursburgh Island, the largest of the group.

Prof. Sollas briefly replied, and adhered to his original contention.

Section D then took the following, chiefly zoological, papers:—(1) Report on work carried on at the Zoological Station, Naples, viz.—On the action of coloured light on assimilation, by C. C. Duncan, and on the function and correlation of the pallial organs of Opisthobranchiata, by J. D. F. Gilchrist. (2) Report on work carried on at the Biological Station, Plymouth, viz., on Turbellaria, by F. W. Gamble; on decapod larvæ, by E. J. Allen; and how fishes find food, by Gregg Wilson. (3) Report on the production of an index generum et specierum animalium. (4) On seals and whales seen during a voyage to the Antarctic, by W. S. Bruce. (5) On the penguins of the Antarctic, by C. Donald. (6) On the development of the molar teeth of the elephant, with remarks on dental series, by Prof. Cleland, who exhibited a specimen showing the sacular condition.

On Tuesday the remaining papers were taken, viz.:—(1) On cytological differences in homologous organs, by Prof. G. Gilson, dealt chiefly with differences in nephridia. (2) The lateral canal system of fishes, by W. E. Collinge, showing the modification effected by this system in the cranial elements and nervous system, and the evidence the sensory organs afford of the development of the higher sense organs. (3) On the ovipositor of the cockroach, by Prof. Denny. This shows that the ovipositor represents the eighth and ninth sternæ, while the two pairs of gonapophyses are developed in connection with these sternæ. (4) On a new butterfly, by Mrs. White. (5) On certain gregarinidæ, and the possible connection of allied forms with tissue changes in man, by Dr. C. H. Cattle and Dr. J. Millar. In this important paper the authors described the changes caused in the rabbit's liver by *Coccidium oviiforme*, and compared them with the changes produced in glandular organs by cancer. The authors gave reasons for believing the bodies found in cancer to be parasites allied to *Coccidium*. (6) The wings of *Archæopteryx* and of other birds, by Dr. C. H. Hurst. The author regards the two large digits of a bird's wing as IV. and V. (7) The starch of the chlorophyll granule, and the chemical processes involved in its dissolution and translocation, by Horace T. Brown, F.R.S. The author gave an account of the work done by himself and Dr. Morris on the formation of starch and its dissipation. He showed that cane sugar was the first carbohydrate recognisable in the leaf, and that the starch, both in green and colourless parts of the plant, is formed from pre-existing carbohydrates. (8) On nuclear structures in the hymenocetes, by H. Wazer. The author finds, in contradiction to Rozen's results, that during karyokinesis in hymenocetes an achromatic spindle exists, and the process is nearly similar to what obtains in higher plants.

CONFERENCE OF DELEGATES OF CORRESPONDING SOCIETIES.

FIRST CONFERENCE, SEPTEMBER 14.

THE Corresponding Societies' Committee was represented by Dr. Garson (in the chair), Mr. Topley, Mr. Symons, and Mr. T. V. Holmes (secretary).

Dr. Garson, the chairman, gave a hearty welcome to the delegates present. These conferences were begun at Aberdeen, in 1885. At that time only twenty-four delegates were appointed, while last year there were forty-two. The number of Corresponding Societies had also increased. This was evidence that the attempt to bring to a focus, as it were, the efforts of the various Corresponding Societies had met with considerable success. But there was also evidence that the societies did not always sufficiently value their privileges. When circulars were sent from the office of the British Association, the majority of the secretaries of the Corresponding Societies did not fill up and return them until they were written to a second time. Again, out of more than sixty societies, only forty-two thought it worth while to send delegates, though it could hardly be a difficult matter to find members able and willing to serve. It was a very great advantage to the workers in the various local societies to have the titles of their papers printed and published in the Annual Reports of the British Association. Then, the Transactions of the various Corresponding Societies were bound and kept for reference in the library of the British Association at Burlington House, while papers read before other local societies

were likely to remain unknown or unconsulted. It was most desirable that the British Association should be brought into closer communication with the societies. It had been usual hitherto for representatives from the different Sections to attend the conferences and to mention anything that had been done, such as the appointment of a committee for some special purpose, in which the co-operation of the Corresponding Societies would be advantageous. It would be a good thing that there should be better means of communication between the Corresponding Societies and the secretaries of the various committees appointed by the British Association. A good example of a committee especially needing the assistance of the Corresponding Societies was that appointed by Section H to make an ethnographical survey of the United Kingdom. The first report of this committee had just been presented to the delegates, and Mr. Brabrook, the secretary, would shortly call their attention to it. At their last meeting at Edinburgh some delegates had asked whether the council of the Association might not be able to obtain greater facilities from the railway companies for members travelling to and from these meetings. The council, consequently, appointed a committee, of which Sir Frederick Bramwell was an active member, to see what could be done. The result, however, could not be deemed satisfactory.

The Chairman proposed to take the report, which had been circulated, as read, and would be glad to hear any remarks from delegates regarding the work done during the past year.

Meteorological Photography.—Mr. Symons (Section A) was much indebted to the delegates for the number of photographs of clouds sent in to him up to the present time. He did not press for more, as the committee appointed by the British Association for the Elucidation of Meteorological Phenomena by the application of photography had the very considerable collection of 1467 to deal with. They proposed to select the typical ones, reduce them to a uniform scale, and print perhaps 100 copies of them. They were hoping to publish the atlas during the year, and would then be glad if the meteorologists would take copies. They would be pleased to have additional photographs of lightning.

Mr. A. S. Reid said that the Geological Photograph Committee of the British Association were publishing their fourth report that year. During the year they had received more than 40 new photographs, making the total collection 846. They were all British. Their appeal to the Corresponding Societies had been more successful than in any previous year, but there was still much to be done, and he hoped the delegates would stir up their societies on this point. As to the best camera, the smallest was to be preferred. He had also to report that many prints had been sent in without the names of the societies sending them, that of the photographer, or that of the place photographed. They had decided not to lend any more photographs to the societies, and they would recommend the societies to send duplicate copies. Mr. Jeffs, the secretary of the Geological Photographs Committee, had unfortunately been ill during nearly the whole of the year, and this had seriously hampered their work.

Mr. P. F. Kendall remarked that not one of the Corresponding Societies had given any information to the British Association Committee appointed to record the character and position of Erratic Blocks, though appeals for help had been made. There were whole counties strewn with blocks of which not a single report had been sent.

Mr. Topley inquired whether any society had made researches like those brought before the Conference last year by Mr. Watts in the neighbourhood of Rochdale, as to the quantity of material brought down streams in flood.

Mr. Watts' work had been confined to the Rochdale district, and it was desirable that the results in other districts should be noted. Any local society wishing to do similar work should consult Mr. Watts.

Mr. Slater (Section D) said that it was an interesting fact that a member of the Yorkshire Naturalists' Union recently found the wild maidenhair fern on the northern portion of Morecambe Bay. It would not be desirable that the exact spot should be given. He would also remark that it was better to obtain seeds from these rare plants than to take the plant itself.

In Section E, Mr. M. H. Mills said that a paper on the subject of ordnance maps had been read before the Federated Institute of Mining Engineers by Sir Archibald Geikie, whose

chief conclusion seemed to be that nothing could be done without increased funds.

Mr. Eli Sowerbutts said that their member, Mr. Cooke, went before the Departmental Committee, appointed to consider the state of the Ordnance Survey, in order to give evidence. He had suggested to Mr. Cooke that he should write a report on what had been done by the Departmental Committee, which might be presented at the next year's meeting of delegates. The examination on geography mentioned in the report of the Conference of Delegates at Edinburgh did not take place. They would, however, conduct some examinations next year, and he would be glad if the delegates would make their intentions widely known. It was a curious fact that there was no cheap book in existence giving a fairly good account of Yorkshire. The examinations were open to all public and private schools. There would be one on Canada for secondary schools. The latter had been found to know nothing about geography last year, and he looked for some improvement next time.

Mr. Hembry said that he had learned that in a certain county children attending schools were not taught geography in any way. He would like to know if this was the case anywhere else.

Mr. Andrews replied that geography was not a class subject, and was not compulsory. As regards the ordnance maps, the archæologists of Warwickshire, acting on the advice of Mr. Whitaker, forwarded a list of thirteen ancient works to the Ordnance Survey Office, Southampton, ten of which had since been inserted in the map.

Mr. Hembry thought that geography should certainly be a class subject. In secondary schools they absolutely ignored it; but he had been astonished to find that an immense advance had been made in the teaching of geography in primary schools. In many of the latter, museums of commercial products were now being formed.

In Section G, Prof. Merivale had nothing to report about flameless explosives.

Mr. Brabrook (Section H) made some remarks on the progress made by the committee appointed to make an ethnographical survey of the United Kingdom, whose first report was in the hands of the delegates. The committee had, he said, obtained, by communication with the Corresponding Societies, a list of nearly 300 villages, with some account of their leading features and peculiarities, all of which were worthy of special examination by the committee. For this result, which was much beyond their anticipations, the Ethnographical Committee gave its most hearty thanks to the members of the corresponding societies who had helped them so efficiently. The next step taken by the committee had been to draw up a brief code of directions for the guidance of those who had been kind enough to offer assistance. This code would be found at the end of the report.

SECOND CONFERENCE, SEPTEMBER 19.

The Corresponding Societies' Committee was represented by Dr. Garson (in the chair), Mr. Galton, Mr. Symons, and Mr. T. V. Holmes (secretary).

The Chairman announced that he had received a letter from the President of the Cardiff Natural History Society, stating that Dr. Vachell was unable to attend as a delegate, and that Prof. Viriamu Jones, Principal of University College, Cardiff, had been appointed in his place. He thought it would be best to take first any discussions upon the committees appointed in the various sections.

Mr. Symons (Section A) said that the work of the Earth Tremors Committee was going on under the care of Mr. Davidson, and he did not think that there were other committees connected with Section A that bore upon the work of the delegates. With regard to the report of the Earth-Tremors Committee, he should like to hold it in suspense for a while, in the hope of co-operation with some of the corresponding societies.

In Section C, Mr. A. S. Reid said he had been asked by the Committee to make some remarks. The Underground Waters Committee would present its final report next year, and would be glad to receive further information up to the date of publication. The Geological Photographs Committee thought that the size of photographs should be left to the donors. As to the best camera, further comments from practical photographers were invited; also remarks as to the best methods

of printing. With regard to publication, negotiations respecting the proposed album of representative photographs were then in progress. The Erratic Blocks Committee had presented a report, and they were going to publish as much as they could as soon as possible. The Coast Erosion Committee had not sent in a report, though they had plenty of material in hand. The Committee on Type Specimens in Museums was making arrangements for the registration of those specimens, and information was required as to where those specimens were housed.

In Section D, Mr. T. V. Holmes (secretary) read a letter from Dr. Vachell stating that he had come to Nottingham in order to present the Report of the Birds' Eggs Protection Committee that morning, September 16, and regretted he should be unable to stay till the conference on the 19th.

Mr. Slater thought it was high time something was done to protect the eggs of wild birds. Influence might be brought to bear upon boys. He also deprecated the wanton shooting of gulls.

The Chairman stated that the committee had been re-appointed, and that the delegates would in due time receive a final communication on the question.

Mr. Holmes then read a letter from Mr. W. Cole, hon. sec. Essex Field Club, on the maintenance of local museums. Mr. Cole thought that if an annual sum for the maintenance of local museums could be obtained from the Technical Education grants in each county, there would be no great difficulty in obtaining substantial sums towards buildings and fittings. The fear that a museum might not be permanent often kept back subscriptions. Donations, both of money and of specimens, would rapidly come in when once the public felt that the museum would be permanent. And in no way could a portion of the Technical Education grant be better expended than in placing on a satisfactory footing the local museum of the county.

The Chairman hoped that members of the Corresponding Societies would occasionally read papers on the specimens in their local museums, each writer keeping to a certain department. These papers would be catalogued in the societies' list, and brought before the notice of many workers in the same subject elsewhere. They would also be available for reference at headquarters in London.

In Section H, the Chairman commended the Ethnographical Survey (the first report of which had been placed in their hands at the previous meeting) to the attention of the delegates and the societies they represented, and explained in what ways they could assist the committee. Local physical, intellectual and moral characteristics, folk-lore, manners, customs, dialect, and ancient monuments might all be noted by various observers, and the results sent to the Ethnographical Committee. Ancient human remains should be carefully preserved, together with any pottery and implements found with them. If any difficulty occurred with regard to the best mode of making any exploration, information might always be obtained at the Anthropological Institute, 3, Hanover Square, London. In some cases he had known pottery and implements had been carefully preserved, and bones thrown away or buried; in others skulls had been kept by the explorer, and the large bones thrown away. The Anthropological Institute was always ready to advise or to send some one down to examine the remains found. It was better to leave barrows, &c., as they were, unless people were prepared to examine them thoroughly and systematically.

After some remarks on a proposed excursion of the delegates, a vote of thanks to the chairman closed the proceedings.

THE GEOLOGICAL SOCIETY OF AMERICA.

THE fifth summer meeting of the Geological Society of America was held at Madison, Wisconsin, on August 15 and 16; vice-presidents J. C. Chamberlain and John J. Stevenson presiding, in the absence of the president, Sir J. W. Dawson.

The popular feature of the meeting was an illustrated lecture in the Assembly Chamber of the Capitol, by Prof. H. F. Reid, on "The Gravels of Glacier Bay, Alaska." The stereopticon views gave quite the best exhibit of this interesting glacial region that has yet been presented.

The papers presented included a description of a new species of *Dinichthys*, a new *Cladodus* from the Cleveland shale, and a remarkable fossil jaw from the Cleveland shale, by Prof. E. W. Claypole, who is carrying on the work begun by the late Prof.

J. S. Newberry on Devonian fossil fishes. The remains described are those of new and remarkable species, one of them showing a degree of specialisation quite surprising for that low horizon. The author even surmised that some of the remains may be amphibian.

Prof. J. J. Stevenson, in his paper on the origin of the Pennsylvania anthracite, seemed to have actually subverted the accepted dogma, that the metamorphosis into anthracite was caused by disturbances of the strata. He showed that the difference between anthracite and bituminous beds is due to circumstances connected with deposition; the former having been laid down rapidly and in thick beds, and having been long under water; they are also earlier than the bituminous beds.

G. Frederick Wright and A. Frederick Wright, in their respective papers on extra-morainic drift in New Jersey, and on the limits of the glaciated area of New Jersey, admitted the correctness of Prof. Salisbury's first announcement that these were genuine glacial deposits, though occurring beyond the limits of the glaciated area.

Edward H. Williams, Jun., in a paper on South Mountain glaciation, described a similar formation in Pennsylvania, where he found transported Medina sandstone and glacial striation.

The programme also included papers on the study of fossil plants, by J. W. Dawson; the Manganese series of the North-Western States, by C. W. Hall and F. W. Lardeson; on the succession in the Marquette Iron district of Michigan, by C. R. Van Hise; terrestrial subsidence south-east of the American Continent, by J. W. Spencer; evidences of the derivation of the kames, eskers, and moraines of the North American ice-sheet, chiefly from its englacial drift, and the succession of pleistocene formations in the Mississippi and Nielson River basins, by Warren Upham; the cenozoic history of Eastern Virginia and Maryland, by N. H. Darton; the Arkansas coal measures in their relation to the Pacific carboniferous province, by James P. Smith; glaciation of the White Mountains, N.H., by C. H. Hitchcock; dislocation in the strata of the lead and zinc region of Wisconsin, and their relation to the mineral deposits, with some observations upon the origin of the ores, by W. P. Blake; geology of the sand hill region in the Carolinas, by J. H. Holmes; notes of geological exhibits at the World's Fair, by G. N. Williams.

BLEEDING BREAD.

THE phenomenon known in Germany as "Blut im Brode," and to us as bleeding bread, has appeared in this country, to no little dismay of the peaceful inhabitants. The subjects of this visitation are not only bread and biscuit, but also boiled potatoes, rice, and other farinaceous substances, on which red stains appear, which resemble blotches of blood. In former times, before their nature was known, these blood stains created much consternation amongst the superstitious as portents of calamity. The first modern naturalist who described it in scientific terms was Dr. Sette, of Venice, who recorded its appearance in Padua, in 1819, and gave it the name of *Zoogalactina imetropha*. In this instance it is stated that "a peasant of Liguara, near Padua, was terrified by the sight of blood stains scattered over some polenta, which had been made and shut up in a cupboard on the previous evening. Next day similar patches appeared on the bread, meat, and other articles of food in the same cupboard. It was naturally regarded as a miracle and warning from heaven, until the case had been submitted to a Paduan naturalist, who easily recognised the presence of a microscopic plant."¹ Subsequently Ehrenberg saw the same production near Berlin, in 1848, and, as usual with him under like circumstances, referred it to the animal kingdom, under the name of *Monas prodigiosa*; but during the same year it occurred in the experience of Dr. Camille Montagne, who saw it on cooked fowls and cauliflower, at Rouen, and it was regarded as an Algid, under the name of *Palmella prodigiosa*. The first definite record of its occurrence in Britain appears to have been in 1853, when H. O. Stephens communicated an account of it to the Bristol Microscopical Society, and submitted specimens to the late Rev. M. J. Berkeley, who declared it to be identical with the organisms described by Ehrenberg and Montagne, but which he regarded as a fungus.

The record of its appearance at Bristol is to the following

¹ Trouessart, "Microbes, &c." London, 1889, p. 126.