GEOGRAPHICAL NOTES.

NORWEGIAN enterprise has led to the fitting-out of a steamer, renamed the *Antarctic*, for a whaling voyage to the Antarctic Sea south of New Zealand, where Ross attained his highest south latitude in 1842. The *Antarctic* has already sailed, but will touch at an Australian port to complete preparations. It is understood that those on board will endeavour to make as complete meteorological observations as possible throughout the voyage.

A TELEGRAM from San Francisco, dated October 3, states that the American steam-whaler *Newport*, one of the fleet working north of the Arctic coast of America, which passed last winter at Herschell Island (long. 139° W. near the mouth of the Mackenzie), succeeded this summer in steaming through an almost open sea to 84° N. No details are given, and until the observations for latitude have been critically examined it is necessary to reserve an opinion as to the latitude really attained. The farthest north points, reached through Smith Sound, are 83° 20′ by Markham, and 83° 24′ by Lockwood. If the report is correct, the *Newport* got nearly fifty miles farther north than any previous expedition.

MR. F. G. JACKSON, who is travelling in the Yalmal peninsula, reports that Dr. Nansen did not finally leave Yugor Strait until August 20, the ice in the Kara Sea turning out to be much worse than was expected. The conditions must have improved shortly afterwards, however, as a telegram from St. Petersburg announces the safe arrival in the Yenesei of the Russian vessels which left Dumbarton with railway material on July 29. The date of arrival is not mentioned, but the fact proves that the *Fram* would have no difficulty in getting east as far as the Yenesei, at any rate, and as she is not reported by the Russian vessels, she was probably far beyond that river before they arrived.

PROF. KOTO publishes in the *Journal of the College of Science*, Imperial University, Japan, a detailed description of the surface changes accompanying the great earthquake of 1891, illustrated by sketch maps and photographic views of the great fault, forty miles long, which was formed in the valley of Neo. On one side of this fault the ground has subsided in places for nearly twenty feet, and has also been displaced horizontally. The result, apart from the destruction of towns and buildings, has been to considerably modify the physical geography of an extensive area, changing the course of streams and their rate of flow, forming swamps, and in many ways accelerating the gentler processes of surface change by erosion.

MR. CLEMENTS R. MARKHAM, President of the Royal Geographical Society, has this year been invited to deliver the opening lecture at the three provincial Geographical Societies. He opened the session of the Tyneside Geographical Society at Newcastle, by a lecture on Peru, on the 6th; that of the Liverpool Geographical Society, by an address on the Polar Regions, on the 10th; and that of the Manchester Geographical Society on the 11th, when his subject was Central Asia with special reference to trade routes. The interest taken in the younger societies by the Royal Geographical Society is sure to increase their popularity and usefulness in their own localties.

BIOLOGY AT THE BRITISH ASSOCIATION.

ON Thursday the address of the President was for several reasons postponed till 12.30, and the work of the section was opened by the Chairman (Sir William Flower) with a sympathetic reference to the recent sudden death of Mr. George Brook, who was to have been one of the secretaries at this meeting. A paper was then read by Dr. David Sharp, on the zoology of the Sandwich Islands. This was followed by the report of Prof. Newton's committee on the present state of our knowledge of the zoology of the Sandwich Islands. The committee have obtained valuable results in several departments of zoology, and more especially in entomology. The consignments received during the year from their collector may be roughly estimated at nearly 150 birds'-skins, 3000 insects, 1000 shells, a collection of spiders in spirit, together with some crustaceans, worms and myriapods. The importance and urgency of the work carried on was testified to by Sir William Flower, Prof. Newton, Dr. Hickson, and others. The report of the committee dealing with observations on the migrations of birds at lighthouses was then read by Prof. Newton. This committee have made progress with the systematic tabulation of their statistics, and are now commencing to fill up the schedules for their final report. The sixth report of the committee investigating the zoology and botany of the West India Islands shows that the Committee have been chiefly engaged during the past year in working out the great series of specimens secured from the West Indian region by means of the collectors. Papers on the birds, on the myriapods, scorpions, pedipalpi, peripatus, and the parasitic hymenoptera, have been published, and investigations on other groups of insects are now proceeding. Collections of various groups of cryptogams have also been made, are now being worked out, and are proving to comprise many new species. The committee propose to examine next the island of Margarita, the natural history of which is wholly unexplored. An important note on the discovery of *Diprotodon* remains in Australia, by Prof. Stirling, was read by Prof. Newton. The new material now found has added to our knowledge of the structure of this remarkable gigantic marsupial, especially in regard to its limbs and feet.

The presidential address (*see* NATURE, p. 490), in the absence of Canon Tristram from illness, was read in the afternoon by Sir William Flower; and the vote of thanks was proposed by Prof. Newton and Prof. Burdon Sanderson.

The section opened on Friday with a physiological discussion on the physico-chemical and vitalistic theories of life. The discussion was opened by Dr. J. S. Haldane, of Oxford, who, starting from the fact that about the middle of the century physical and chemical theories to explain the peculiar properties of living organisms were completely substituted for the traditional vitalistic theories, proceeded to inquire how far this substitution has been justified by the results of subsequent investigation. He argued that as evidence has accumulated the failure has become more and more manifest of the attempts to specify physical and chemical factors from which vital properties may be deduced. This argument he based on the facts relating to cell-formation, nutrition, heat-production, the secretion and absorption of solids, liquids, and gases, and to other physiological processes. He then endeavoured to show that the old vitalistic theories were not mere expressions of the negative fact that physiologists are face to face with a large residuum of unexplained facts, but constituted real working hypotheses, which summarised the peculiarities of living organisms, and indicated fruitful lines of inquiry. In conclusion he maintained that the former crude beliefs as to the existence of a material or immaterial "vital principle," formed no essential part of a vitalistic theory of life.

The Chairman (Mr. Langley), in inviting discussion, said that the problems of life had been thought to be physical and chemical questions, and the mistake had been that they had been thought to be easy questions. Possibly the fact was that the unexplained residue appertained to more complex chemistry and physics than we know at present.

Prof. Cleland said that the old vitalism was dead, but that there was a new vitalism which must be supported. To him there appeared to be something in life in addition to the mere laws of dead matter.

Prof. Burdon Sanderson said that the real change that took place about 1840 was not a change of doctrine but a change of method. It was then seen that the only way to investigate the phenomena of life was by processes which they understood, such as those of chemistry and physics. A great number of easy questions had since been settled, and the difficult ones appeared now all the greater because we had come nearer to them. Profs. Schäfer, Allen, Heger, Hartog, Bohr, and Dr. Waller also took part in the discussion. In his reply Dr. Haldane maintained that physiologists had always employed methods of observation based on physics and chemistry. The change at the middle of the century seemed to him to be a change in working hypotheses rather than in methods.

The Chairman, in closing the discussion, said that during the first half of the century there had been a lamentable absence of results, mainly owing to the fact that the whole process of research was governed by the vitalistic theory.

A paper by Dr. A. R. Wallace, on malformation from prenata influence on the mother, was illustrated by photographs of a remarkable case of a child born with an imperfect arm some months after the mother had been engaged in dressing the wound of a gamekeeper who had had his arm amputated.

In the afternoon the section divided into the two departments of Physiology and Zoology. In the former, the following papers were read:—(1) On the digestive ferments of a large Protozoon, by Prof. Marcus Hartog and Augustus E. Dixon. The authors experimented with about 2000 large individuals of *Pelomyxa palustris*, and found that the watery extract hydrolyses starch paste in a neutral solution, and converts the starch rapidly into erythro-dextrin, has no action on thymolised milk in two days, liquefies fibrin rapidly in presence of dilute acids, only attacks fibrin very slowly and partially in neutral solution, and indol and skatol are not formed. (2) On the effect of the stimulation of the vagus on disengagement of gases in the swim-bladder of fishes, by Dr. Christian Bohr (Copenhagen). This showed that the air secreted in the bladder is largely composed of oxygen. The paper was illustrated by tables showing the increase in the proportion of oxygen at stated times during the refilling of the bladder after puncture. (3) On a method of recording the heart sounds, by Prof. W. Einthoven. (4) On nerve stimulation, by Prof. F. Gotch. The author finds that with the induction current he obtained excitation of the nerve of a frog at a low temperature which disappeared at a higher temperature, while with the discharge of a condenser the result was the reverse of that. He also found a similar difference in action in regard to the passage of the impulse down the nerve in the two cases. Therefore he comes to the conclusion that the impulse started in the nerve is somewhat different in the two cases. (5) On fatigue of nerves, by Prof. Schäfer. (6) On Calorimetry, by Dr. A. Waller. This applied more particularly to the temperature difference of the body under varying conditions of the surrounding medium. (7) The report of the committee on the physiological action of the inhalation of oxygen in asphyxia. The results are as follows:—(1) In the case of asphyxiated rabbits, oxygen is of no greater service than air; (2) pure oxygen when inhaled by a healthy man for five minutes produces no effect on the respiration or pulse; (3) oxygen produces no effect upon a patient suffering from cardiac dyspnœa, either on respiration or on pulse; (4) an animal can be kept for a long time in a chamber containing 50 per cent. of carbonic acid without muscular collapse, provided a gentle stream of air or oxygen be allowed to play upon the nostrils.

In the Zoological Department the following papers were read:—(1) Report of the committee appointed to explore the region of the Irish Sea lying around the Isle of Man. The committee have conducted eight dredging expeditions, most of them lasting for several days; about 1,000 species of marine animals have been collected and identified, of these thirty-eight are new records to the British fauna, 224 are new to the district, and seventeen are new to science. Prof. Herdman gave a general account of the expeditions and the results attained, while Mr. A. O. Walker, Mr. I. C. Thompson, Mr. Stebbing, and Prof. Brady gave more detailed accounts of special groups of Crustacea. (2) Report of the committee on a deep-sea townet. (3) On luminous organs in Cephalopoda, by W. E. Hoyle. These minute light-producing organs are scattered over the general integument in certain species. (4) On the origin of organic colour, by F. T. Mott. This was to show that the colours in going from stem to blossom indicate a decrease in the amount of light absorbed, and the author contends that the amount of reflected light increases as the plant attains maturity. (5) On the roots of *Lemna*, and the reversing of the fronds in *Lemna minor*, by Miss Nina F. Layard, who showed that in dry seasons, when the fronds dried up, the root-cap would act as a protector for the tender cells of the root. Miss Layard accounted for the observed reversal of the fronds as cases where a growth had covered the upper surface, and the fronds had revolved in order to expose a better surface to the air.

The section met on Saturday forenoon. when the following papers, chiefly botanical, were taken:—(1) Report of the committee on the legislative protection of wild birds' eggs. This was read by Dr. Vachell, and supported by Prof. Newton, who urged the necessity of making known to the schoolboy which birds' eggs ought to be protected. (2) On the ætiology and life-history of some vegetal galls and their inhabitants, by C. B. Rothera. The author traced out the life-history of certain typical galls, those of *Cynips kollari*, *Teras terminalis*, and *Biorhiza aptera* being specially dealt with. He gave a series of facts positive and negative, which point to the action of the embryo, and not to the deposit of a special virus by the parent *Cynips*, as the direct and necessary agent in the production of the gall. He therefore discards the hypothesis of a specific virus deposited by the parent, and attributes the genesis and metamorphoses of the gall to the activities of the living embryos combined with the normal forces of the plant. (3) Report of the Committee on the Botanical Laboratory at Peradeniya, Ceylon, where a good deal of the apparatus requires to be renewed. (4) On some new features of nuclear division, by Prof. J. B. Farmer. This paper, illustrated by microphotographs, included some new results of researches on the centrogomes and the behaviour of the achromatic spindle. (5) Variations of fecundity in *Trifolium pratense* and its varieties, and *Trifolium medium*, by W. Wilson. This paper detailed some observations made as to varieties of clover, contrasting them with hybrids as regards fertility. (6) Lime salts in relation to some physiological processes in the plant, by Dr. J. Clark. The action of lime salts may modify the effect of low temperatures in seed germination. The author had succeeded in finding a *Bacillus* which is capable of breaking up the calcium oxalate, which is at one time precipitated in the plant. (7) On the cortex of *Tmesipteris tannensis*, by R. J. Harvey Gibson. This gives an account of the histology of the cortex of the stem, with special reference to the origin and nature of the "brown deposit" seen in the cells.

On Monday a joint meeting with Section C was arranged, when a discussion on "Coral Reefs" was opened by Prof. W. J. Sollas, F.R.S.

Prof. Sollas said that the problem before the Sections was to explain the presence of large groups of atolls in the deep ocean, every atoll in some of the groups, save for the land piled up by the breakers, rising just up to the level of the sea. The two fundamental difficulties which had to be met were the existence of a submarine bank and the presence of a lagoon, which sometimes attained a depth of 60 fathoms or more. Volcanoes had once been supposed to furnish by their cones the bank, and by their craters the lagoons. Possibly some individual atolls might be explained in this way, but not whole groups. Chamisso, postulating a submarine bank, accounted for the lagoon by the fact that corals grow fastest in the wash of the surf. In this way a lagoon 9 or 10 fathoms in depth might be formed, and some of the Florida reefs might be so explained. Dr. Murray accounted for submarine banks by the precipitation of organic sediment on volcanic cones, and for the lagoon by an explanation similar to Chamisso's, which he supplemented by supposing that the central part of the shoal was removed by solution. There was, however, no evidence that lagoons were deepened by solution, and much opposed to it. Deposition, and not solution, occurred in the lagoon, and so long as an atoll remained stationary the lagoon tended to become filled up.

Darwin, instead of meeting each difficulty by a separate assumption, proposed a theory which, by a single assumption, in itself very probable, accounted for all the facts. One of the gravest objections to Darwin's view had been the apparent absence of coral reefs resembling atolls in ancient systems of rocks. That had been removed by the labours of geologists, who were able to point to atoll-like limestones, from 400 to 800 fathoms in thickness, in the Tyrol, the Eastern Alps, and elsewhere. Elevation had recently affected some existing atolls, as might naturally be expected in an unstable area. That fringing reefs, barrier reefs, and atolls should occur together in a single area proved, when the facts were examined in detail, to furnish a striking confirmation of the theory, since these different kinds of reefs were not confusedly intermingled, but arranged along lines which showed a progressive change from elevation at one end to subsidence at the other. The arrangement of atolls in linear series, curving in the Pacific, and straight in the Indian Ocean, was in accordance with the outlines of the surrounding continents, and pointed to deep-seated structure in the earth's crust. Most remarkable in connection with this was the fact that individual atolls were elongated in the same direction as the group of which they formed a part. This was readily explicable on Darwin's theory, but not by the supposition that the elongation was determined by oceanic currents, since these cut the atolls in various directions, not correlated with that of their longest diameter. Further, the areas in which subsidence had occurred were in many cases just those where geologists had reason for supposing that land had existed in secondary times. Particularly was this true of the Indian Ocean, across which, as Neumayer had shown, a great tract of land had probably extended in the Jurassic period.

Dr. Hickson (Section D) said that he agreed with Prof. Sollas in thinking that the Darwinian hypothesis was both clear and beautiful, but that that was about the only point in which he

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 Horsburgh 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 sterna, while the two pairs of gonapophyses are developed in connection with these sterna. (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 oviforme*, 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 hymenomycetes, by H. Wager. The author finds, in contradiction to Rozen's results, that during karyokinesis in hymenomycetes 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