

(9) A circulatory apparatus for experimental observations on marine organisms.—The work has been carried out by Mr. F. W. Gamble at the Piel Sea-Fish Hatchery on the Lancashire coast; and the observations chiefly dealt with the changes in colour, and the mechanism of colour physiology in the Crustacean *Hippolyte varians*.

On one of the afternoons Mr. J. W. Woodall took a small party of zoologists to sea in his yacht *Vallota*, to witness the trial of Mr. Garstang's new tow net, which can be opened and closed in any depth of water. In addition to the actual proceedings in Section D, it may be noted that there was a good deal in several of the other Sections that was of zoological interest.

THE SEVENTH INTERNATIONAL GEOGRAPHICAL CONGRESS.

AT the close of the Sixth International Geographical Congress in London in 1895 it was decided that the next meeting should be held in Berlin in 1899, under the auspices of the Berlin Geographical Society. This meeting, with its attendant festivities, has just been concluded. Although the actual sittings of the Congress extended only from September 28 to October 4, the proceedings began a week earlier and were continued more than a week later, by a series of geographical excursions to different parts of the German Empire. Taken as a whole the Congress must be pronounced not only successful, but brilliantly so; it presents a sort of climax in respect of grandeur to the preceding meetings, and suggests that the time has now come for reconsidering the general plan of such gatherings, and starting afresh on lines of plainer living, if not of higher thinking. Here, however, we have only to sketch the work of the Congress just over, not to suggest the plan of its successor.

The Council of the Berlin Geographical Society had the entire charge of the organisation, and by the usage of previous meetings the President of the Society, Baron Ferdinand von Richthofen, professor of Geography in the University of Berlin, was President of the Congress. The personal efforts of Baron Richthofen were unceasing before and during the meeting, and as no German geographer is better known or more widely respected at home and abroad, the accident of his presidency of the Society was singularly fortunate for the success and *éclat* of the Congress. He was supported as secretary by Hauptmann Georg Kollm, and a number of younger geographers who formed a staff of efficient assistant secretaries, but whose names were not brought before the members. Similarly, the various honorary officials—vice-presidents, members of committees, &c., whose names had appeared in circulars sent out some months before the meeting—remained unknown to most of the members, who had left their early circulars at home. There were general programmes, printed in German, English and French, detailing the work for each day, and a supplementary programme of entertainments in German only, with additions and alterations to the list of papers; but there was no daily journal giving a clear view of the work of each day, with the names of presiding officers and a summary of the work of the day before, as at the London Congress. German also was the one language used in the general business, all announcements were made in German only, almost all the notices exhibited were in German and sometimes even in the German script, which can scarcely be looked on as an international character. In London the three languages were used for every written or printed notice and every important verbal announcement. The abstracts of papers, which were circulated daily, were printed in the language of the author only. The foreigner, unversed in the German language and unused to German customs, was somewhat at a disadvantage throughout, both in scientific meetings and at social functions.

These minor matters apart, the organisation left nothing to desire. The grand building of the Prussian Chamber of Deputies, generously lent to the Congress by the Prussian Government, formed a perfect home for the member. A "depositorium," bearing the number of his ticket, received all communications intended for him, an admirably-conducted cloak-room relieved him of hat and coat, and restored them with a swiftness and certainty that seemed magical to the frequenter of British scientific gatherings; a vast refreshment room could serve breakfast, lunch and supper to the whole Congress simul-

aneously; picture post-cards (more essential than food to the German visitor) were on sale in every room, even in the Great Hall while papers were being read; desks were provided for issuing tickets, badges and the many offerings of books, maps, &c., presented by institutions and firms; while the luxurious reading- and writing-rooms of the Prussian Deputies were thrown open absolutely without reserve. As an example of international hospitality, the installation of the Congress was memorable and unique. Perhaps the best managed of all the hospitable arrangements was the Ladies' Committee, specially charged with the care of the lady associates of the Congress, which carried out its work with most satisfactory diligence and completeness.

The Congress commenced informally in true German style by the members dropping in as they arrived on the evening of Wednesday, September 27, to the restaurant of the House of Deputies, where they sat at supper or wandered through the various halls, greeting old friends and forming new acquaintances. Next morning at ten o'clock the formal opening took place with much dignity, the gentlemen appearing in evening dress or uniform with a profuse display of orders. Prince Albrecht of Prussia welcomed the Congress in the name of the Emperor; Prince Hohenlohe, the Imperial Chancellor, welcomed it in the name of the Empire; Herr Studt, the new Prussian Minister of Education, in the name of the kingdom of Prussia, the speeches of these great personages being received in solemn silence. The *Bürgermeister* of Berlin then welcomed the members in the name of the city, and applause, which was not stinted to subsequent speakers, then began. The welcome was responded to by a few of the most distinguished foreigners. Baron Richthofen read his presidential address, on the progress of geography in the nineteenth century; Sir Clements Markham, as president of the sixth Congress, gave a short address, resigning his office and presenting the report of the London Congress. Vice-presidents and chairmen of the different sections were nominated, and the formalities were over.

It is unnecessary to detail the social accompaniments of the Congress. The Imperial Chancellor gave a small dinner and a large reception to the foreigners and the more prominent German members. The city of Berlin gave an admirably conducted dinner to the whole Congress in the Zoological Gardens. The Berlin Geographical Society also entertained all the members to a reception and supper, and there was a special performance in the Opera House.

It is impossible to pass without remark the magnificent hospitality of Hamburg, where over 500 members of the Congress were received by the local Geographical Society, and carried through two days of uninterrupted festivity. The Senate opened the State rooms of the new Town Hall, probably the finest municipal building in the world, for the first time in honour of the visitors, and an even more impressive view of the vast wealth and activity of the greatest continental seaport was afforded by a cruise through the harbour and a visit to the floating docks and ship-building works. The Hamburg-America Line entertained a thousand guests to lunch in the "tween-decks" of the *Pretoria*, said to be the largest cargo steamer afloat, and this on the day before she sailed for New York with a full cargo and complement of passengers. No less hearty and no less interesting were the receptions accorded to the members of the various excursions to the Baltic shores, the Rhine and Central Germany by the local authorities and geographical societies.

The serious business of the Congress was divided into a general meeting in the forenoon from ten to one, and three simultaneous meetings in the afternoon, commencing at two o'clock, and sitting until five or even six. A time-limit for speakers was formally announced, but rarely, if ever, enforced; and the system of allowing one speaker to address the meeting as often as he liked on the same subject led to the degeneration of some of the debates into long-winded dialogues.

The programme with its additions bore the titles of no less than 150 papers, many of which were intended to be introductory to discussions. This number might have been reduced with great advantage. A few were the work of "cranks," a good many were old or of no international interest; but the great majority were new and valuable and deserving of far more complete discussion than their number made it possible for them to receive.

The departments of Geography which received most attention at the Congress were, perhaps, Antarctic Exploration, Oceano-

graphy and Plant-Geography. Dr. Erich von Drygalski gave a detailed account of the plans for the German Antarctic expedition, which is to sail in 1901, and submitted the specifications for the ship and her equipments. All the preparations for the expedition are in a forward state. Dr. Drygalski himself is the scientific leader, the captain of the ship being simply a sailing-master responsible for the navigation. Dr. Vanhöffen, who accompanied Dr. Drygalski in his Greenland expedition, goes as botanist, and several other members of the scientific staff, which will number at least six, have been chosen. Much stress is laid on the importance of co-operation with the British expedition. Dr. Drygalski hopes to land somewhere to the south of Kerguelen, that island being occupied by a land-party as a scientific base, and to advance towards the South Pole by the aid of dogs. Sir Clements Markham gave a full exposition of the plans of the British expedition. He said that the vessel for the expedition will be built of oak with an ice-casing of harder wood. She will be 172 feet long by 33 broad, with a displacement of about 1525 tons. Arrangements will be made for a magnetic observatory before the mainmast, which shall have no iron within 30 feet of it. There will be accommodation for six executive officers, including two engineers, three civilians for biology and geology, including the surgeon, and thirty-nine men. Melbourne will be the base for magnetic observations, and a party will be landed in MacMurdo Bay, near Mount Erebus, to push inland with sledges, but without dogs, the use of which involves unjustifiable cruelty. In the discussion on the Antarctic papers, Dr. Nansen strongly defended the use of dogs, the alternative being in his opinion far greater cruelty to men. Sir John Murray urged the importance of circumpolar oceanographical investigations as a preliminary to the penetration of the Antarctic ice-pack. M. Arctowski read a paper on the oceanographical and meteorological results of the *Belgica's* voyage, and Prof. Nielsen of Christiania gave some account of Sir George Newnes' expedition under Mr. Borchgrevink.

In north polar exploration the most important papers were the first public statements regarding the scientific results of the *Fram* expedition. Dr. Nansen in a lecture of an hour and a half's duration described the North Polar Basin as revealed by his soundings, and discussed the distribution of temperature and the circulation of water in it in great detail, while Prof. Mohn in another paper gave a *résumé* of the meteorological results. It is impossible in a few lines to summarise either of these massive contributions to knowledge.

Oceanographical papers were numerous, that of Prof. Chun, the leader of the *Valdivia* expedition, exciting the greatest amount of interest. Sir John Murray discussed the distribution of deep-sea deposits over the ocean floor, and the Prince of Monaco described some of the results of his recent cruise to Spitsbergen. Several useful and really international discussions took place, culminating in the appointment of committees to draw up a systematic terminology and nomenclature for the forms of sub-oceanic relief, introduced by Profs. Wagner, Krümmel, Voiehoff and Dr. H. R. Mill, and to determine a common method of expressing the density of sea-water, introduced by Baron Wrangell and Prof. Pettersson.

There were several valuable papers on subjects involving climatology, limnology, the study of glaciers and seismology, and one on kumatology by Mr. Vaughan Cornish; indeed it would be difficult to mention any department of physical geography to which some contribution was not made.

The geography of plants was discussed with particular thoroughness, both with regard to the distribution of special types of vegetation and the more general relations of nomenclature and cartographic representation. Profs. Drude, Engler, Warburg, Krasnoff and Nehrning dealt with these subjects.

The geological aspects of geography produced several papers of unusual value, including one by Prof. de Lapparent on the question of peneplains, one by Prof. Penck on the deepening of alpine valleys, and one by Mrs. Gordon (Dr. Maria Ogilvie) on the basins of southern Europe. Mr. W. Obrucheff, of St. Petersburg, gave an important account of the orography and tectonic structure of the trans-Baikal region of Siberia as revealed by the most recent observations—between 1895 and 1898; and Prof. Philippson discussed the Ægean region in a similar way.

The human and historical aspects of geography were not left in the background. Prof. Ratzel discoursed on the origin and dispersal of the Indo-Germanic peoples, and Prof. Sieglin on the discovery of England in ancient times. Papers were read

on the need of fresh organisation in obtaining statistics of population in unorganised countries by Dr. Scott Keltie, and on means of representing such statistics on maps by Prof. Hettner. Prof. Neovius, of Helsingfors, exhibited a remarkable atlas of Finland recently completed by the Finnish Geographical Society, in which all the conditions of the land, natural and economic, are mapped with a completeness that has never been attempted for any other country. It even includes a map showing in horse-power the available energy of the rivers.

As was to be expected there were many papers on geography in its educational aspects. Amongst these one by Prof. Ratzel on geographical position as the central fact in geographical education was perhaps the most important.

The last meeting of the Congress was to have been addressed by Prof. Hergesell on the results of international balloon investigations, but the author somewhat rashly made an ascent the previous morning in a balloon, which carried him so far towards the Russian frontier that the Congress had been formally closed before the slow means of terrestrial locomotion brought him back to Berlin.

No better bird's-eye view of the work of the Congress can be given than by presenting in a condensed form the series of resolutions passed at the final meeting, which are intended to minister to more complete international co-operation in the work of scientific investigations.

RESOLUTIONS OF THE SEVENTH INTERNATIONAL GEOGRAPHICAL CONGRESS.

(The order is that in which the resolutions were presented.)

(1) The Congress appoints a Committee of Bio-geographers resident in or near Berlin to draw up a uniform scheme of nomenclature for plant-formations, and after consultation with non-resident specialists, to revise the same and present it to the Eighth Congress.

(2) The Congress believes that the plans for international co-operation in Antarctic exploration form an excellent basis for joint research in physical geography, geology, geodesy and biology. With regard to meteorological and magnetic work, however, they appoint an international committee to determine the general scheme and methods to be employed on the expeditions, and to endeavour to organise a system of simultaneous observations in the regions surrounding, but exterior to, the Antarctic.

(3) The Congress expresses the earnest desire that all maps, including those published in countries using English and Russian measures, should, in addition to the graphic scale, bear the proportion of lengths on the map to those in nature in the usual form 1 : x.

(4) The Congress views it as desirable that the publication of all new geographical material accompanying accounts of travel, should be supported by details regarding the methods of surveying, the instruments employed, and their verification, the calculation of astronomical positions with their probable error, and the method of utilising these data in preparing the map. Also that all maps published by scientific men, institutions or governments should be accompanied by notes of the principal fixed points.

(5) The Congress expresses the hope that a uniform system of measures will be used in all geographical researches and discussions, and recommends that the metric system of weights and measures be so employed.

(6) The Congress expresses the hope that in scientific publications the centigrade thermometer scale should, as far as possible, be employed; or, at least, the values in centigrade degrees added to those expressed on the scales of Fahrenheit or Réaumur.

(7) With regard to the proposal to introduce a decimal division of time and angles, the Congress desires to preserve the present division of time and of the circumference into 360°, but allows that the adoption of a different subdivision of the angle might be studied, and considers that in certain cases the decimal subdivision of the degree of arc presents no objection.

(8) The Congress is of opinion that the *Bibliotheca Geographica*, published by the Berlin Geographical Society, may be accepted as an efficient international bibliography of geography.

(9) The Congress considers the construction of statistical population maps to be very desirable, and appoints an international committee to draw up a scheme, at the same time expressing the hope that national committees will be formed in various countries to promote the preparation of such maps.

(10) The Congress considers the collection of data as to the

distribution of floating ice to be very important, and appeals to the hydrographic and meteorological institutes of the countries whose ships frequent high latitudes to induce the masters of vessels to keep a regular record of the occurrence of drifting ice. The Congress believes that the Danish Meteorological Institute in Copenhagen is the best adapted as an international centre for collecting the records.

(11) The Congress nominates an international committee to consider the nomenclature of the floor of the ocean, and to produce and publish at latest in time for the next Congress a chart of the ocean with revised nomenclature.

(12) The Congress hopes that the names of oceanic islands, especially in the Pacific, will be revised with a view to ascertaining and preserving the native names. Where no native names exist or can be ascertained, the names given by the discoverers should be used. The arbitrary changing of established names ought to be opposed by every means.

(13) The Congress recognises the desirability of obtaining data for a more exact estimate than now exists of countries in which there is no means of taking a census, and desires to bring the matter to the notice of such Governments as have foreign possessions.

(14) The Congress expresses sympathy with the proposal to equip an expedition in New South Wales, with the sole object of endeavouring to discover remains or traces of the route of the Leichhardt expedition, which perished in the interior of Australia fifty-two years ago.

(15) The Congress is favourable to the foundation of an international seismological society, and appoints an international committee for the study of earthquakes.

(16) The Congress believes the production of a map of the world on the scale of 1 : 1,000,000, the sheets bounded by meridians and parallels, to be both useful and desirable. The Permanent Bureau of the Congress is instructed to deal with the question, and in the first instance to secure the preparation of a projection for the map with degree-lines on the determined scale.

(17) The Congress considers the establishment of an International Cartographical Association of service, and appoints a committee to take preliminary steps.

THE SCIENTIFIC CONFERENCE AT WIESBADEN.

WE refer in a leading article to one of the most important developments of scientific organisation which our time has seen. The proceedings at a recent conference at Wiesbaden, dealing with this matter, are thus stated in Monday's *Times* :—

"For several years past there has existed an Association or Cartell of the Academies of Sciences of Munich and Vienna and of the Royal Societies of Sciences of Göttingen and Leipzig, which has met yearly to discuss matters of common interest, and the combined action of these bodies has in several ways been fruitful of results. Representatives of the Royal Society of London attended the meeting held last year at Göttingen, as well as that which took place the previous year at Leipzig, chiefly with the object of discussing the project of an international catalogue of scientific literature which the society has been engaged in promoting.

"When the invitation was conveyed to the Royal Society of London to send representatives to the Göttingen meeting it was intimated that the Cartell would be glad to learn the views of the society as to the possibility of its joining the association. The delegates appointed from London were instructed to state that the Royal Society would be disposed to join provided that the organisation were so extended as to assume a truly international character. This suggestion was not only accepted in principle at Göttingen, but it was agreed that the Royal Society of London should be requested to take the steps, if thought desirable, to ascertain how far the establishment of such an international association would commend itself to the leading scientific bodies of other countries.

"The Royal Society of Sciences of Berlin, although not included in the Cartell, has for several years past been represented at its meetings. When the Royal Society of London had ascertained that the project was likely to find favour it was agreed that the Royal Society and the Berlin Academy should together issue an invitation to the Academy of Science, Paris, the Imperial Academy of Sciences, St. Petersburg, the

Reale Accademia dei Lincei, Rome, the National Academy, Washington, U.S.A., as well as to the bodies included in the Cartell, requesting them to send delegates to a conference to be held in Wiesbaden on the 10th and 11th of this month.

"At the conference, excepting the Reale Accademia dei Lincei, which was unable to send delegates, although in full sympathy with the movement, all the bodies invited were represented—the Berlin Academy by Messrs. Auwers, Virchow and Diels; the Göttingen Society by Messrs. Ehlers and Leo; the Leipzig Society by Messrs. Windisch and Wislicenus; the Royal Society by Messrs. Rücker, Armstrong and Schuster; the Munich Academy by Messrs. von Zittel Dyck and von Sicherer; the Paris Academy by Messrs. Darboux and Moissan; the St. Petersburg Academy by Messrs. Famintzine and Salemann; the Washington Academy by Messrs. Newcomb, Remsen and Bowditch; and the Vienna Academy by Messrs. Mussafia, von Lang, Lieben and Gomperz.

"Prof. Auwers, one of the secretaries of the Berlin Academy, occupied the chair, and the success of the meeting was largely due to the extreme ability and tact, combined with judicious firmness, with which he conducted the proceedings. Besides showing himself a master of the three languages—German, French and English—used in the debates, he was thoroughly informed on every point which came up for discussion. Fortunately, all the delegates appeared to be actuated by the desire to co-operate, and there was little difficulty in framing statutes which all were prepared to accept.

"The immediate outcome of the conference has been that it is resolved to found an international union of the principal scientific and literary bodies of the world, the object of which will be to initiate or promote scientific enterprises of general interest recommended by one or more of the associated bodies, and to facilitate scientific intercourse between different countries. It is to be known as the International Association of Academies. A number of important bodies besides those represented at Wiesbaden are to be invited to join. General meetings of delegates from the various constituent academies are to take place, as a rule, at intervals of three years, but the interval may be varied and special meetings held if necessary. The Royal Society had proposed, prior to the conference, that the first general meeting should be held in Paris next year. At the general meetings two sections will be constituted, one dealing with mathematics and the natural sciences, the other with arts and philosophy.

"A council is to be appointed which will carry on the business in the intervals between meetings. The formation of committees of experts to initiate and promote scientific investigations of international importance is also contemplated.

"It remains to be mentioned that the Berlin Academy had also arranged for the entertainment of the delegates at the close of the debates. On the Monday evening they were invited to attend a performance of Lortzing's opera *Undine*, and on the Tuesday they were entertained at dinner in the Kurhaus. On the latter occasion Prof. Virchow occupied the chair, and opened the proceedings by toasting the delegates generally; he was followed by Prof. Darboux, of Paris, who proposed the health of the Berlin Academy. In the course of the evening, in characteristic German style, every other possible toast was proposed by one or other of the delegates.

"It is to be hoped that when the statutes framed at the conference are communicated to the various bodies interested they will meet with approval, and that the establishment of the organisation will soon be an accomplished fact. In times when political feeling is so strongly developed the provision of a common platform on which all nations can meet amicably and co-operate in furthering scientific enterprises must prove of the very greatest value; and if the spirit of amity which prevailed at the conference be extended to future meetings the success of the association is assured."

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Sir Michael Foster has been reappointed a manager of the Balfour Fund for zoological research.

Mr. Yule Oldham, reader in geography, is giving three courses of lectures this term : (1) on the Geography of Europe, for history students; (2) on Physical Geography; and (3) on the History of Geographical Discovery.