

of the Cunos or Tulé Indians of Darien, from the reports of a missionary sent to labour among them to Bishop Thiel, of Costa Rica, who has communicated them to Herr Polakowsky.

THE current *Mittheilungen* (Band xxix. Nos. 7 and 8) of the Geographical Society of Vienna contains letters from Dr. Lenz and Herr Baumann, from the Congo, and part of an account by Dr. Holub of his present journeyings in South Africa. Of special interest are two papers on the Hauslab cartographical collection. One describes the general extent and contents of the collection, which is in three parts: (1) books; (2) engravings; (3) maps. The last contains about 4500 sheets, and is especially rich in old specimens of cartography. Two of these form the subject of a second paper: they are a globe, the author of which is unknown, but which probably dates from soon after Columbus; the other is a chart of the Mediterranean dated 1513.

### THE FIFTY-NINTH MEETING OF GERMAN NATURALISTS AND PHYSICIANS, BERLIN, SEPTEMBER 18-27

[FROM OUR BERLIN CORRESPONDENT]

THE present has in every respect been the most important of these annual meetings. Even in the number of visitors it far exceeds any similar reunion since the foundation of the Society, as many as 2224 members, and 1931 associates, or 4155 altogether, having entered their names, while no less than 1496 ladies took part in the general proceedings and social gatherings. It may here be remarked that the constitution of the German Naturalists' Society differs essentially from that of the British Association, as it exists only so long as the meeting lasts, and consists of members—that is, of persons who have published treatises, other than dissertations for academical honours, on general scientific and medical subjects—and of ordinary associates. Two or three sittings are devoted to the formal proceedings, such especially as the choice of the following year's place of meeting, and of the two leaders, whose duty it is to summon the next assembly, and arrange the work on hand. The general sittings are occupied with matter of universal interest, and are attended in common by all members, associates, and ladies. The more strictly scientific work, however, is distributed amongst the several Sections, thirty on this occasion, each of which is presided over by a freshly elected chairman, and set apart for the discussion of papers by specialists. After the last general sitting, at which the annual meeting is officially dissolved, it ceases for the time being to exist. Enjoying no special source of income, and keeping no permanent records, it possesses in the officers appointed to arrange for the next gathering the only germ of a new and equally ephemeral existence. To this temporary organisation corresponds the manner in which its proceedings are issued. An official journal, published only while the gatherings are held, contains the proceedings of the general sittings *in extenso*, those of the various Sections in shorter or more detailed reports. It may here be mentioned that, at the suggestion of the administration, a Commission was on this occasion appointed for the purpose of reporting to next year's meeting any proposals for a modification of the statutes. Reference was made more especially to such a change as would confer on the German Naturalists' Society a more stable existence; in fact, an organisation somewhat similar to that of the British Association.

Of the 4155 members and associates present, Berlin was represented by 1444, other places by 2711 (including 429 foreigners), as under: Europe, 347; America, 54; Asia, 18; Africa, 6; Australia, 4. Most of the leading representatives of German science were present, although illness unfortunately prevented the attendance of Von Helmholtz, Kirchoff, and Wislicenus, the first and last of whom had undertaken to deal with some matters of general interest.

Under the presidency of the two administrators, Prof. Rudolf Virchow and Prof. A. W. Hofmann, the first sitting was held on Saturday, September 18, when an audience filling the spacious Circus Renz was addressed by Herr Virchow on the development of the Society from modest beginnings, and its present importance for the mutual interdependence of the various branches of the natural and therapeutic sciences. He dwelt on the progress made since the first meeting in Berlin, in 1828, under the presidency of Alexander von Humboldt, which had been attended by Oerstedt, Berzelius, Gauss, Weber, Johannes Müller, Mitscherlich, Rose, Magnus, Ehrenberg, but from

which Goethe had absented himself. The importance of these illustrious *savants* for the development of the physico-chemical and biological sciences, and the continuity of their researches with the problems now under discussion, formed the conclusion of this highly instructive opening address. After receiving the felicitations of the representative of the Minister of Public Instruction, Von Gossler, of the Berlin Oberbürgermeister, and the Rector of the University, and after the meeting had made choice of Wiesbaden for next year's gathering under Prof. Fresenius and Dr. Pagenstecher, Dr. Werner Siemens discoursed on "The Scientific Character of the Age." The speaker dilated on the spread of the natural sciences through these periodical gatherings and through their introduction into the school-room, thus influencing the *technique* of the arts, which in their turn react powerfully on the social relations, so that, by his command of the forces of Nature, man is now enabled to produce the necessaries and the pleasures of life in greater abundance with less expenditure of time and labour. He is certainly not able to overcome all the evils inherent to the present period of transition; but our scientific age promises to discover all the remedies calculated to alleviate and cure the ills from which we now suffer.

At the second general sitting, held on September 22, Prof. Pohlmann, of Buffalo, conveyed the greetings of the American Association to the German Naturalists, together with a general invitation to the International Medical Congress to be held next year in Washington. Prof. Ferdinand Cohn, of Breslau, then spoke on "Vital Questions," dealing with the nature of life from the present scientific stand-point, in reference more especially to the simplest living beings, the lowest plants, whose vital functions he described in attractive language. He considered that we had already half solved the riddle of life, inasmuch as we had grasped its mechanism and the physical and chemical forces which set it in motion. But we have to face other phenomena and active forces, which must be clearly fathomed by the more fortunate efforts of future research, so that the full solution of the problem of life may perhaps be deferred to a remote period. The next speaker was Herr George Schweinfurth, from Cairo, who spoke on "Europe's Mission and Prospects in Central Africa," arguing energetically for the possibility and necessity of colonising that region. He described the wealth of this continent, both in natural resources and available labour, which by colonisation alone could be properly utilised in order not only to insure a happy and worthy future for the natives of Africa, but also to open a wide field of fruitful activity for the already crowded populations of Europe. He warmly combated the assumptions that its tropical climate closed the door of Africa to most Europeans, and that acclimatisation was impossible. Under certain precautionary measures, and when Western culture has reclaimed Africa by railways, draining, disafforestation, tillage, and stock-breeding, just as Europe itself has been reclaimed by the hand of man, then the white race will find itself as much at home in Africa as the Negro. After the transaction of some formal business, Prof. His, of Leipzig, addressed the meeting on "The Development of the Zoological Station at Naples, and on the Growing Urgency of a Scientific Central Establishment." From the information gained by repeated personal visits, he gave a vivid description of the Neapolitan Station, and concluded by indicating the chief objects of such a central institution as he considered should now be founded. Amongst these objects he mentioned the investigation of the anatomy of the brain, which could be best carried out in such a central station.

At the third general sitting, held on September 24, Dr. Ludwig Wolf, of Dresden, reported on his journey to Central Africa, describing his route from Leopoldville, on the Kassai, and its copious affluent, the Sankuru, through the domain of the Bakutu, the Bakuba, the Balula, and Lunda peoples. He gave an animated picture of his experiences on this journey, which he made as a member of the Wissmann Expedition. He was followed by Prof. Neumayer, of Hamburg, who urged the necessity of Antarctic exploration, dilating especially on its importance for geology and palæontology. From it he anticipated an answer to the question how, as he assumed, the South Pole had been a centre of dispersion for living organisms throughout the southern, as the North Pole is now generally supposed to have been for the northern hemisphere. He further dwelt upon the great value of terrestrial magnetic observations in high southern latitudes, since in the far north a whole chain of stations had recorded the extent of the fluctuations of the magnetic needle. Simultaneous observations in the north and south will alone enable us to arrive at definite conclusions on the nature of

terrestrial magnetism and its relations to the earth-currents, Polar lights, and solar energy. Prof. Bergmann, of Berlin, followed with some remarks on the relations of modern surgery to the treatment of internal ailments. After some formal proceedings, the third general sitting, and with it the fifty-ninth gathering of the German Naturalists and Physicians, were brought to a close.

In a brief report of this nature it would be impossible to do more than refer in the most summary way to the work done in the several Sections, of which twelve were devoted to scientific and eighteen to medical subjects. Altogether 522 topics were discussed, and 155 demonstrations carried out. Most of the proceedings will be published in special scientific journals, and here it will suffice to mention more especially the remarkable synthesis of coniine, the poisonous alkaloid of hemlock, effected with surprising success by Prof. Ladenburg. Thanks to this achievement, the artificial production of a vegetable alkaloid may now for the first time be regarded as successfully accomplished. In the physiological department the question of the localisation of the cerebral functions gave rise to an animated discussion, in which Profs. Hitzig, Munth, and Soltz took part. In the section devoted to the subject of scientific instruction, Prof. Haeckel pleaded strongly for a severer training in this branch of knowledge amongst young students. It may be mentioned in conclusion that, in connection with this meeting, an exhibition of scientific instruments, apparatus, and educational appliances was held in the apartments of the Academy of Arts and Sciences. There was a good show of instruments of precision, microscopes, electric, medical, and other appliances, which attracted a large number of visitors during the few days the exhibition lasted, from September 16 to 26.

#### THE HARVEIAN ORATION

DR. PAVY, F.R.S., delivered the Harveian Oration at the Royal College of Physicians on Monday afternoon. After giving the directions marked out by the founder of the Oration—viz., to commemorate the benefactions that have fallen into the possession of the College and to search and study out the secrets of Nature by way of experiment—the orator alluded to the augmentation which the income from the endowment of the Croonian Lectureship has recently undergone, by which the amount available is raised from 10% to 200% per annum; and to the sum (2000%) bequeathed by the late Dr. Gavin Milroy. He next spoke of the course pursued by Harvey as set forth by Lord Bacon, in his “*Novum Organum*,” or “true directions concerning the interpretation of Nature.” Instead of giving himself up, as others had done before him, to arguing out conclusions from accepted axioms, Harvey struck out, Dr. Pavy continued, into the hitherto untrodden path of inquiry—that of induction—and sought knowledge by a direct appeal to Nature through the medium of observation and experiment. “It were disgraceful,” he says, “with this most spacious and admirable realm of Nature before us, did we take the reports of others upon trust, and go on coining crude problems out of these, and on them hanging knotty and captious and petty disputations. Nature is herself to be addressed, the paths she shows us are to be boldly trodden.” In the discovery of the circulation Harvey applied the principles of induction and argued upon them in a strictly logical way. He showed himself to be a good and careful observer, judged even by the standard set forth by John Stuart Mill on the process of observing. The experiments which Harvey conducted on the arteries and veins, to assist him in his inquiry, were founded upon a well-devised plan. Dr. Pavy next spoke of the new departure in physiology which Harvey’s discovery established, of the opposition with which his views were received, and remarked that the high position in his profession he had attained did not suffice to secure his escape from the effect of the prejudice against innovation entertained by the multitude. Aubrey tells us he had “heard him say that after his book on the circulation of the blood came out he fell mightily in his practice; ’twas believed by the vulgar that he was crack-brained, and all the physicians were against him.” Harvey lived, however, to see his doctrine generally accepted. The orator next referred to one issue of research derived, he said, from the labours of the present day, which has already yielded much good and useful fruit and gives promise of yielding much more. “Belonging to the realm of living Nature there are,” he continued, “small organisms, the existence of which we must have remained unconscious of in the absence

of the aid of the microscope. These bodies are known by the name of bacteria or bacilli, and, while some difference of opinion has existed, it is generally thought that they are organisms belonging to the vegetable kingdom. There is nothing in their appearance to strike the observer that they possess any significance, and yet by recent research it has been found that they play a most important part as constituents of the living world.” The experiments of Spallanzani, Schulze, and Swann, were next described by Dr. Pavy, the natural conclusion to be drawn from which, he said, “goes far towards absolutely establishing that the air contains the germs of living organisms, and that it is these that constitute the source of the microscopic organisms found to become developed in the presence of organic matter, which some have contended take rise spontaneously. This view is supported by the researches of the present day, and nothing that would bear the scrutiny of strict investigation has ever been adduced against it. It stands at the foundation of our modern notions regarding the rôle played by bacilli, and thus occupies a position of weighty importance with reference to the matter. The step from the action exerted by bacteria as agents exciting the decomposition of organic products to that which brings them before us as a source of disease is not a large one. In the one case they lead to change which would not otherwise occur, and in the other they disturb the order of changes naturally taking place and thus induce an abnormal state; and although there is nothing in their morphological characters to show the reason, different trains of phenomena—in other words, different diseases—are occasioned by different kinds of bacilli. . . . Through the indefatigable researches of Pasteur and others the distinguishing form and life-history of certain of these organisms have been clearly made out. Placed under suitable conditions, it has been found that they can be reared or cultivated artificially, and one of the most marked and important characters belonging to them is the enormous extent of self-propagating power they possess. This accounts for the rapid spread that is observed to take place of an infectious disease, if allowed to progress without controlling measures being brought to bear upon it. We have to deal, then, with something that lives and grows by virtue of a power pertaining to itself. Permit this living growth—this parasite, in fact—to become dispersed and to enter the system of a living person, and presuming it has lodged upon a soil supplying suitable conditions for its development, it will thrive and multiply and give rise to a series of phenomena which the physician has no power to arrest. Once the bacillus is implanted and the disease established, all that the physician can do is to see that the patient has fair play—that he is kept under the most favourable conditions for battling successfully against his enemy. What is to be philosophically aimed at, however, is to check the spread—to bar the transmission of the parasite from one person to another, by attacking it outside the body; and this, with the application of the proper measures of disinfection, can with facility be done, but naturally the facility of preventing extension stands in proportion to the degree of limitation at the time existing. The spark of fire is with the greatest ease extinguished, but let it kindle into flame, and in proportion as the flame spreads the difficulty becomes greater to get the conflagration under. This is one way in which the attack upon the bacillus may be made, and the ravages of disease restrained. Another way, by quite a different line of tactics, presents itself; and the knowledge of this is due to the researches that have been recently conducted. The vulnerable point to which I am alluding lies not in connection with the bacillus itself, but with the condition of the medium upon which it may chance to fall. It has been found that the parasite requires virgin soil for its growth. This observation stands in harmony with the result of common experience as regards disposition to contract infectious disease. It has been from remote times generally known that a person who has passed through one attack of an infectious disorder is not liable to the same extent as before to become affected on exposure to contagion. An influence has been exerted giving rise to more or less protection being afforded against a recurrence of the disease. Now it happens that by certain means the bacillus may be brought into such a weakened state as only to occasion, when introduced into the system of an animal, an effect of a mild nature, not dangerous to life, instead of the ordinary form of disease; but the effect produced, and this is the great point of practical importance, is as protective against a subsequent attack as the fully-developed disease. There are two methods by which attenuation in virulence of the disease-producing organism may be brought about—