

the Psilotæ; on this ground, among others, an affinity between the fossil and the recent family appeared tenable. This view has recently been supported by Prof. Thomas, of Auckland, N.Z., on evidence drawn from certain remarkable variations which he observed in the genus *Tmesipteris*. On the view suggested, the synangium of the Psilotæ is neither a reduced strobilus nor a septate sporangium, but a ventral sporangiophore bearing a variable number of sporangia, normally two or three, according to the genus. Mr. A. C. Seward, F.R.S., and Mr. Arber gave an account of some fossil *Nipa* seeds from Belgium.

In the domain of plant morphology, several interesting papers were communicated. Mr. John C. Willis, director of the Royal Botanic Gardens, Peradeniya, described the dorsiventrality of the Podostemaceæ, and showed that it extends both to the vegetative and floral organs. The more modified types show a progressive increase in dorsiventrality of the vegetative system followed throughout by an increase in that of the floral. The same series, regarded ecologically, shows that though the flowers are steadily more and more zygomorphic—a condition usually regarded as an adaptation to insect visits—we have here flowers which stand stiffly erect, and are more and more anemophilous and autogamous. Miss Sibille O. Ford (Cambridge) gave an account of the morphology of the Araucariæ, which include the two genera *Araucaria* and *Agathis*; they are characterised by the regularity of their branching and the persistence of their leaves. The apex of the stem shows no definite apical cell, but a somewhat irregular dermatogen. Well-marked annual rings may be found in the wood, and bordered pits are found on the tangential walls of the latest formed summer wood. Mr. Herbert Wright (Ceylon) described the sex relationships in Ceylon species of *Diospyros*. These plants have hitherto been regarded as dioecious, but he finds from an examination of fresh material frequent departures from this condition, some being monœcious, others dioecious and polygamous, and others dioecious, monœcious and polygamous. Mr. Worsdell gave an account of the various theories as to the nature of the sporangial integuments in various groups of plants. The author maintains Čelakovsky's view that in the ferns the *sporiferous segment of pinnae*, bearing as a rule sporangia on its lower (dorsal) surface, is the homologue of the outer integument of the ovule in Angiosperms, and *indusium* that of inner integument. Mr. Worsdell also read a paper on the nature of the vascular system of the stem in certain dicotyledonous orders, in which he comes to the conclusion, from anatomical data, that no hard and fast line exists between the two classes of dicotyledons and monocotyledons. The flowering stem and peduncle, as being those parts of the caulome which have undergone least modification owing to the necessities of adaptation to external conditions, exhibit, as a rule, most clearly the primitive structure which in the vegetative parts has become obscured. Mr. E. A. Newell Arber (Cambridge) read a paper on the morphology of the flowers in certain species of *Lonicera*. The genus includes about seventy species which belong to the section *Xylostemum*. In this section, the gynœcea of a two-flowered dichasium are more or less completely united together. In some cases, the two inferior ovaries are united in one plane by the *union of their receptacular walls*. In others they are for the most part free from one another, but surrounded by an outer parenchymatous tissue, arising from the base. This tissue is the result of the *fusion of the bracteoles* of the true flowers. Mr. Harold Wager communicated some of the results of his recent observations on the structure of the central body in various species of *Cyanophyceæ* which show that, although wanting some of the characteristics of the nuclei of higher organisms, it must be regarded as nuclear in character and possibly as a nucleus of a simple or rudimentary type. In another paper, Mr. Wager dealt with the function of the nucleolus. This body, in the cases examined by him, appears to be intimately connected with the nuclear network, and contains chromatin material which contributes directly to the formation of the chromosomes. Prof. Oliver and Miss Edith Chick had a paper on the morphology of *Torreya myristica*, in which some interesting features of morphological importance were described.

Among other papers brought before the Section were the following contributions from mycologists:—Miss Lorrain Smith described a disease of the gooseberry which attacks the hard stem of the bushes above and below the ground level. The inner bark is permeated and completely destroyed by the mycelium of a fungus. The outer bark cracks and splits, and sclerotia are formed on the outside or half embedded in the

cortex. Mr. Barker (Cambridge) gave an account of the fungus of Samsu, a fermented drink of Eastern Asia, obtained by the distillation of a fermented liquor prepared from rice. The conversion of the starch into fermentable sugars is due largely to a species of *Monascus*. Hitherto this genus has been placed in the Hemiasci on account of a supposed formation of spores in a sporangium, surrounded by an investment of hyphæ. It is, however, one of the simplest sexual Ascomycetes. Mr. E. M. Freeman (Cambridge) contributed a paper on the darnel seed fungus, in which several new and important facts were brought forward.
H. W.

CARLSBAD MEETING OF THE GERMAN ASSOCIATION OF NATURALISTS AND PHYSICIANS.

THE seventy-fourth annual meeting of the Association of German Naturalists and Physicians was held on September 21–28 at Carlsbad, after an interval of not less than forty years. At the meeting, very naturally, the hot springs for which the place is famous suggested a suitable subject for discussion. Geologists and chemists alike concentrated their attention upon them. Prof. van 't Hoff, who may be regarded as the veritable creator of modern theoretical and physical chemistry, was there to elucidate the subject. Prof. Meyerhofer applied the latest teaching of that particular science to the springs, exciting a keen interest by his masterly method of dealing with the subject, more particularly when entering into the newest discoveries with regard to the theory of osmotic pressure and of ions which van 't Hoff and Arrhenius have effectively established. The entire organism in biology may be shown to be a collection of osmotic cells, enclosing saline solutions, and the movement of liquids in them is to a high degree, if not entirely, determined by the laws of osmotic pressure.

The Carlsbad springs have been again and again subjected to osmotic analysis, and this has led to a considerably deeper insight into the cause of their hygienic action than the merely chemical analysis which had first been judged sufficient. Mineral waters of high osmotic pressure, so it has been ascertained, remain in the stomach longer than waters of low osmotic pressure, and this fact enables the physician the better to judge what kind of water should be selected in dealing with any particular affection of the stomach. The study of the waters has been carried further, and the value of certain distinct rules and modified methods has been ascertained as facilitating comparison in respect of osmotic pressure between mineral springs and liquids occurring in the human body. Among other results, it has been shown that natural mineral waters are much more efficacious than artificial imitations. Very possibly this is due to the presence in the natural springs of certain chemical substances held in solution in such infinitesimal quantities that make them escape the notice of the purely chemical analyst. Such undiscovered ingredients may very well act by catalytic methods and so increase the efficacy of the solution.

That question, indeed, requires further elucidation, which is likely to prove of much benefit to balneological science, to the relief of suffering humanity.

Another lecture of great interest was that delivered by Prof. Suess, of Vienna, on the nature of hot springs. The mineral springs which are due to infiltration from surface water go by the name of "vadose" springs; they may be either cold or hot, according to their depth. It has been proved in the case of more hot springs than one that they run along earth crevasses formed before their own origin. Thus at Carlsbad the springs have followed the preexisting metallic veins (ore-lodes) which thousands of years ago found an outlet from the interior to the surface. The Carlsbad springs yield yearly about 5·6 million kilogrammes of solid ingredients which originate in the interior of the earth and contain in correspondingly small quantities the same elements as the ore-lodes the course of which they follow. Carlsbad is therefore manifestly a "juvenile," *i.e.* volcanic, water. Attempts made to search for an area of infiltration (as for "vadose" waters) or to estimate the depth of its origin from any kind of a so-called thermal scale have proved absolutely futile. Nor yet can the presence of mineral ingredients be explained by the nature of the granite through which they run to the surface. The cavities which were long supposed to have been formed by the continual effusion of 5·88 million

kilogrammes of fixed ingredients annually are due to an entirely different cause. Carlsbad, it ought to be remembered, stands on a spathic lode of horn stone. Whether its hot waters in the depth still precipitate heavy metals and are active in building up a metallic vein, reaching finally daylight in an impoverished state, or whether the conditions of to-day do not admit of such an activity, it is impossible to say. The presence of arsenic, antimony and zinc, indeed, favours the former conclusion.

The Congress held general meetings in which very interesting communications were made. Thus, Prof. Weber, Amsterdam, had much to say upon the Malay Archipelago and the history of its fauna. He reconstructed, so to speak, the great bridge between the people of East Asia and Australia. Again, Prof. Voller, director of the Electrotechnical Institute of Hamburg, explained the foundation and methods of electrical wave telegraphy. Communications showed that very substantial progress has recently been made, thanks to the theoretical study of the subject by Prof. Braun, of Strassburg, and the practical experiments of Prof. Slaby, of Charlottenburg. Some practical demonstrations of what has been called the Slaby-Braun system, for which the Congress was indebted to the General Electrical Company, of Berlin, and the Society for Wireless Telegraphy (by the Braun and Siemens-Halske process), of Berlin, helped to make the matter very much clearer.

The Carlsbad Congress, which was, according to established usage, held in a number of distinct sections—28 in all—was opened with a very interesting address on the constitution of the molecule of albumen, by Prof. Hofmeister, of Strassburg. Investigation of this important subject is beset by difficulties. However, in spite of this, modern science has, by means of continued inquiry, succeeded in establishing certain valuable facts which promise to lead to a clear knowledge of the subject. Thus it has been ascertained that glyocol, which is derived from albuminoid bodies, becomes transformed into urea. Therefore the road to further discovery must, one would think, lie across glyocol, and we can unconstrainedly trace back the other principal nitrogenous final products, just like urea, to the splitting up of the molecule of albumen, and *vice versa* we might reconstruct the molecule of albumen from the final products.

Prof. Emil Fischer, of Berlin, in the Section of Chemistry, spoke on practically the same subject in an intensely interesting way. He was able to state that he succeeded in obtaining albuminoid substances by synthesis the possibility of which had so far only been dreamed of.

Furthermore, Prof. Leube, of Würzburg, reviewed the whole question of physiological albuminuria (both "manifest" and "latent"). He showed that in some healthy individuals albumen passes in the urine regularly after standing, whereas it disappears when the persons affected alter their position to sitting or lying. Muscular exertion may also be productive of albuminuria, but only in a standing position. Food of itself causes no albuminuria. It may, indeed, result, after the eating of raw eggs, but only when the person eating them has been standing. Such disposition to albuminuria is probably owing to an innate greater transmissibility of the filtrating membrane of the kidney. It is innocuous. Prof. v. Eiselsberg, of Vienna, dealt with the subject of the thyroid gland. His paper showed that goitre is caused by some mineral constituents occurring in certain geological formations and transmitted by water. In all probability, cretinism is due to similar causes, made effective through the action of the thyroid gland. Prof. v. Wettstein, of Vienna, made "Neo-Lamarckism" his subject, and explained the great importance of "selection" in the development of species, showing that by "selection" alone is it possible to account for the remarkable variety of forms to be observed in the same scale of organisation. The argument is, however, manifestly incomplete. For "selection" cannot account for the progress of development which, on the other hand, "direct accommodation" does explain.

Prof. Penck, of Vienna, in his paper on prehistoric man, proved that the interval between the older and the younger Stone age can only have been a very short one. In future, therefore, we will have to consider rather an advance of the culture of the younger Stone age than an immigration of Neolithic people, bearing in mind that, according to the present standard of our knowledge, Europe is the scene of a prehistoric culture the beginning of which lies a few hundred thousands of years back.

So much for the general meetings. The sectional gatherings

proved no less interesting and instructive. In the Pediatric Section, Dr. Moser, of Vienna, threw new light upon the theory, still to be proved, of the unity of species of the streptococci in scarlet fever. He has used a mixture of bouillon-cultures of streptococci from various cases of scarlet fever for immunising animals. In this way he has obtained a serum from horses which was shown to possess a specific curative value in scarlet fever when tried in the pediatric clinic of the University (Prof. Escherich). The serum, which was prepared in the Serotherapeutical State Institute (Prof. R. Paltauf), has been used in the clinic since November, 1900. Of 699 scarlet fever cases of St. Anna Hospital, the worst were picked out and 81 received injections. It is the clinical aspect which in all these cases speaks for the specifically curative effect of the serum. If the injection is made on the first or second day there is no death; at a later period the result is less certain. The effect of the injection is that the fever vanishes or subsides, the general feeling improves in a remarkably short time, the nervous disturbances disappear very rapidly, the children feeling surprisingly better. Up to now it has proved necessary to inject the serum in considerable quantities, and the effect has sometimes been that sensitive children have suffered in consequence from eczema. This, however, passes away speedily without causing any injury. In the St. Anna Hospital it was found possible to lessen mortality to 8.9 per cent. out of almost 400 cases, whereas in the other hospitals of the town the average mortality was 13.09 per cent. Yet these results were obtained under partial application of the method, owing to the insufficient quantities and low concentrations only of the serum being available, so that only a fraction of the sick could be subjected to this treatment. Prof. Escherich spoke energetically of the favourable action obtained with the serum. Prof. Paltauf expressed regret that the quantity of serum necessary cannot yet be precisely determined, as is the case with the diphtheria serum. The Government has, however, granted the Serotherapeutical Institute an exceptional subsidy of 10,000 kr. so as to produce this scarlet fever serum in sufficient quantities.

In the Section of Dentistry, Dr. Sickingen furnished really astounding material illustrating the necessity of paying careful attention to the teeth of soldiers. As a result, an appeal was made to the Ministry of War recommending that garrison dentists should be appointed in the army. Furthermore, the Section of Hygiene adopted a resolution urging that as a means of raising the general hygienic condition of the people, special district dentists and school dentists should be appointed by the State and prohibited from engaging in private practice. Dr. Sternberg, in the Section for Pathological Anatomy, related that dead tubercle bacilli may bring about the same anatomical changes as living ones, causing the death of the animals experimented upon. Dr. Kraus, Vienna, spoke of the action of immune-hæmolysine (the serum of rabbits treated previously with canine erythrocytes); small quantities of such serum have been found to produce a grave disease which has been characterised as hæmoglobinæmia, hæmoglobinuria, grave anæmia or possibly icterus. Prof. Takahasi (Tokio) spoke on poisonous fish. Of such he showed the Tetroton (called "Tugu" in Japan) to be the most poisonous of all. Its ovary contains most of the poison, the next dangerous being the liver; the muscles, on the other hand, are entirely free from the poison. Accordingly, a police regulation has been enforced, permitting the sale of this fish only after the internal organs have been removed.

Prof. Frick, Zurich, spoke of the treatment of feverish diseases without alcohol, and aroused considerable interest in view of the bearing of this matter upon the anti-alcoholic movement. He said that the popularity of alcohol is entirely due to its quality as a narcotic. Alcohol, however, possesses a number of qualities which make its use seriously contra-indicated in the ward altogether, and more particularly in febrile diseases. Moreover, the power of resistance against infectious matter is abated in the animal organism by the consumption of alcohol, and this is the reason why drinkers show in any kind of infectious disease a lesser power of resistance than people who practise abstinence.

Another question of great interest raised in the proceedings was that of the "circuit of nitrogen." Among the highly instructive communications which were made on the subject, space will permit me here to mention only one. Prof. Meyer, of Göttingen, began his paper with these words:—"Cellulose must become a food stuff." He pointed out the necessity for nitrogen both in vegetable and animal life, and the importance

of preserving it and turning it to practical account in the economy of nature. The population of the German Empire, so he instanced, increases at the rate of one per cent. every year, yet the quantity of nitrogen provided for our sustenance by the ordinary channels remains constantly the same. We shall, therefore, have to take advantage of the free nitrogen present in the air, first to benefit the plants and indirectly to benefit the plant-eating animals. It is known that small organisms, such as the so-called nitrifying bacteria, are able to assimilate directly the free nitrogen occurring in the atmosphere. The immense importance of this economic question is understood upon realising that in the German Empire an area of twelve-and-a-half million acres is covered with lupins and other leguminous plants, cultivated for agricultural purposes, and that these maintain a close touch ("symbiose") with the nitrifying bacteria. The nitrogen of the air which these bacteria attract on such an area may amount to five million quintals, representing at the current market rate something like 300,000,000 marks.

In the Section of Legal Medicine, the director of the Forensic Institute of Graz spoke of the serum diagnostic of blood, and pointed out the difficulties and responsibility involved. Jolles insisted upon the importance of chemical examination of blood, and explained some clinical apparatus which he has devised for such purpose, viz. the ferrometer, the phosphometer and the hæmoprometer.

In the Botanical Section, Prof. Molisch, of Prague, in his paper on the phosphorescence of meat, described the method by which it is possible to obtain such with the certainty of a physical experiment. It is invariably the same micro-organism which causes the phenomenon, namely, the *Micrococcus phosphoreus*, Cohn, a bacterium which has made itself at home all over the continent, though it may be true that it came originally from the sea. Prof. Pribram, Vienna, spoke of the new institute for biological investigation in Vienna, in which it has been made possible to observe an organism during several generations and of studying the principal question of biology, namely, the transmission of acquired characters. Prof. Roehman, Breslau, showed that he had succeeded in keeping mice in the best of health with food consisting of albuminates, carbohydrates and salts mingled in a certain ratio. Prof. Exner, Vienna, with the help of an "acousto-meter," demonstrated that the bad acoustic properties of many public rooms are due in the main to the existence of an echo. Police-Surgeon Dr. Schrank, in the Section for Hygiene, advocated international legal proceedings to prevent the spreading of venereal diseases.

An important demonstration took place in the Section of Mathematics after Prof. Klein, Göttingen, had finished his report on the present condition of the "Encyclopædia of Mathematical Sciences." Prof. Molk, Nancy, added that this great work is now being edited in common by German and French authors, and that this is the first occasion since 1870 that men of science of either side of the Vosges have been brought into active co-operation. In the Section of Astronomy, Prof. Archenholz, of the Treptow Observatory, mentioned that in the determination of the influence which sun spots have on our atmosphere, it is rather the position of these spots and their size on the solar disc than their number which enters into account. Prof. Hasslinger, of Prague, in the Chemical Section, relates the results of his latest experiments by which he has secured diamonds with Goldschmid's thermite method. By adding carbon in various forms, such as that of finely suspended graphite to a fused mass, similar to the South African mother stone Kimberlit, he succeeded in obtaining true diamonds. This is not only an entirely new method, but also corroborates the theory previously maintained of the natural origin of diamonds.

In the Section of Gynæcology, the conservative treatment by bath cures, mud poultices, hot baths, thermophor, &c., was forcibly advocated as yielding complete success and as well qualified to substitute the radical operations, while pus-formation can be stopped by incision only. Prof. Chrobak, of Vienna, pointed out that even so pronounced a radical as Prof. Martine expressed himself in favour of the conservative method. Prof. Kehr, of Halberstadt, gave a *résumé* of no less than 730 operations executed for the removal of gall stones. Where gall stones were removed from the gall bladder, mortality was found to be at the rate of 2 per cent., when the gall bladder was removed with the stones it rose to 3 per cent., and when the stones occurred in the hepatic duct to 6.5 per cent.; however, by continual practice he managed in the last 200 operations to restrict mortality to only 1½ per cent.

From these short notes it will be seen that there was abundant material of a very varied character brought under the notice of the Congress, and dealt with in a manner to make the latter a not unworthy successor of its precursors. Science generally has distinctly gained by its transactions. The next Congress is to be held September 21, 1903. F. SCHUMAN-L. KCLERCQ.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The 240th meeting of the University Junior Scientific Club was held on October 31. Dr. A. D. Darbishire, Balliol, showed an interesting case of reversion. The offspring of an albino pet mouse and a Japanese "waltzing" mouse bears many resemblances to a common house mouse, and does not "waltz."

Mr. H. M. Hartley, Balliol, read a paper on "Jöns Jakob Berzelius."

Mr. W. K. Spencer (Magdalen) has been elected to the Burdett Coutts' scholarship in geology.

The Chemistry School suffered a heavy loss at the beginning of the present term in Mr. Vernon Harcourt's resignation of the Lee's readership, which he held for forty-three years. Mr. Harcourt was a Balliol undergraduate, and in 1858 was placed in the first class in the Natural Science School. During the next year he was elected to the Lee's readership at Christchurch. In addition to his research work, he took an important part in the teaching of chemistry. He did not merely train his pupils in the ordinary curriculum required for the schools, but imbued them with the ambitions of the researcher, and it is a striking testimony to his efforts that the best experimental work by Oxford men of the present generation has come from those who were his own pupils or worked under his influence. His departure from Oxford will be greatly regretted by very many friends both young and old, and he will leave behind him a place which it will be very hard adequately to fill.

CAMBRIDGE.—In the combination room of Peterhouse on Wednesday of last week, Lord Kelvin unveiled a portrait of the late Prof. P. G. Tait, honorary fellow of the college, who was senior wrangler and first Smith's prizeman in 1852. The portrait, which was subscribed for by the master and fellows of Peterhouse, was painted by Sir George Reid, president of the Royal Scottish Academy, and it will be hung in the hall of the college by the side of the portraits of Lord Kelvin and the late Dr. H. W. Cookson. The *Times* reports Lord Kelvin to have said, in the course of his remarks, that he valued most highly the privilege of being allowed to ask the master and fellows of Peterhouse to accept for their college a portrait of Prof. Tait. He felt specially grateful for this privilege as a forty-years' comrade, friend and working ally of Tait. The master of Pembroke (Sir George Stokes) spoke of Prof. Tait as an intimate friend, and said all who knew him must have been impressed with his great ingenuity and the versatility of his genius.

Mr. F. C. Kempson, Caius, has been appointed a demonstrator of anatomy.

The following are the examiners for the natural sciences tripos:—Physics: Prof. L. R. Wilberforce, F.R.S., and T. C. Fitzpatrick; chemistry: C. T. Heycock, F.R.S., and H. McLeod, F.R.S.; mineralogy: A. Hutchinson and G. F. Herbert Smith; geology: H. Woods and Prof. T. T. Groom; botany: Prof. Ward, F.R.S., and D. H. Scott, F.R.S.; zoology: J. S. Gardiner and Prof. Graham Kerr; physiology: W. B. Hardy, F.R.S., and E. H. Starling, F.R.S.; anatomy: N. B. Harman and Dr. A. Keith.

Dr. W. H. R. Rivers, University lecturer in experimental psychology, has been elected a fellow of St. John's College.

Mr. H. O. Jones, Jacksonian demonstrator of chemistry, has been elected a fellow of Clare College.

DR. R. H. ADERS PLIMMER has been appointed Grocers' Company research student at the Jenner Institute of Preventive Medicine.

SIR GEORGE KEKEWICH, who has been secretary to the Board of Education since 1890, has resigned his appointment and has been succeeded by Mr. R. L. Morant.