found a Jenner professorship of bacteriology, and in addition, or as an alternative, of a Jenner scholarship.

The resolution having been briefly seconded by Lord Davey, and supported by Mr. Brudenell Carter, was put to the meeting and carried unanimously.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—Mr. H. M. Vernon, of Merton College, has been elected Radcliffe Travelling Fellow for the year 1897. Mr. Vernon took a first class in the Natural Science School in 1891.

EX-MAYOR WILLIAM R. GRACE, of New York City, and his wife and daughter have given two million dollars to establish in that city a school of manual training for women and girls.

THE first Huxley medal and prize of 10*l*., open to students of the Charing Cross Hospital Medical School at the end of their second winter session, has been awarded to Mr. Arthur Gentry Pitts. The awards were founded last year, in memory of the late Prof. Huxley—a former student of the school.

IT has been decided that the memorial to the late Rev. William Rogers shall take the form of a physical laboratory, to be erected and fitted up in connection with the Charterhouse Schools, which were inaugurated by the Prince Consort, and were the first schools with which Mr. Rogers was connected on his entry into parochial work in London.

THE state of chemical industries in Germany, France and England, and the position of chemistry in higher education, forms the subject of an article, by M. M. A. Haller, in the *Revue Générale des Sciences* for March 30. Referring to the efforts which are made in this country to obtain a fuller recognition of the value of chemistry to manufactures, the author says: "Industriels et Professeurs prennent part à cette campagne, sans que les pouvoirs publics s'émeuvent." It is this lack of interest shown in scientific matters by State authorities that astonishes men of science on the continent.

BY the will of the late Mr. John Crerar, of Chicago, who died October 19, 1889, the residue of his estate, after the payment of numerous bequests, both private and public, was given for the creation and endowment of a free public library, to be called the John Crerar Library, and to be situated in the city of Chicago. Having sympathetically reviewed the library section of John Crerar's monumental will, and carefully considered the library facilities and needs of the city, the directors unanimously decided to establish a free public reference library of scientific literature. This library was opened on April 1. Its special field is that of the natural, the physical, and the social sciences, with their applications, the adopted classification being into general works, social sciences, physical sciences, natural sciences, applied sciences. The directors propose, however, to make the library exceptionally rich in scientific periodicals, American and foreign. The total endowment is estimated to be over 2,500,000 dollars, and the income should be sufficient ultimately to allow the making of a good collection within the proposed limits. At present the library has 15,000 volumes ready for use, and nearly 7000 more in process of preparation. The number of periodicals in the reading-room is 800, with 400 others to be added. By the end of 1898 it is expected that there will be 40,000 volumes on the shelves.

THE following are among recent announcements:—Dr. A. F. Dixon, senior demonstrator of anatomy at the School of Medicine of Dublin University, to be professor of anatomy at the University College of South Wales and Monmouthshire, Cardiff, in succession to Prof. A. W. Hughes, now professor of anatomy in King's College, London; Dr. Classen, of the Polytechnic Institute at Aachen, to be professor of chemistry in the University at Kiel; Dr. A. Palladin to be professor of plant anatomy and physiology at the University of Warsaw; Dr. de Vries to be professor of geometry in the University of Utrecht; Prof. von Kries, who had been offered the chair of physiology in Berlin in succession to Dr. du Bois Reymond, has decided to remain in Freiburg; Dr. Ernst Gaupp to be associate professor of embryology at Freiburg; Dr. Wernicke to be associate professor of hygiene at Marburg; Dr. Karl Bohlin, of Upsala, to be director of the Stockholm Observatory; Dr. James Clark to be professor of agriculture at the Yorkshire College, Leeds, in succession to Prof. James Muir; Dr. Karl Fütterer to be associate professor of mineralogy and geology in the Polytechnic Institute at Karlsruhe; Mr. Louis M. Dennis to be professor of analytical chemistry in Cornell University; Mr. Henry S. Jacoby to be professor of civil engineering; Mr John Henry Barr to be professor of machine design; and Mr. Joseph E. Trevor to be professor of physical chemistry in the same University (Cornell); Dr. Karl Kaiser to be associate professor of physiology in the University of Heidelberg.

THE *Journal* of the Society of Arts gives the following particulars with reference to the fourth meeting of the Congrès International de l'Enseignement Technique, to be held this year in London. The previous meetings of the Congress were—in 1886 at Bordeaux, in 1889 at Paris, and in 1895 at Bordeaux. The meeting will be held at the invitation of the Society of Arts, and of the Worshipful Companies of Drapers, Fishmongers, Goldsmiths, Merchant Taylors, and Clothworkers. The Congress will be opened at 11 o'clock, on June 15, by an address from the President, the Duke of Devonshire, K.G., and from the President of the last Congress, M. le President Léo Saignat. The meetings will be held on Tuesday, Wednesday, Thursday, and Friday. The subjects for discussion at the Congress will include:—Technical Education: (1) Advanced Instruction. Polytechnics, Universities, Colleges. (2) Secondary Instruction. Higher Technical Schools; Secondary and Intermediate Schools; Evening Schools. Commercial Education: (1) Advanced Instruction. Colleges; High Schools and Institute of Commerce. (2) Secondary Instruction. Commercial Schools; High Schools; Classes for Adults. It is not proposed to deal with elementary technical or commercial education. The education of both sexes will be included. The proceedings of the Congress will be reported in English. Papers intended for the Congress may be in French, German, or English, and speakers may make use of any of these languages. All communications relating to the business of the Congress should be addressed to the Secretary, Society of Arts, John Street, Adelphi, London, W.C.

CHILDREN are always interested in natural history, and with a little help and encouragement they become keen collectors and quick observers. Prof. W. A. Herdman relates, in the tenth annual report of the Liverpool Marine Biology Committee, how the aquarium at Port Erin is used as an educational influence. "For example," he says, "if a boy brings us a light-coloured shanny, caught in a shallow exposed pool, we can place the little fish in a deep vessel in semi-darkness under a table, or cover it with some brown sea-weed, the result being that when the boy comes next day to look for his specimen, he has been known to exclaim, 'Hullo! where is my shanny? There is only a black one here.' It is then easy, by putting the fish into a shallow white dish in the bright sunlight, in a short time to turn the black shanny into what he recognises as the light-coloured one he caught. You can then tell him of the beautiful pigment cells of the skin, and show them to him under a microscope in a small living fish, in a watch-glass full of sea-water. You can show him a speckled shrimp hiding in sand and a mottled shrimp in gravel, and the little prawn *Virbius*, which may be almost any colour according as you change its surroundings from green to red or to dark brown sea-weeds. You explain the difference in pigmentation on the upper and lower sides of a flat fish, you remind him of the chamæleon, tell of Lord Lister's observations on the change of colour in the skin of the frog, and—most beautiful experiment of all—show him the 'blushing' of the newly-born cuttle-fish. From this there opens up a wide range of physiology, of the influence of light and the controlling action of nerves, not to mention natural selection and evolution in general. This is only one of many examples that might be taken. Almost any of the common marine animals, if carefully watched as to structure and habits, show us interesting cases of adaptation to their surroundings and mode of life."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 4.—"Second Report on a Series of Specimens of the Deposits of the Nile Delta, obtained by Boring Operations undertaken by the Royal Society." By John W. Judd, C.B., LL.D., F.R.S., Professor of Geology in the Royal College of Science. Communicated by desire of the Delta Committee. Received February 11.

The last report on the borings undertaken in the Delta of the Nile under the auspices of the Royal Society was communicated to the Society by the direction of the Delta Committee on November 12, 1885, and published in No. 240 of the *Proceedings*. This report dealt with the materials obtained from the three borings made at Kasr-el-Nil, at Kafr-ez-Zayat, and at Tantah, which reached depths of 45 feet, 84 feet, and 73 feet respectively. Although these borings made known to us the character of the delta deposits at greater depths than the explorations made by Mr. Leonard Horner and M. Linant de Bellefonds, yet none of them succeeded in reaching the solid rock on which these deposits lie, and in which the Nile Valley was originally excavated. It was therefore decided by the Delta Committee to make still more strenuous efforts to attain this result.

In their attempts to carry out this important work, the Delta Committee have received the most valuable aid from the Secretary of State for War, the Inspector-General of Fortifications, and the officers of the detachment of the Royal Engineers attached to the Army of Occupation in Egypt.

Zagazig having been chosen as a suitable site for the next attempt to penetrate the delta deposits, a boring with a 5-inch tube was carried down to 97 feet, with a 4-inch tube to 190 feet 6 inches, and with a 3-inch tube to 345 feet.

From the surface to a depth of 115 feet the strata passed through in the Zagazig boring closely resembled those already reported upon as occurring in the three earlier borings of Kasr-el-Nil, Kafr-ez-Zayat, and Tantah, and consisted of alternations of desert-sand and Nile-mud.

At the depth of 115 feet a very noteworthy change was found to occur in the characters of the beds passed through, a mass of coarse sand and shingle being met with, and this continued to the depth of 151 feet. At the latter depth a band of yellow clay 2 feet thick was passed through, and under it sand and shingle beds prevailed till the lowest depth reached, 345 feet. In some of these shingle beds the fragments, which were usually well rounded—often, indeed, perfect pebbles—were very coarse, the fragments being of all sizes up to that of a hen's egg.

It is interesting to note that a boring made at Rosetta in the summer of 1885 by Mr. T. E. Cornish, C.M.G., Director of the Alexandria Waterworks, gave a section very similar to that at Zagazig. This boring was carried down by a 5-inch tube. Various beds of sand and mud, the latter containing in some places impure lignite, occurred down to the depth of 143 feet 8 inches from the surface, but at this latter depth a mass of "coarse sand and pebbles" was found, which was followed down for about 10 feet.

It will thus be seen that in the case of the Zagazig boring we find at the depth of 115 feet 8 inches (89 feet below sea level) a sudden change from the blown sand and alluvial mud of the Nile delta to masses of shingle and sand, and that the same change is found to take place at the Rosetta boring at a depth of 143 feet 8 inches (134 feet 4 inches below sea level). That these shingle beds were deposited under totally different conditions to those which prevailed while the delta deposits were laid down, and that they were in fact the product of ordinary fluviatile action, can scarcely be doubted, and the determination of the geological age of the great gravelly deposit which is now shown to underlie the modern delta deposits, and to attain depths which certainly in places exceed 230 feet, becomes a problem of the greatest importance and interest.

That the surface of these old gravelly deposits is a very uneven one is indicated by the difference of depth at which it is found at Rosetta and Zagazig respectively. It is possible, indeed, that this gravelly floor may in places rise through the whole of the Nile deposits, and form the present surface of the country. The late Sir Samuel Baker, in a letter addressed to the Delta Committee on February 20, 1886, called attention to the existence of the so-called "turtle-backs," which he regards as interesting proofs of "the pre-existence of desert, before the Nile deposit had converted the lower level into delta."

In spite of the most careful search, not a single organism has been found which lived when the shingle beds were deposited, and which would serve to throw light on the geological period to which they must be assigned. As, however, it was of considerable interest to determine the source of the various pebbles making up the deposit, which we may conveniently speak of as the "Sub-delta formation," I placed myself in communication with Dr. Karl von Zittel, of Munich, who possesses such a unique knowledge of the rocks and fossils of North-eastern Africa. In his obliging communication, he has indicated the probable source of the pebbles which I forwarded to him, and writes as follows:—

"The quartz and chalcedony pebbles, from depths of 120, 160, 245, and 270 feet, are almost absolutely pure examples of those rocks. The sandstones (for example, those from the depth of 120 feet) rather recall, in their general appearance, the Tertiary Sandstone of Gebel Achmar, near Cairo, than the older (Cretaceous) Nubian Sandstone of Upper Egypt. The quartz and chalcedony pebbles, before referred to, might also be derived from the Gebel Achmar Sandstone. The absence of limestone pebbles is striking; it would appear that only the harder rocks have been preserved in the gravels of the Delta, the softer ones having been possibly worn away."

With respect to the igneous rocks found as pebbles in these shingle beds, Dr. von Zittel suggests, from their macroscopic appearance, that they may be derived "from the side valleys of the Arabian Desert." Of metamorphic rocks, quartzites, which are evidently altered sandstones, were found somewhat frequently. Many pebbles of sandstone, sometimes showing stratification and fault-structures, but destitute of organic remains, were obtained at various depths.

Pebbles of flinty limestone from various depths contain recognisable Foraminifera, and one is crowded with specimens recognised by von Zittel as "belonging to the Textularidæ, Rotalidæ, and Globigerinæ." Of these there are other specimens from a depth of 270 feet. Dr. von Zittel states:—"I hold it as probable that these pebbles come from the Eocene of the Nile valley. Flinty layers and concretions are extremely common in the Egyptian Eocene (as, for example, in Central and Upper Egypt). The absence of sections of *Nummulites* and *Alveolinæ* is particularly noticeable."

At the depth of 121 feet, a pebble of a somewhat different class of rock was obtained. This rock may have come from a Cretaceous deposit, and not from the Eocene, like the others.

Of the general sources from which these pebbles were derived, Dr. von Zittel writes as follows:—

"On the whole, it appears to me conceivable that these gravels under the delta originated at a time when the Nile had already formed its present valley, but not to so great a depth as at present. The majority of the rolled rock-fragments would seem not to have been derived from points extremely distant from those in which they are at present found."

There can scarcely be the smallest doubt that in this Sub-delta formation we have a series of deposits, which were formed under totally different conditions from those which prevail in North-eastern Africa at the present time. The land must have been at an elevation at least from 100 to 300 feet higher than at present; and the Lower Nile, instead of forming an alluvial flat, as at present, must have deposited coarse sands and gravels. It is upon the very uneven surface of this Sub-delta deposit that the alluvial mud and sands of the delta have been deposited, as the surface gradually subsided below the level of the Mediterranean.

The interesting problem of the geological age of this Sub-delta deposit remains to be solved, but it may be hoped that the explorations now being carried on by the Geological Survey of Egypt, under Captain H. G. Lyons, R.E., will furnish new and important evidence bearing on this important question.

It is to be regretted that the borings carried out by the Royal Society have not set at rest the doubts which have long existed as to the depth at which the solid rock-floor lies below the surface of the delta. But while this has not yet been accomplished, it is satisfactory to have been able to show that the supposed insignificant thickness of the alluvial deposits is altogether a mistake; while the existence of an underlying formation, laid down under conditions totally different to those which prevail at present, has been demonstrated.

Communications have lately passed between the English War Department, the Egyptian Public Works Department, and the Royal Society, which lead us to hope that borings, to be shortly undertaken for economic purposes, may, either with or without aid from this Society, supply the means of reaching greater depths than that obtained at Zagazig, and possibly of reaching the old floor of solid rocks on which the Sub-delta deposits rest.

Geological Society, March 24.—Dr. Henry Hicks, F.R.S., President, in the chair.—The following communications were read:—Notes on some volcanic and other rocks which occur near the Baluchistan-Afghan Frontier, between Chaman and Persia, by Lieut.-General C. A. McMahon and Captain A. H. McMahon. In the first part of this paper Captain McMahon

described briefly the physical geography of th Baluchistan deserts, which extend along the south of the Helmund River, between Quetta and Persia. Taking first the plains and their drainage-system, he showed how the wide alluvial plains of Shorawak and Chagai were probably in earlier times one large lake. North and west of these plains, as far as Persia, lie vast deserts of sand, which in places were gradually encroaching upon and burying the mountain-ranges which rise up like islands in the desert. He showed how the sand had intercepted all the drainage from the mountains and prevented it from making its way, as it would otherwise have done, into the Helmund River and the God-i-Zirreh Lake. Turning next to the mountains, Captain McMahon described a well-defined line of fault, which he traced for a distance of about 120 miles from north of Chaman, along the Khwaja Amran and Sarlat mountain-ranges to Nushki. East of this fault all the rocks appeared to be sedimentary; while those to the west were all, with few exceptions, volcanic and igneous. The mountain-ranges in the desert described appeared to be all volcanic, and reference was made to the Koh-i-Taftan, 12,600 feet high, lying south-west of them, which is still an active volcano. The curious, grotesquely-shaped peaks of the Koh-i-Sultan range were then briefly described, and especially that named Neza-i-Sultan—a gigantic natural pillar of volcanic agglomerate many hundreds of feet high. After thus describing the general character of the country, Captain McMahon pointed out the very remarkable force and activity with which certain natural agents were at present at work there—namely, water, wind, sand, and extremes of heat and cold. In the second part of the paper General McMahon described the microscopical characters of the rocks, which consist of lavas, ashes, pumice, igneous intrusive, and sedimentary rocks. In the discussion which followed, the President remarked, concerning the corrosion of basic minerals by silica, that silica might be truly a corrosive mineral, but hitherto the idea had been that the basic mineral had decomposed *in situ*, and that the silica had filled up the hollows and cracks resulting from this decomposition. Mr. Griesbach considered the paper a valuable contribution to our knowledge of Baluchistan. But, having spent some years in that part of Asia himself, he wished to point out that there is abundant evidence to show that the Pliocene deposits which are seen in Shorawak and the neighbouring Registan have not been laid down in a lake-basin, but are chiefly of a fluviatile nature. Dr. Blanford referred to the great prevalence of Tertiary and Cretaceous rocks throughout the wide area extending from the Indus to Mesopotamia. The volcanic rocks of Eastern Baluchistan, like the Deccan traps of India, appear to be of Cretaceous and Lower Eocene age; but the igneous formations near the Baluchistan and Persian frontier must be, in part at all events, of far more recent origin, some of the cones of loose materials seen by the speaker between Bampur and Bam, having undergone no change through denudation. The Rev. Edwin Hill said the pinnacle shown resembled a magnified earth pillar. Was the water which disappeared in the sand ultimately evaporated? Prof. Milne made special reference to the fault which Captain McMahon had described, and compared it with a fault which in 1891 had been formed in Japan. Mr. Cadell said that the remarkable peaks described by the author, which were said to be of agglomerate, might be explained on the supposition that these were the necks of old volcanoes, the upper parts of which, together with the surrounding strata, had been denuded away. Prof. Judd called attention to the great steep-sided masses of volcanic agglomerate which rise up in the midst of the town of Le Puy in Central France, and are crowned by the cathedral and the church of St. Michel. These seem comparable, though of smaller dimensions, to the great columnar masses described by Captain McMahon. There is no doubt that the masses of Le Puy are relics left by denudation of a mass of volcanic agglomerate that once filled the whole valley. The reason why these masses have escaped removal by denudation is probably not because they are "volcanic rocks," but because these materials have been consolidated by the action of siliceous, calcareous, or chalybeate springs. Dr. H. Woodward and Mr. W. W. Watts also spoke, and the authors replied.—On the association of *Sigillaria* and *Glossopteris* in South Africa, by A. C. Seward. In this paper the author described in detail several specimens of fossil plants submitted to him by Mr. David Draper, of Johannesburg. His conclusions as to the geological age of the plant-bearing beds differed from those arrived at by Mr. Draper from stratigraphical evidence; the plants pointed to an horizon which may be referred to what is now termed the Permo-Carboniferous age. The difficulty of distinguishing between various forms of *Glossopteris*-leaves was discussed at some length; and the opinion expressed that it is practically impossible to separate the Indian, Australian, and African forms of *G. Browniana*, *G. indica*, and others. The chief interest as regards the plants centred round the specimens of *Sigillaria*; these were fairly well preserved impressions, and were referred to the well-known species, *S. Brardi*. In addition to various forms of the genus *Glossopteris* and the specimens of *Sigillaria*, the following plants were recorded:—*Noeggerathiopsis Hislopi*, *Gangamopteris cyclopteroides*, *Phyllotheca*, *Conites* sp., *Cardiocarpus* sp., and *Sphenopteris* sp.—Notes on the occurrence of *Sigillaria*, *Glossopteris*, and other plant-remains in the Triassic rocks of South Africa, by David Draper. The author gave a brief description of the geology of four localities, within a comparatively short distance from Johannesburg, from which several fossil plants have recently been obtained. He considered the plant-bearing beds to belong to the Lower Stormberg Series of Dunn, and to the horizon known as the Molteno Beds. The most important locality described in these notes was that of Vereeniging, thirty miles south of Johannesburg, where the author found several specimens of *Sigillaria* associated with *Glossopteris* and other plants in iron-stained sandstones. The significance of this discovery of *Sigillaria* was briefly discussed. —In the discussion on the two preceding papers, Dr. Blanford said that it was a source of much gratification to those who, despite the views of many European palæontologists, had maintained for years on geological evidence that the *Glossopteris*-fauna was Palæozoic, to find their contention confirmed by recent botanical discoveries. Mr. Griesbach pointed out that the fossil plants exhibited, showing true Carboniferous types associated with *Glossopteris*, constituted another and valuable contribution to our knowledge of these beds, which were known as Gondwanas in India; and they confirmed in a striking manner the fact, already accepted in India and Australia, that the lowest beds of this group of strata belonged to the later Carboniferous and Permian systems. Prof. Seeley stated that when he visited Aliwal North in 1889, Mr. Alfred Brown showed him many plants which he had obtained in white sandstone. They included *Glossopteris* and Lepidodendroid plants, together with a variety of ferns, which might be new. There was no opportunity of visiting the locality; but Aliwal North was near the top of the Karoo Series, and he though that Mr. Brown's plants might be from beds yielding *Euskelesaurus*, which he would place above the Indwe coal. There were indications of coal near the base of the Karoo and in the middle, but the workable beds which he had seen were towards the top; although their flora was not the same as in the beds worked by Mr. Brown, which resembled the types now exhibited. He should like to see better evidence of the age of the beds before admitting them as Permo-Carboniferous, because the whole of the South African vertebrata of the Karoo appeared to be below the beds which are found near Aliwal North. The Lower Karoo comprised the zone of *Pareiasaurus*. Then came the zone of *Dicynodon*. Above that is the zone of *Ptychognathus*. And at the top is the zone of the Theriodont reptiles, which he placed below the Cape coal. He had regarded all these beds as Permian. Mr. Stonier observed that in New South Wales *Glossopteris* was characteristic of the more important of the productive Coal-Measures. Feistmantel had described the Palæozoic plants; but there was a difficulty, as stated by Mr. Seward, in distinguishing forms; and in 1894 Mr. R. Etheridge, jun., pointed out that the whole question of generic name, specific characters, &c., of *Glosssopteris* had become almost hopelessly involved. *Gangamopteris* and *Glossopteris* were associated at Lochinvar and Newcastle (N.S.W.).

EDINBURGH.

Royal Society, March 15.—Lord Kelvin in the chair.—Dr. James Kerr Love, Glasgow, read a paper on deaf mutism and its prevention. He divided deaf mutism into two classes—the one caused by disease, the other due to heredity or congenital causes. Dealing with congenital deafness, a tree was shown of a family, called the Ayrshire family, where about forty deaf mutes resulted during five generations. Dr. Love's conclusions with regard to the transmission of deafness were that congenital deafness was hereditary either in the direct line, or it might be the expression of a tendency which was seen only in the collateral branches of a family. The anatomical lesions upon which deafness depended, were not one but many. The intermarriage of the deaf, therefore, only perpetuated without

accentuating the tendency. In Great Britain, the tendency to have deaf progeny was about the same, whether one or both parents were congenitally deaf. Adventitious or acquired deafness ending in mutism, was not usually hereditary. The hearing brothers and sisters of a congenitally deaf mute, were as liable when they married to have deaf progeny as the deaf themselves. Consanguinity of the parents emphasised family defects in the children, and in this way many cases of congenital deafness arose. Dr. Love asserted the right of the State to control the marriage of those who belonged to badly tainted families, and were likely to transmit deafness.—Mr. W. R. Laing communicated a note on an analysis of human gastric juice, which he had procured from a fistulous opening of the stomach. His analysis proved the presence of free hydrochloric acids.—Dr. John Murray gave the first of two papers on the structure and origin of coral reefs. He recapitulated his old theory as opposed to Darwin's, and showed that evidence since procured supported his view. A still greater number of submerged volcanic cones, which were the foundations of coral atolls, had been discovered in the coral seas. Some were rising by the accumulation of shells and various dead calcareous animals. Others were being worn down by tidal action in the same way as certain parts of the ocean bed is kept clear of mud. These facts helped his theory. The second paper will deal with the growth of the corals, and more especially with their food.—Mr. J. Erskine Murray laid before the Society a new form of constant volume air thermometer, which shows the total pressure directly, and may be graduated in degrees of temperature. The feature of the instrument is an arrangement whereby the pressure of the atmosphere is eliminated by the adjustment of an auxiliary reservoir of mercury. The total pressure of the air, and hence its temperature, is measured directly by the height of a column of mercury. To the bent stem of the air bulb a barometer tube with a vacuum at the top is connected, and the stem is continued in flexible form to the mercury reservoir. The barometer tube is graduated in absolute degrees of temperature by fixing one point—the pressure for the temperature of melting ice—and dividing the tube mechanically. To make an observation of temperature the mercury is adjusted to a mark fixed on the bulb-stem, by raising or lowering the mercury reservoir, and the pressure of the enclosed air is given by the height of the mercury in the barometer tube over the mark in the stem of the air bulb. By closing a stop-cock between the pressure gauge and the reservoir, the bulb and the gauge may be completely cut off from external pressure.

PARIS.

Academy of Sciences, March 29.—M. A. Chatin in the chair.—Second note on asynchronous motors, by M. A. Potier.—On the transformations of the sugars and on levulic acid, by MM. Berthelot and André. A thermochemical study of the various modes in which glucose is decomposed by yeast, alkalies, and acids. All three reactions are exothermic, and evolve approximately equal amounts of heat.—On the fatty materials found in the Egyptian tombs at Abydos, by M. C. Friedel. The presence of partially hydrolysed glycerides of palmitic and stearic acids was proved, showing that the original grease probably consisted of beef or mutton fat.—On the transformation of the diamond into graphite in the Crookes' tube, by M. Henri Moissan. By the molecular bombardment in a high vacuum, Crookes showed in 1879 that the face of the diamond became covered with a blackish deposit. By its behaviour towards oxidising agents this deposit is now shown to consist of graphite, proving that the diamond must attain on its surface a temperature approaching that of the electric arc.—On the Insemineæ without ovules, forming the subdivision of the Inovulæ or Loranthineæ, by M. Ph. van Tieghem. A further note on the classification of the Insemineæ.—On the transformation of algebraic equations, by M. Brioschi.—Remarks by M. Henri Moissan on the presentation of his work on the electric furnace.—The Academy nominated the Committees to act as judges for the prizes awarded in 1897, bearing the names of Jecker, La Caze (Chemistry), Delesse, Desmazières, Montagne, Thore, Savigny, Gama-Machado, Montyon, and Bréant.—Emission of liquid water by vegetables: new method for this study, by M. Maxime Cornu. The method described is based upon the use of an electrical counter for automatically recording the number of drops of water exuded from a given surface.—On associated congruences, by M. C. Guichard.—On the singularities of partial differential equations, by M. Jules Beudon.—On interpolation, by M. Émile Borel.—On the successive differentials of a function of several independent variables, by M. E. Goursat.—On a complete apparatus for researches relating to electro-magnetic waves, by M. Jagadis Chunder Bose. The apparatus described, although occupying but a relatively small space, suffices to show the reflexion, refraction, diffraction, double refraction, rectilinear, circular, and magnetic polarisation of electro-magnetic waves.—Mutual actions of the electrodes and kathode rays in rarefied gases, by M. H. Deslandres.—On the propagation of strains in metals submitted to stresses, by M. Mengin. A description of experiments performed on aluminium, nickel-steel, Delta metal, and brass.—On the chlorobromides of tin, by M. A. Besson. These substances are formed by the action of hydrogen bromide upon stannic chloride, and by the action of bromine upon anhydrous stannous chloride in carbon tetrachloride solution, the latter method giving the best yield. The chlorobromides were separated by fractional distillation under reduced pressure, $SnCl_3Br$, $SnCl_2Br_2$, and $SnClBr_3$ being isolated.—On the conditions under which sulphur and hydrogen directly combine, by M. H. Pélabon. Hydrogen and sulphur combine slowly to form sulphuretted hydrogen at temperatures between 215° and 350°, and the reaction is a limited one, although hydrogen sulphide is not decomposed under 350°.—Action of bromine and hydrobromic acid upon ethyl acetate, by M. Boleslas Epstein. The results obtained in this experiment differ in some respects from those previously published by M. Crafts, the products being ethyl bromide, monobromacetic acid, and hydrobromic acid; the latter in considerable quantity. Experiments with ethyl monobromopropionate gave analogous results.—On the formation of native iron carbonate, by M. L. De Launay. The view is put forward that agglomerated iron carbonate has not been, as is generally held, deposited as carbonate from water, but that, like calamine and cerussite, it has been produced by the action of limestone upon the salts arising from the destruction of iron sulphides. It is pointed out, in confirmation of this view, that whilst massive sulphide of iron is always found in schists, the carbonate occurs with limestone.—Clasmatosis in the Lamellibranchs, by M. Joannes Chatin.—On the organisation and relationships of the *Pleurotomaria*, by MM. E. L. Bouvier and H. Fischer.—The refractory period and synchronisation of nervous oscillations, by MM. André Broca and Charles Richet.—Demonstration of the existence of vaso-sensitive nerve regulators of the arterial pressure, by M. C. Delezenne.—Action of the bile and the biliary salts upon the nervous system, by M. Adolph Bickel. The application of bile or of a solution of the biliary salts to the brain of certain animals (cat, dog, rabbit, rat, and guinea-pig) causes cerebral phenomena which vary with the animal, but generally characterised by convulsions and loss of consciousness, accompanied by salivation.—*Pseudocommis Vitis* (Debray) in the tubercles of the potato, by M. E. Roze.—Observations on some properties of the oxydase of wines, by M. Bouffard. Sulphurous acid acts directly upon the oxydase, and completely destroys its oxidising properties. Its use as a preventive of the decolorisation of wines (*la casse*) is specific.—On rye, by M. Balland. The results of proximate analyses are given.—Radiography of a man and a woman, by M. F. Garrigou.—Note relating to an experiment of cone set in rotation on water, by M. Aug. Coret.—Note on electric tourniquets, by M. Galamand.

AMSTERDAM.

Royal Academy of Sciences, February 27.—Prof. van de Sande Bakhuyzen in the chair.—Prof. Franchimont on the nitro group of the nitramines. According to the author, both the acid and the neutral nitramines contain the same group. When in the acid nitramines the hydrogen atom is replaced by metals, the metal may, under certain circumstances, pass from the nitrogen to the oxygen.—Mr. Hamburger, on the influence of carbonic acid upon the volume of the red and the white blood corpuscles. Continuing his investigations (*vide Proc.* November meeting, 1896), Mr. Hamburger observed that not only CO_2, but also other acids, as HCl and H_2SO_4, when added to blood in very small quantities (0·04 per cent.), caused a swelling of those cells, and that an equally small amount of KOH brought about a shrinking. An explanation of these phenomena was given by the author.—Mr. Verbeek gave a survey of the sedimentary formations and the eruptive rocks occurring in Java. The author also made some communications concerning the useful minerals of Java, viz. ores, coal, and petroleum; the last-mentioned substance seems to be present in large quantities in the neo-tertiary strata, not only of Java, but also of Sumatra and Borneo.—Prof. van der Waals, on special points in the melting-

curve. The author demonstrated (1) that the real melting temperature, *i.e.* that temperature at which solid and liquid have the same composition, is the highest temperature at which the solid can ever occur under that pressure; (2) that at that temperature a break in the melting-curve can occur only when the liquid contains no other molecules than complex ones of the composition of the solid.—Prof. Franchimont presented a paper by Dr. van Romburgh, of Buitenzorg, on the action of fuming sulphuric acid upon methylethylaniline and of chromic anhydride upon 2·4 dinitromethylethylaniline.—Prof. Kamerlingh Onnes presented, on behalf of Dr. W. van Bemmelen, of Utrecht, a paper entitled "Values of the terrestrial magnetic declination for the period of 1500–1700, and its secular variation during the period 1500–1850."—Mr. Jan de Vries presented, on behalf of Dr. G. de Vries, of Haarlem, a paper entitled "The motion equations of cyclones." After a discussion of the motion equations in cylinder coordinates, the hypotheses are made that the radian and the tangential velocities are independent of the height above the ground, and that the motion near the centre is symmetrical with respect to the axis of the clycone.—Prof. Haga presented, on behalf of Mr. D. G. Tiddens, of Gröningen, a paper entitled "Observations on Fomm's experiments on the wave-length of the X-rays." On repeating Fomm's experiments (*Wied. Ann.*, 1896) on the wave-length of the X-rays, it appeared that the maxima which the X-rays produce upon a photographic plate after passing through two narrow slits, do not obey the laws of diffraction; for each edge of the slit produces one maximum, while it depends upon the width of the slit, whether the two maxima coincide or even overlap each other, whereby, *e.g.* the left maximum is caused by the edge of the right slit. Consequently no conclusion can be drawn from these experiments as regards the wave-length.

DIARY OF SOCIETIES.

THURSDAY, APRIL 8.

ROYAL SOCIETY, at 4.30.—The Production of X-rays of different Penetrative Values: A. A. C. Swinton.—Photographic Spectra of Stars to the 3½ Magnitude: F. McClean, F.R.S.—Condensation of Water Vapour in the presence of Dust-free Air and other Gases: C. T. R. Wilson.—(1) Double (Antidrome) Conduction in the Central Nervous System; (2) Further Note on the Sensory Nerves of Muscles: Prof. Sherrington, F.R.S.—On the Breaking-up of Fat in the Alimentary Canal under Normal Circumstances and in the Absence of the Pancreas: Prof. V. Harley.—On the Application of Harmonic Analysis to the Dynamical Theory of the Tides, Part I.: S. S. Hough.—On Boomerangs: G. T. Walker.—Kathode and Lenard Rays: J. A. McClelland.

ROYAL INSTITUTION, at 3.—Roman Britain: Prof. W. Boyd Dawkins, F.R.S.

MATHEMATICAL SOCIETY, at 8.—On the Potentials of Rings: A. L. Dixon.—An Extension of a certain Theorem: Rev. F. H. Jackson.—On the Deformation of a Closed Polygon, so that a certain Function remains constant: F. S. Macaulay.—Ueber verzweigte Potentiale im Raum: Prof. A. Sommerfeld.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Recent Developments in Electric Traction Appliances: H. A. Baylor.

INSTITUTION OF NAVAL ARCHITECTS, at 12.—On the Fighting Value of certain of the Older Ironclads if re-armed: Captain the Right Hon. Lord Charles Beresford, C.B., R.N.—The Application of the Compound Steam Turbine to the Purpose of Marine Propulsion: Hon. Charles Parsons.—On the Use of the Mean Water-Line in designing the Lines of Ships: A. G. Ramage.——At 7.—The Accelerity Diagram of the Steam-Engine: J. Macfarlane Gray.—Note on the Geometry of Stability: J. Macfarlane Gray.—Acetylene, and its Probable Future Afloat: Prof. Vivian B. Lewes.

CAMERA CLUB, at 8.15.—The Phonograph: Mr. Stroh and F. C. B. Cole.

FRIDAY, APRIL 9

ROYAL INSTITUTION, at 9.—The Limits of Audition: Lord Rayleigh, F.R.S.

PHYSICAL SOCIETY, at 5.—A Nickel Stress Telephone: T. A. Garrett and W. Lucas.—On Alternating Currents in Concentric Conductors: W. A. Price.—On the Effect of Capacity on Stationary Electrical Waves in Wires: W. B. Morton.

ROYAL ASTRONOMICAL SOCIETY, at 8.—A New Quadruple Stellar System: R. T. A. Innes.—On the Straightness of Spider Lines: H. H. Turner.—Observations of the Minor Planet (8) *Flora*: John Tebbutt.—The Orbit of Sirius: S. W. Burnham.—Micrometrical Measures of the Double Stars in the Great Nebula and Cluster surrounding *η Carinæ*: T. J. J. See.—On some Original Observations of the Comet of 1652: E. B. Knobel.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Poole Harbour: Harold Berridge.

INSTITUTION OF NAVAL ARCHITECTS, at 12.—Nickel Steel as an Improved Material for Boiler Shell-Plates and Forgings: William Beardmore.—Application of Electrical Transmission of Power in Marine Engineering and Shipbuilding: Herr F. von Kodolitsch.

MALACOLOGICAL SOCIETY, at 8.

SATURDAY, APRIL 10.

ROYAL INSTITUTION, at 3.—Electricity and Electrical Vibrations: Lord Rayleigh, F.R.S.

ROYAL BOTANIC SOCIETY, at 4.

GEOLOGISTS' ASSOCIATION (Baker Street Station), at 1.37.—Excursion to Aylesbury, Hartwell, and Stone. Directors: A. M. Davies and Percy Emary.

ESSEX FIELD CLUB (at Theydon, &c.).—Fresh-water Algæ: their Structure, Distribution, and Relationships: E. D. Marquand.

MONDAY, APRIL 12.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Fourth Centenary of the Voyage of John Cabota, 1497: Sir Clements R. Markham, K.C.B., F.R.S., President.

SANITARY INSTITUTE, at 8.—Sanitary Appliances: Dr. George Reid.

VICTORIA INSTITUTE, at 4.30.—The Scope of Mind: Dr. A. T. Schofield.

CAMERA CLUB, at 8.15.—Some Recent Investigations in X-Ray Work: Campbell Swinton.

TUESDAY, APRIL 13.

ANTHROPOLOGICAL INSTITUTE, at 8.30.—Some Points in connection with the Anthropology of the Kafirs of the Hindu Kush: Sir George S. Robertson, K.C.S.I.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Paper to be discussed: The Blackwall Tunnel: David Hay and Maurice Fitzmaurice.

ROYAL HORTICULTURAL SOCIETY, at 1.—Artificial Manures.

PHARMACEUTICAL SOCIETY, at 8.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—Colour Measurement in Photography: C. F. Townsend.

ROYAL VICTORIA HALL, at 8.30.—Modes of Mountain Making: F. W. Rudler.

THURSDAY, APRIL 15.

LINNEAN SOCIETY, at 8.—On some New Irish Crustacea: A. O. Walker.—On Desmids from Singapore: W. and G. S. West.——Exhibition: Plants collected during Two Years' Residence in Franz Josef Land: H. Fisher.

GEOLOGISTS' ASSOCIATION (Charing Cross, S.E.R.), at 4.30.—Long Excursion to Walmer, St. Margaret's, Dover, Folkestone, and Romney Marsh. Directors: George Dowker, W. F. Gwinnell, Dr. A. W. Rowe, and C. Davies Sherborn.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—First Principles of Mechanical and Engineering Drawing: H. Holt-Butterfill (Chapman).—Rough Notes and Memoranda relating to the Natural History of the Bermudas: J. L. Hurdis (Porter).—Ferrets: N. Everitt (Black).—Wild Bird Protection and Nesting Boxes: J. R. B. Masefield (Leeds, Taylor).—Stones for Building and Decoration: G. P. Merrill, 2nd edition (New York, Wiley; London, Chapman).

PAMPHLETS.—Equipment and Work of an Aero-Physical Observatory: A. McAdie (Washington).—On the Forms of Plane Quartic Curves: R. Gentry (New York, Drummond).

SERIALS.—National Review, April (Arnold).—Humanitarian, April (Hutchinson).—Contemporary Review, April (Isbister).—Fortnightly Review, April (Chapman).—Astrophysical Journal, March (Chicago).—Scribner's Magazine, April (Low).—Journal of the Royal Agricultural Society of England, Vol. viii. Part 1, No. 29 (Murray).—Bibliography of South African Geology: H. P. Saunders, Parts 1 and 2 (Cape Town).

CONTENTS.