silk from a cocoon; this species was called "Matere." *L. florida* also occurred, and was called "m'bunga"; its rubber was worked up into balls, but was inferior in value. The rubber of *L. Petersiana* was of little importance. In South America *Hancornia speciosa* yielded what was called "mangabeira rubber."

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

AT the summer commencements of the University of Dublin, held on June 29 last, the degree of LL.D. Honoris causâ was conferred on Dr. Siemens and on Mr. Alfred Russel Wallace.

At a special meeting of the Council of the University of Dublin, held on June 30, Mr. Robert Crauford was nominated for the important post of Professor of Engineering in the University. Mr. Craufurd is well known for his many fine engineering works successfully carried out in North and South America, and in Europe.

UNIVERSITY COLLEGE, BRISTOL.—The new wing of the permanent buildings of University College, Bristol, is now rising rapidly. The portion devoted to physical and engineering laboratories and lecture-rooms will be ready for occupancy in October; the new chemical laboratories and lecture-rooms will be completed before Christmas. This greatly-needed extension will not, however, meet all the requirements of the growing institution, and additional buildings to accommodate the medical faculty are greatly wanted. One of the laboratories of the Physical Department is to be fitted up as an electrical laboratory. Prof. Thompson is actively endeavouring to raise funds for its complete outfit. Mr. C. C. Starling has been appointed Demonstrator in Physics.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, June 15.—"On the Specific Heat, and Heat of Transformation, of the Iodide of Silver, AgI, and of the Alloys $Cu_2I_2.AgI$; $Cu_2I_2.2AgI$; $Cu_2I_2.3AgI$; $Cu_2I_2.4AgI$; $Cu_2I_2.12AgI$; $PbI_2.AgI$." By Sigr. Manfredo Bellati and Dr. R. Romanese, Professors in the University of Padua.

The authors have determined the specific heat, and heat of transformation, of iodide of silver, and of five alloys or compounds of that substance with iodide of copper, and one with iodide of lead. The substances have already been studied by Mr. G. F. Rodwell as regards their expansion and contraction on heating, and the results communicated to the Royal Society; the same specimens were transmitted to Padua for the experiments of Prof. Bellati and Romanese. The following results were obtained. θ_1 and θ_2 are the temperatures at which change of molecular structure respectively commences and finishes; c the mean specific heat between t and T for temperatures below θ_1; c_1 specific heat for temperatures above θ_2; and λ the heat absorbed by the unit weight of the substance in consequence of change of structure.

Composition of the substance.	Percentage of AgI.	θ_1.	θ_2.	c.	c_1.	λ
		C.	C.			
AgI.....	100·0	142°	156°·5	$0·0543891+0·0000372(T+t)$	0·0577	6·25
$Cu_2I_2.12AgI$	88·1	95	228	0·05882 (from 16° to 89°)...	0·0580	8 31
$Cu_2I_2.4AgI$	71·2	180	282	$0·056526+0·0000410(T+t)$	0·0702	7·95
$Cu_2I_2.3AgI$	65·0	194	280	$0·059624+0·0000280(T+t)$	0·0726	7·74
$Cu_2I_2.2AgI$	55·3	221	298	$0·061035+0·0000295(T+t)$	...	7·88
$Cu_2I_2.AgI$...	38 2	256	324	$0·063099+0·0000260(T+t)$	...	8·67
$PoI_2.AgI$ ...	33·8	118	144	$0·047458+0·0000026(T+t)$	0·0567	2·556

The results are compared and discussed, and inferences are drawn therefrom as to the constitution of the bodies experimented upon.

Geological Society, June 7.—J. W. Hulke, F.R.S., president, in the chair.—Alfred Morris, C.E., and William Henry Watson were elected Fellows of the Society. Prof. Louis Lartet of Toulouse was proposed as a Foreign Correspondent of the Society. The following communications were read:—The President read the following note, forwarded by Don Manuel F. de Castro, Director of the Geological Survey of Spain:—"On the Discovery of Triassic fossils in the Sierra de Gador, Province of Almeria, Spain. The metalliferous limestone of the Sierra de Gador, owing to no fossil remains having been found prior to this occasion, has been a perfect puzzle to all geologists for the last fifty years. MM. Maestre, Amar de la Torre, Pernolet, Ansted, and Cooke considered these limestones to belong to the Transition series, the former taking it as a representative of the Mountain Limestones of other parts of Europe. M. Prado hinted that they might be Devonian; whilst M. Willkomm, in the geological map published to accompany his botanical researches in Spain, considered them Silurian. Lately MM. Botella and Vilanova, in their respective maps, have marked them as belonging to the Permian series, whilst M. de Verneuil, coming nearer to the truth, took the whole of the limestones to the south of Granada and the Sierra de Gador as Triassic, though in doubt ('Trias incertain') Under these circumstances I was commissioned by the Director of the Geological Survey of Spain to investigate the south-west portion of the Province of Almeria, which comprises the Sierra de Gador. In February last I had the good fortune of discovering abundant fossil remains in different parts of the Sierra de Gador, which perfectly fix the age of the metalliferous limestones of this part of Spain. The whole series of rocks forming this *sierra*, resting on the mica-schists and slates of the Sierra Nevada, is a succession of black, white, and purple talcose schists at the base, which alternate with some beds of yellowish and porous limestone, and which pass through a considerable thickness of grey limestones and slates, and precisely where the fossils have been found, to the metalliferous limestone of Sierra de Gador, which appears to form the top of this interesting formation. The fossils found belong to the following genera:—*Myophoria* (*M. lævigata* and *M. Goldfussi*), *Hinnites*, *Monotis*, *Avicula* (*A. Bronni*), *Myacites*, *Rissoa*, and many others difficult to determine. The places where the fossils have been found are the following:—On the southern slopes of the Sierra de Gador, in the Rambla del Cañuelo, midway on the road from Felix to Marchal, and in the place named La Solana del Fondon, to the left of the River Andarax, following the track between the mine Sebastopol and the town of El Fondon.—Joaquin Gonzalo y Xavier."—The Girvan Succession.—Part 1. Stratigraphical, by Charles Lapworth, F.G.S., Professor of Geology in the Mason Science College, Birmingham. The Lower Palæozoic rocks of the neighbourhood of Girvan, in the south of Ayrshire, have long been famous for the remarkable variety of their petrological features and for the abundance and beauty of their organic remains; but the strata are so intermingled and confused by faults, folds, and inversions, that it has hitherto been found impossible to give a satisfactory account of the geological structure of the region. The most remarkable formation in this Girwan area is a massive boulder-conglomerate, several hundreds of feet in thickness, which forms the high ground of Benan Hill, and ranges throughout the district from end to end. Employing this formation as a definite horizon of reference, the author showed, by numerous plans and sections, that it was possible for the geologist to work out the natural order of the strata both above and below this horizon, and to construct a complete stratigraphical and palæontological scheme of the entire Girvan Succession. The development of the palæontological features of the several zones of life in this succession, and the demonstration of their correspondence with the zones already recognised in the synchronous Lower Palæozoic strata of Moffatt, the Lake District, Scandinavia, and elsewhere were reserved by the author for a second part of this memoir.—Notes on the *Annelida tubicola* of the Wenlock Shales, from the washings of Mr. George Maw, F.G.S., by Mr. George Vine. Communicated by Prof. P. Martin Duncan, M.B., F.R.S., V.P.G.S.—Description of part of the femur of *Nototherium Mitchelli*, by Prof. Owen, C.B., F.R.S., F.G.S. The specimen described consisted of the distal portion, probably about one-half, of a femur obtained from Darling Downs, Queensland, and received by the author from Dr. George Bennett. Its principal differences from *Diprotodon* are that it has no depression above the outer condyle, but in its place a rough longitudinal rising for the attachment of the same or of a homologous muscle; and the hinder surface of the condyle is transversely convex. The relative width of the post-condylar fossa resembles that in *Phascolomys*; and a further resemblance to the Wombats consists in the more equal prominence of the lateral boundaries of the rotular surface than in *Diprotodon* and *Macropus*. The bone differs from the corresponding part in the

Wombats by several subordinate characters, and the animal to which it belonged would seem to have been intermediate between *Phascolomys* and *Macropus*. From the size and characters of the bone, the author referred it to *Notetherium Mitchelli*; its breadth across the condyles is $5\frac{3}{4}$ inches.—On *Helicopora latispiralis*, a new spiral Fenestellid from the Upper Silurian beds of Ohio, U.S., by Mr. E. W. Claypole, B.A., B.Sc. (Lond.), F.G.S.

Chemical Society, June 15.—Dr. Gilbert, president, in the chair.—The following papers were read :—Note on β naphthaquinone, by C. E. Groves. The author has repeated the experiments of Liebermann (*Ber.* xiv. 1310) as to the preparation of the above substance from β napthol-orange, and fully corroborates the results of that chemist, but disagrees with him as to the economical value of the process. He has somewhat improved Liebermann's method by using less stannous chloride, but finds that even then it is more troublesome and tedious than the conversion of β napthol into the amidonapthol through the nitroso-compound, &c. The cost of Liebermann's process is four times as great as the one originally proposed by Stenhouse and Groves. In preparing either α or β naphthaquinone from the corresponding amido-compounds, the author prefers to use ferric chloride as the oxidising agent.—On some new compounds of Brazilein and Hæmatein, by J. F. Hummel and A. G. Perkin. Extract of logwood is dissolved in hot water and when cool, ammonia is added in slight excess. This solution, by exposure to the air, deposits a dark purplish precipitate of hæmatein, which, on purification, gave numbers indicating the formula $C_{16}H_{12}O_6$; by the action of cold sulphuric acid, an orange crystalline substance, $C_{16}H_{12}O_6SO_3$ was obtained. By the action of hydrochloric acid in sealed tubes, hydroxyl is replaced by Cl: $C_{16}H_{11}O_5Cl$), a similar body is produced by hydrobromic acid. Brazilein was prepared in a similar way from Brazil extract. It forms compounds which resemble those of hæmatein.—On the determination of nitric acid as nitric oxide by means of its reaction with ferrous salts, Part II., by R. Warington. The method is founded on that proposed by Schlœsing, but the nitric oxide is collected and determined by gas analysis, the gas being absorbed by caustic potash after successive treatments with oxygen and pyrogallol; great care was also taken to exclude all oxygen from the carbonic acid used.—On a new process of bleaching, by J. J. Dobbie and J. Hutcheson. The authors have investigated various methods of liberating chlorine by decomposing hydrochloric acid and chlorides with a weak electric current. The best results were obtained by moistening the goods with sea-water and passing them between two slowly-revolving carbon rollers, which were connected with opposite poles of a battery; sodium hypochlorite was formed in the fabric, and on immersion in acid the bleaching was effected. Results were also obtained with dilute hydrochloric acid. Pure hydrofluoric acid also bleaches when thus decomposed.

Physical Society June 17.—The Physical Society met in Oxford by invitation of the president, and after luncheon in the hall of Merton College, by kind permission of the Warden and Fellows, the health of the Society was proposed by the president, and responded to by Lord Rayleigh. The usual meeting was then held in the Clarendon Laboratory, Prof. Clifton, president, in the chair.—Dr. W. H. Stone exhibited and described an electro-dynamometer specially designed for measuring the currents used in the medical applications of electricity (NATURE, vol. xxvi. p. 201). Mr. Varley, Prof. Perry, and others, offered some remarks.—Mr. Bosanquet then described his application of the Faure accumulator charged by a dynamo-electric generator to the working of laboratory apparatus instead of the usual Grove, or other battery. The net result of his experiments is that the accumulators charged for two hours have sufficient energy to keep the apparatus employed running for a week, and hence it is unnecessary for him, as heretofore, to put up thirty Grove cells each day. Prof. Perry observed that a well-made Faure cell, having the minium laid on in a uniform coat, does not lose its charge nor develop local action, as is done by those accumulators in which the minium is put into holes in the plates.—Prof. W. G. Adams then took the chair while Prof. Clifton described some ingenious devices adopted by him in lecture experiments on electrostatics. These consisted of insulating glass stems with glass cups to hold sulphuric acid formed on the stems; also a form of key which, by rapidly succeeding contacts, brings the spot of light on the electrometer scale to rest without tedious swinging. He also described a form of lecture-galvanometer, sine or tangent, which could be readily shown in all its working to a large class, and exhibited a simple and inexpensive apparatus for measuring the focal length of a lens in six different ways, according to what is known about the lens. The results showed that the apparatus was very accurate in its indications.

SYDNEY, N.S.W.

Royal Society, May 3.—Annual Meeting.—The number of new members elected during the year is 46, making the total number of ordinary members upon the roll to date 475.—At the Council Meeting held on March 22 it was unanimously resolved to award the Clarke Memorial medal for the year 1882 to Prof. James Dwight Dana, LL.D., of Yale College, Newhaven, Conn., in recognition of his eminent work as a naturalist, and especially in reference to his geological and other labours in Australia, when with the United States Exploring Expedition round the world in 1836 to 1842.—During the year the Society has held eight meetings, at which thirteen papers were read, and three of the sections held regular monthly meetings.—At a meeting held by the Council on October 26, it was resolved that the Society should offer prizes of 25*l.* each for the best communication containing the results of original research or observation upon certain subjects to be set forth from time to time.—The Bill for incorporating the Society was approved by the Parliament of New South Wales on December 16, 1881.

BERLIN

Physiological Society, June 16.—Prof. Du Bois-Reymond in the chair.—Prof. Zuntz read a paper upon the value of amid bodies as animal nutriment, based on experiments which he made upon a number of rabbits. In each experiment he divided the animals that he was experimenting on, into two groups. One of these groups was fed with food-stuffs containing no nitrogen (starch and oil) and with various nutritive salts, while the other rabbits received, in addition to this food, a supply of amid bodies. The object of the experiments was to determine which, if any, of the amid bodies could replace the albumen of the food. Herr Zuntz managed to overcome the distaste of the animals for the monotonous, unstimulating diet (a difficulty which has often to be combated in a disagreeable manner in experiments of this kind), by also giving them small quantities of an alcoholic infusion of hay, and by giving the food that had been refused by the animal as pap or powder, in a firm friable form. The results of the experiments may be shortly summed up thus: Extract of meat, when added to the non-nitrogeneous food-stuffs, produced no effect upon the nutrition; the animals died in exactly the same time as without the extract. Asparagine likewise could not take the place of the albumen of the food, but the loss of albumen was about 20 per cent. less in the animals that were fed with the asparagine, in addition to their other food, than in those who were fed on non-nitrogenous food alone. An addition of a mixture of asparagine and some other amid bodies, *i.e.* leucine, tyrosine, and others, of which one might have presumed that they would together form an albumin-material during the process of digestion, had, as a fact, the exactly opposite effect of producing a remarkably larger loss of albumen than the non-nitrogenous diet of the other group of animals that were kept for purposes of comparison. In the same way the addition of the crystallising decomposition-products of albumen which were got by the action of pepsin, had a prejudicial influence, producing a greater loss of albumen. Probably an ammoniate was the active principle in both cases, as it is known to work destructively in the body upon albumen; but it is possible that the amid bodies themselves behaved like ammoniate. These experiments are to be pursued with other amid bodies and with decomposition-products of albumen.—Prof. du Bois-Reymond made some remarks upon Prof. Fritsch's late investigations as to the homology of the torpedo-electrical organ with muscles and mucous-cells, and on the development of the Torpedinea, the relative weights and the nerve-endings in the electric plates, and made some observations upon the question of the immunity of the electric fish against their own shocks. He especially drew attention to the fact that there are to be found in the intestines of electric fish, certain entozoa, which must either have an immunity against the shocks of their hosts, or, a question that has not yet been investigated, be altogether insensible to electricity.

Physical Society, June 23.—Prof. du Bois-Reymond in the chair.—Prof. Neesen showed a new mercury air-pump, made on

the principle of the Topler air-pump, but with several alterations to facilitate the working.—Dr. Braun exhibited a somewhat modified Huyghens barometer, which had, both at the upper and at the lower meniscus of mercury, points for exact measurement, and which served to measure not only the variations, but also the amount of the air pressure.—Dr. Kaiser showed a moment-shutter for instantaneous photographs, in which, on pressing a small capsule with the hand, two pendant valves before the aperture are raised, and meet one over the other. The time during which the light can penetrate by the aperture into the apparatus, is 1-20th second. By a simple replacement in the apparatus, the mechanism can be so altered, that the light coming from above—that of the sky and clouds—acts a much shorter time than that from other objects, so that, with 1-20th second of illumination, the exposure for the sky is not excessive.—Prof. Neesen remarked, *à propos* of a former communication by Dr. Thiesen, on the deflection of projectiles, that in the case of the best German guns, this deflection amounts to one degree; thus, with a distance of 3000 metres, it is about 128 metres, a value which cannot be explained by the hypothesis of Dr. Thiesen.—The next meeting of the Society takes place after the holidays, on October 20.

VIENNA

Imperial Academy of Sciences, June 9.—E. Mach, on A. Guebhard's statement on equipotential curves.—L. Boltzmann, on the theory of gas-diffusion.—E. Heller and C. Della-Torre, on the distribution of the fauna in the high mountains of Tyrol.—E. Rathay, Researches on the spermagonia of the Æcidiomycetes.—R. Andreasch, on mixed alloxantins.—On cyamidomalonic acid, by the same.—On dimethylglyoxylcarbamide, a product of reduction of Cholestrophæne, by the same.—W. Pscheidl, on determination of the coefficient of elasticity by bending of a rod.—G. Schmidt, on analogies.—C. Braun, a sealed packet, with the inscription, some suggestions to the technics and praxis of astronomical instruments.—L. Psæczolka, a sealed packet with the inscription, on the action of silicon on carbonic oxide in the recarburation in the Siemens-Martin process.—C. Natterer, on monochloraldehyde.—E. Lecher, on the absorption of radiant heat by steam of water and carbonic acid.—V. Uhlig, on the cephalopoda fauna of the strata of Wernsdorf.—On the strata of Wernsdorf and their equivalents, by the same.

June 15.—K. Fulkowsky, on the constituents of corallin.—B. Brauner, contributiou to the chemistry of the cerite metals.—E. v. Haerdtl, computation of the orbit of the planet Adria.

June 22.—Ph. Knoll, contributions to the theory of respiratory innervation (part 2); on respiration with artificial stimulation of the cervical part of vagus.—G. Stach, on the fossils collected in the Western Sahara, by O. Lenz during his journey to Timbuctu. They belong all to the carboniferous, and show analogies with the fossils of the Belgian limestone.—F. Steindachner, ichthyological contributions (part 12) on a new Ezemias species, *E. Holubi*, from the valley of the Limpopo River (Transvaal).—Th. Weinzweig, on the anatomy of laryngeal nerves.

PARIS

Academy of Sciences, June 26.—M. Jamin in the chair.—The president reported on the presentation of a commemoration medal to M. Pasteur on June 25, by a committee of friends and admirers. M. Dumas' address and M. Pasteur's reply are given in *Comptes rendus*.—A telegram from the Emperor of Brazil stated that comet Wells was visible on the 17th (June). On the 20th the tail measured 45°, and the nucleus was very bright.—On the reciprocal displacements of acids combined with oxide of mercury, by M. Berthelot.—Note on the preparatory works of the submarine railway between France and England, and on the geological conditions under which they are executed, by M. Daubrée.—On *débris* of mammoth found in the heart of Paris, by M. Gaudry. The locality is in the Rue Pagevin, the foundations of the new Hôtel des Postes. M. Gaudry showed a molar. Since Cuvier's time numerous remains of large quaternary mammals have been found in Paris, and human remains contemporary with the mammoth.—Mobile tableau of the different attitudes of the horse in any pace, by M. Marey. He describes a device of M. Cuyer, in which a jointed figure of a horse is fixed on a board; the hoofs are painted different colours; and placed on corresponding coloured and numbered spaces on sheets of paste-board, so that different phases of a pace can be represented. Direction is also given in placing the head, neck, body, and tail.—Action of low temperatures on the vitality of trichinæ in meat, by MM. Bouley and Gibier. Exposure of meat to a temperature of − 20° and even − 15° is sufficient to kill the trichinæ in it.—On the second comet of the year 1784, by M. Gyldén.—On the photographic spectrum of Comet I, 1882 (Wells), by Dr. Huggins.—On *Laminaritez Lagrangei*, Sap. and Mar., by M. de Saporta.—Experimental study of the conditions that allow of rendering usual the employment of the method of M. Toussaint for weakening the virus of charbon and vaccinating animal species subject to splenic fever, by M. Chauveau. Heating (according to certain rules) blood infected with bacteria, makes it a vaccinating liquid quite as sure as that of M. Pasteur. The temperature 43°-44° suffices. In an hour enough vaccine matter for 500 sheep can be prepared from one guinea-pig.—M. Lallemand was elected Correspondent in Physics in room of the late M. Billet.—On Eulerian integrals, by M. Tannery.—On Abelian functions, by M. Appell.—On the reduction of Abelian integrals to elliptic integrals, by M. Picard.—On the perforating machine of Col. Beaumont employed on the submarine railway, by M. Duval.—On the employment of zinc-carbon couples in electrolytes, by M. Tommasi. A reply to M. Berthelot.—On silicium, by MM. Schützenberger and Colson. Platinum plate or wire, heated to a white red within a thick layer of non-siliciferous lamp-black, gains weight, and has its fusibility increased, through fixation of silicium, which can only have come from the crucible. From various experiments, the authors infer that nitrogen, and probably also oxygen, have a *rôle* in the transport of silicium.—Action of bimolybdate of potash on some oxides; production of corundum and specular iron ore, by M. Parmentier.—Action of sulphuretted hydrogen on sulphate of nickel in acetic solution, by M. Baubigny.—On the supposed compound NH_2, by M. Combes. Having repeated M. Maumené's experiments, he gets only ammonia and carbonic acid.—On didymium, by M. Brauner.—Action of oxygenated water on the red colouring matter of blood and on hematosin, by M. Béchamp. Hemoglobin and hematosin behave, in contact with oxygenated water, as oxidable bodies. The blood contains two causes of decomposition as regards oxygenated water, viz. microzymas and hemoglobin.—On gastric juice, by M. Chapoteaut. Pepsine seems to him to be a combination of an albuminoid matter with an organic acid; (he hopes to prove this shortly).—On the differentiation of protoplasm in the nerve-fibres of Unionides, by M. Chatin.—On the sexual organs of *Ciona intestinalis*, by M. Roule.—The eye of *Proteus*, by M. Desfosses. It has retinal development, but no crystalline lens, nor any refractive organ; thus it cannot be compared with the eye of any vertebrate.—New example of alternating generations; œcidium of creeping Ranunculus [*Œc. Ranuncuacearum* (*pro parte*)] and Puccinia of roses (*Puccinia arundinacea*, Dc.), by M. Cornu.—On the disease of saffrons called "Death," by M. Prillieux.—On the petioles of Alethopteris, by M. Renault.—On the marine carboniferous of Upper Alsace; discovery of its relations with the culm or the plant carboniferous, by MM. Bleicher and Mieg.

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