given by the craniometric methods of Broca and Jhering. M. Lapouge measured the skulls exactly one year after Dr. Wilser, and during the whole of that time they had been thoroughly dried under the sunny roof of his laboratory at Montpelier. He also made a double series of measurements of the length and breadth of the skulls, first, by Broca's method, with a pair of calipers, and secondly, with Ammon's sliding compass, and after the method of Jhering, in precisely the same manner as Dr. Wilser's observations had been made. The results obtained are exceedingly interesting, and show that, in competent hands, it is a matter of perfect indifference which instrument is used, and that although, as one would naturally expect, the cephalic index is slightly greater when Jhering's method is employed, yet the difference is so small as to be almost insignificant. By Jhering's method the mean index of the series is 82·54, while Broca's index is 81·87. Both the length and breadth of the skull appear to be somewhat increased by drying, and the value of the cephalic index is a little raised, that obtained by Dr. Wilser from the fresh skulls being 81·84, while M. Lapouge's measurements of the dried skulls gave an index of 82·54. It will be observed that the difference is almost exactly the same as the excess of Jhering's index over Broca's. The flattening of skulls under the influence of desiccation is a phenomenon well known to all anthropologists, and in the case of these Karlsruhe skulls the mean diminution of height was more than a centimetre, so that, although the hygrometric conditions under which skulls are measured do not seem to affect the cephalic index of a series to an appreciable degree, the vertical and transverse indices of damp and dry crania are not comparable with one another.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, March 9.—Prof. A. W. Rücker, F.R.S., President, in the chair.—Prof. O. Henrici, F.R.S., made a communication on mathematical calculating machines, especially a new harmonic analyser. After mentioning the general principles on which such machines are based, the author showed a new arithmometer devised by Prof. Selling, in which the jerky motions of the numeral wheels common in such instruments are eliminated, and the operations simplified. Another arithmometer of very compact design, named the "Brunsviga," had been placed on the table by Prof. Boys. The simple and ingenious "hatchet" integrator was then shown. It resembles a small hatchet with a tracing-point projecting at right angles to, and at the end of, the handle. Moving the point from near the centre of mass of any closed curve, round the curve once and back to the starting-point, the distance between the initial and final positions of the hatchet-head is a measure of the area of the curve. The instrument has been found very useful for indicator diagrams. A Hine and Robertson's planimeter (lent by Prof. Perry), an Amsler planimeter combined with a pentograph for measuring small areas, an Amsler integrator to give areas and first moments, and a beautiful sphere and cylinder rolling-integrator of great accuracy, by Coradi of Zürich, were shown, as well as an ingenious integraph devised by Abdank Abakonowitcz. Passing on to harmonic analysers, Prof. Henrici explained the object of such instruments, viz. to determine the coefficients in Fourier's expansion for any periodic curve,

$$y = A_0 + A_1 \cos\theta + A_2 \cos 2\theta + \ldots + B_1 \sin\theta + B_2 \sin 2\theta + \ldots$$

and briefly described Lord Kelvin's instrument now in use at the Meteorological Office. This machine gives the first term and three pairs of coefficients A and B, but is large and expensive. The author had endeavoured to devise a simple and more portable instrument, and now described the various stages in the evolution of his new analyser. Using Clifford's method of wrapping the curve round a cylinder, he saw that by imparting a simple harmonic motion to a plane tangential to the cylinder, which plane carried an Amsler planimeter whose tracing-point followed the intersection of the plane with the curve, as the cylinder rotated, any coefficient A_n or B_n could be determined. This arrangement had considerable friction, and only gave one coefficient at a time; it also necessitated readjustment of the period of the harmonic motion for each pair of terms. Another machine founded on integration by parts was then constructed, in which the relative periods of cylinder and registering wheels was adjusted by a disc and roller, the motion being transmitted to the wheels by bands driven from the disc spindle. This gave A_n and B_n at one operation. Mr. A. Sharp used this machine for some time and then designed an inversion of it, in which the curve was laid out flat and the machine rolled over it. This arrangement greatly facilitated the multiplication of registering wheels, and thereby enabled several pairs of coefficients to be determined at once. The first machine of this kind showed several small errors which were avoided in a second instrument, a specimen of which, made by Coradi, was exhibited and described. A rectangular frame carried on three rollers (two being fixed to the ends of a long axis) traverses the paper in the direction of y, and the tracing point is fixed to a carriage which moves on the frame in a direction perpendicular to y, *i.e.* in the direction of θ. A band is attached to this carriage and imparts a motion proportional to θ to two horizontal axes (one for the A coefficients, and one for the B's), placed above and parallel to the long roller axis above mentioned. Each of the two axes carries five pinions having teeth in the ratios 1, 2, 3, 4, 5, respectively, which gear with crown wheels fixed to vertical spindles. The latter, therefore, rotate through angles proportional to θ, 2θ, 3θ, 4θ, and 5θ. To the lower ends of these spindles horizontal rings are attached, in which the bearings of a registering wheel are formed; each wheel rests on a cylinder carried by the long axis, and rolls or slides thereon according as its axis is parallel or perpendicular to that of the cylinder. Moving the tracing-point once round the curve gives five pairs of coefficients. By changing the driving-band to other pulleys so as to turn the pinions at different rates relative to the θ movement, the 6th, 8th, 10th, and 7th and 9th pairs can be determined. The chief drawback of the instrument is that the registering wheels are not easy to read, whilst the back-lash of the crown wheels and pinions introduces small errors. In the latest form of instrument toothed wheels are dispensed with, and glass spheres carried in frames on the vertical spindles roll on the horizontal cylinders; each sphere actuates two registering wheels on fixed areas at right angles to each other, and these give respectively the sine and cosine coefficients. The number of vertical spindles is therefore halved, and the instrument greatly simplified. These details have been introduced by Coradi. A working drawing of another analyser, designed by Mr. Sharp, which gives the amplitude and epoch of the curve resulting from each pair of terms in Fourier's expansion, was exhibited. The discussion on Prof. Henrici's communication was postponed until next meeting.—Mr. H. Wilde, F.R.S., then exhibited and described his "magnetarium." This consists of a hollow geographical globe, wound all over the inner surface with insulated wire in planes parallel to the equator. Within this globe is a sphere wound with wire on its surface, and having its axis inclined at $23\frac{1}{2}°$ to that of the outer globe. By means of epicyclic gearing the spheres can be made to rotate at slightly different rates. When electric currents of suitable strength are passed through the two windings, the magnetic condition of the earth can be imitated, both as regards distribution at any epoch, and the secular variations. A better result was obtained by putting sheet iron over the land areas, and a still closer approximation by using thin iron over the water areas. A magnetic chart and tables giving the magnetic elements at various places for different epochs as determined by the magnetarium were shown. The author mentioned that recent observations by the United States Survey at Ascension Island, and by Prof. Thorpe in Senegambia, had confirmed results obtained by his instrument. The President said he had tried the apparatus, and found the Siberian oval closely imitated. The secular variations at Greenwich were also well shown. In South America the approximation was not so good. In reply to a question by Mr. Blakesley, Mr. Wilde said the present position of the pole of the inner sphere was 84° W., 67° N.

Geological Society, March 7.—Dr. Henry Woodward, F.R.S., President, in the chair.—The Secretary announced that a portrait of the late Sir Richard Owen had been presented to the Society by Mr. Ernest Swain.—The following communications were read:—The systematic position of the Trilobites, by Mr. H. M. Bernard. The author, in his work on "The Apodidæ," endeavoured to show that *Apus* was the ancestral form of all existing crustacea except the ostracoda,

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and as such might be expected to throw light upon the trilobites. Since the publication of this work he had been studying the organisation of the trilobites themselves, and the results were given in the present communication. He discussed the great variability in the number of segments shown by the trilobites; the formation of the head by the gradual incorporation of trunk-segments; the bending round ventrally of the first segment; the "wandering" of the eyes; the existence and modification of the "dorsal organ"; and especially the character of the limbs. As a result of this discussion, he stated that the zoological position of the trilobites can now be fixed with considerable probability. The features described serve to connect the trilobites with *Apus*. *Apus* must be assumed to lie low in the direct line up from the original annelidan ancestor towards the modern crustacea, and the trilobites must have branched off laterally from this line, either once or more than once, in times anterior to the primitive *Apus*, as forms specialised for creeping under the protection of a hard imbricated carapace, obtained by the repetition on every segment of the pleuræ of the head-segments, which together form the head-shield. The trilobites may be briefly described as fixed specialised stages in the evolution of the crustacea from an annelidan ancestor with its mouth bent round ventrally, so as to use its parapodia as jaws. The President agreed with Mr. Bernard that the earlier trilobites presented forms with very numerous segments, but pointed out that the later ones showed signs of advance in having fewer free thoracic rings and a well-developed pygidial shield. He had always cherished the idea that the Isopoda might have branched off at some distant time from the Trilobita, and he drew attention to such points of structure as the pores in the free cheeks, which were present in such isopods as *Sphæroma* and *Serolis*, and in such trilobites as *Phillipsia*, *Griffithides*, *Ampyx*, and *Trinucleus*. The Rev. T. R. Stebbing agreed with the author in thinking that the trilobites have little connection with the isopods, though the resemblance was sometimes striking, and was often favoured rather than otherwise by the character and position of the eyes. Prof. G. B. Howes said that he believed the discovery of the terminal anus in the trilobite dealt the death-blow to the association of the trilobites with the arachnoid series. He believed that the facts and arguments brought forward by the author of the paper proved the trilobites to be crustacea, and fully justified their association with *Apus* as an early offshoot on the crustacean line. Mr. Malcolm Laurie also spoke, and the author replied.—Landscape marble, by Mr. Beeby Thompson The Cotham stone is a hard, close-grained, argillaceous limestone with conchoidal fracture. The dark arborescent markings of the stone rise from a more or less stratified dark base, spread out as they rise, and terminate upwards in wavy banded portions of the limestones. In some specimens two "landscapes" are seen, one above the other, each rising from a distinct dark layer. The author described the microscopical and chemical characters of the rock, and its mode of occurrence, and discussed the explanations which have been put forward to account for its formation, especially that of Edward Owen, who in 1754 gave the first published description of the Cotham stone, and that advanced by Mr. H. B. Woodward in the *Geological Magazine* for 1892. He then proposed a new explanation to account for the formation of the rock, and maintained that its peculiar characters are due to interbedded layers of vegetable matter, which decomposed and evolved carbonic acid gas and marsh gas. This decomposition continued while several inches of new sediment were laid down, the result being that arborescent markings were produced along the lines taken by the escaping bubbles, and that the upward pressure of these gases, after their escape had been prevented by increasing coherence or greater thickness of the upper layers of sediment, caused the corrugations in the upper surface of the stone. He further discussed the composition of the stone, and described experiments which he made to illustrate his views. Mr. H B. Woodward, Prof. T. Rupert Jones, Mr. F. A. Bather, and Mr. Monckton spoke upon the subject of the paper, and the author replied.—On the discovery of molluscs in the Upper Keuper at Shrewley, in Warwickshire, by the Rev. P. B. Brodie. Mr. R. B. Newton read a paper at the meeting of the British Association at Nottingham in 1893, on some lamellibranchs found at Shrewley by the author of the present paper and Mr. Richards. This paper gave details of the section where the shells were found, and their interest and importance were pointed out, no shells having been previously detected anywhere in the New Red Sands one in this country.

Entomological Society, March 14.—Colonel Swinhoe, Vice-President, in the chair.—Dr. D. Sharp, F.R.S., exhibited a collection of white ants (*Termites*), formed by Mr. G. D. Haviland in Singapore, which comprised about twelve species, of most of which the various forms were obtained. He said that Prof. Grassi had recently made observations on the European species, and had brought to light some important particulars; and also that in the discussion that had recently been carried on between Mr. Herbert Spencer and Prof. Weismann, the former had stated that in his opinion the different forms of social insects were produced by nutrition. Prof. Grassi's observations showed this view to be correct, and the specimens now exhibited confirmed one of the most important points in his observations. Dr. Sharp also stated that Mr. Haviland found in one nest eleven neoteinic queens—that is to say, individuals having the appearance of the queen in some respects, while in others they are still immature. Mr. Haviland gave an account of the structure of some of the nests, and stated that two of the species of white ants exhibited certainly grow fungus for their use, as described by Smeathman, many years ago, in the *Philosophical Transactions*. Mr. H. Goss remarked that the fact that the different forms of social insects were produced by nutrition was known to Virgil, who referred to it, and to the subject of parthenogenesis in bees, in the "Georgics," book iv. Mr. McLachlan, Colonel Swinhoe, Mr. Champion, Mr. Jenner-Weir, and Dr. Sharp continued the discussion.—Mr. O. E. Janson exhibited specimens of *Dicranocephalus adamsi*, Pascoe, from Sze-chuen, Western China, and *D. dabryi*, Auz., recently received from the neighbourhood of Moupin, in the same district; he observed that, although the latter had been quoted by Lucas, Bates, and others, as a synonym of *adamsi*, the two species were perfectly distinct; the females of both were unknown to the authors when describing them, and presented a remarkable difference.—Mr. C. O. Waterhouse exhibited, for Mr. E. A. Waterhouse, a specimen of *Colias edusa* resembling *C. erate*, a continental species, which was taken on Wimbledon Common; a varied series of *Chrysophanus phlæas*, from Barnes Common; and a series of *Lycæna arion*, from Cornwall.—The Rev. Canon Fowler read a paper entitled "Some New Species of *Membracidæ*."—Mr. F. Merrifield read a paper entitled "Temperature Experiments in 1893, on several Species of *Vanessa* and other Lepidoptera." He said that the results tended to confirm Dr. Dixey's conclusions as to the origin of the wing-markings in the *Nymphalidæ*, brought out many ancestral features, and in some cases were very striking. There was much difference in sensitiveness between the seasonal broods of the same species, even in *V. c-album*, although both broods of that species passed the pupal state in the warmer part of the year.—Dr. Dixey read a paper entitled "On Mr. Merrifield's Experiments in Temperature-variation as bearing on Theories of Heredity," which was supplemental to the previous paper. Colonel Swinhoe, Mr. Hampson, Mr. Jenner-Weir, Mr. Merrifield, and Dr. Dixey took part in the discussion which ensued.

Linnean Society, March 15.—Prof. Stewart, President, in the chair.—Mr. Clement Reid exhibited some cones of Scotch fir, and also some carbonised pine wood from a peat moss at Parkstone, Dorset. He said the pine had become extinct in the South of England after Neolithic times, and had been reintroduced only recently. Its extinction was commonly supposed to be due to forest fires. He found that every piece of pine wood imbedded in the peat moss was similarly charred, while portions imbedded in sand were little altered, and he suggested that the appearance of burning might possibly be due to the action of the growing peat, and have nothing to do with fire. A discussion followed, in which Messrs. Carruthers, Hanbury, Christy, and others gave reasons for adhering to the older theory. Mr. Carruthers exhibited a diagrammatic table showing an accurate counting of the annual rings of growth in three gigantic specimens of Wellingtonia, *Sequoia gigantea*, from which he calculated the age of the trees (see p. 507). A section of one in the British Museum (Natural History), fifteen feet in diameter, which was a living tree when cut down, he estimated to be 1330 years old. As illustrative of the size to which these trees grow, he mentioned that he had measured two in America, one of which was 92 feet and the other 77 feet in circumference. A discussion followed on the conditions which accelerated or retarded growth, and Mr. G. Murray, in reply to a suggestion of Mr. Reid, pointed out that a number of experiments had

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been made on various trees to test their rate of growth under different conditions of weather and temperature, but that the results varied to such an extent as to afford no basis for sound conclusions. Mr. A. B. Rendle exhibited the fruit of *Melocanna bambusoides* from the Mauritius, where it had been introduced, and gave some account of its structure and mode of growth, referring to the figure of it given by Roxburgh in his "Plants of the Coast of Coromandel" (pl. 243), under the name *Bambusa baccifera*.—Mr. C. B. Clarke gave the substance of a paper "on certain authentic *Cyperaceæ* of Linnæus," describing the results of his examination of the type specimens in the Linnean Herbarium, with suggestions for some rectifications in the nomenclature. Referring incidentally to the history of this Herbarium, he regretted the additions which had been made to it since the death of Linnæus, and the introduction of plants which Linnæus had never seen. In the discussion which followed, Mr. Carruthers and Mr. Daydon Jackson explained under what circumstances these additions had been made, and showed that it was antecedent to the collection coming into the possession of the Society, since which time no alteration in its condition had taken place.—Mr. George Brebner read a paper "on the development of the mucilage-canals of the *Marattiaceæ*," in which, with the aid of some excellent lantern slides, he showed that these canals are schizogenous intercellular spaces arising from the separation of cells, and are lined by a persistent epithelium. The secretion is thus the product of the activity of living cells, and not the result of cell-degradation. An interesting discussion followed, in which Dr. D. H. Scott, Prof. Reynolds Green, and others took part, and the meeting adjourned to April 5.

Zoological Society, March 20.—Prof. G. B. Howes in the chair.—The Secretary exhibited and made remarks on a photograph of a young male Indian bison (*Bos gaurus*), proposed to be sent home as a present to the Society's menagerie by Major G. S. Roden.—Mr. F. G. Parsons read a paper on the myology of the Hystricomorphine and Sciuromorphine rodents, and stated that it was based on the dissection of the muscles of examples of twenty-one species of rodents, belonging to many families of the Hystricomorpha and Sciuromorpha, made at the Society's gardens. The results of these dissections had been compared with the writings of other observers, and arranged, firstly under the heads of the different muscles, and secondly under those of the different families. The arrangement of the muscles coincided in a marked manner with the usual classification of the order, and seemed to depend much more upon the affinities of the animals than upon their habits and mode of life. The muscles which seemed most characteristic of the two principal sections were the masseter, the long flexors of the foot, the sterno-scapular, and the digastric. Three genera of the *Dipodidæ* had been examined, and were found to resemble the Hystricomorpha in many respects, while in others they approached the Sciuromorphine type.—A communication was read from Babu Ram Bramha Sányál, containing remarks on a rare carnivorous mammal of Borneo (*Cynogale bennetti*), based on a specimen living in the Zoological Gardens of Calcutta.—A communication was read from Dr. R. W. Shufeldt, containing an account of the osteology of certain Cranes, Rails, and their allies, with remarks upon their affinities.—A communication was read from Mr. O. V. Aplin, containing field-notes on the Mammals of Uruguay, made during his recent expedition to that country.

Chemical Society, March 1.—Dr. Armstrong, President, in the chair.—The following papers were read:—The aerial oxidation of terpenes and essential oils, by C. T. Kingzett.—The amides of sodium, potassium, and lithium, by A. W. Titherley. Sodamide, $NaNH_2$, is obtained as a white crystalline mass by passing ammonia over sodium at 300°-400°; no sodium nitride, Na_3N, or disodium amide, Na_2NH, could be prepared. Potassamide, KNH_2, is similarly prepared, and sublimes at 400°. Lithamide, $LiNH_2$, is obtained in the same way, and has similar properties to the sodium and potassium amides.

Quekett Microscopical Club, March 16.—Mr. A. D. Michael, Vice-President, in the chair.—The secretary said they had received a donation which required something more than a formal acknowledgment. As members were aware, the club's collection was undergoing revision, and Mr. Morland, who had undertaken the Diatomaceæ, had presented a series of thirty-seven slides to replace others found to be bad or wanting. A special vote of thanks to Mr. Morland was carried unanimously. The chairman, on behalf of the subscribers, presented Mr. F. A. Parsons with an address and a valuable gold watch, as a testimonial to his zealous endeavours as secretary of the excursions sub-committee, during the last ten years, to make the gatherings a success. Coupled with these was a special series of pond-life, prepared and presented by Mr. C. F. Rousselet. Prof. Edlinger's photographic and drawing apparatus, made by Leitz, was exhibited by Mr. C. L. Curties.—Messrs. Swift exhibited and described their new biological microscope, which had the posterior limb of the tripod doubled and rotating on a pivot, thus giving increased steadiness to the stand, and at the same time enabling it to be packed in a smaller case. It was explained that the pivot was provided with a strong spiral spring, which would prevent it becoming loose, and also take up any wear at the bearing surfaces.—Mr. E. M. Nelson's paper on "the determination of the foci of microscopical objectives; lantern and camera lenses by arithmetical formulæ," was taken as read.—Mr. H. W. King read a paper on "Amoeba." A discussion ensued, in which Mr. J. D. Hardy, the chairman, and the author took part.

CAMBRIDGE.

Philosophical Society, March 12.—Prof. T. McK. Hughes, President, in the chair.—Dr. W. H. R. Rivers showed apparatus devised by Prof. Hering to illustrate (1) colour-blindness of peripheral retina; (2) mirror-contrast; (3) influence of strength of illumination and of contrast on quality of colour; (4) diagnosis of colour-blindness.—Mr. J. C. Willis exhibited a plant of *Deherainea smaragdina* in flower. The flowers are interesting on account of their green colour, their large size and disagreeable smell. They are extremely protandrous. In the early stage the extrorse anthers completely surround and hide the stigma; later on the stamens bend away and come to rest on the corolla, and the flower is now female. From its colour scent, &c. it is probably adapted to large flies.—Notes on the Bunbury Collection of Fossil Plants, by Mr. A. C. Seward. Attention was called to the exceedingly interesting and representative collection of fossil plants recently acquired by the Botanical Department through the generosity of Lady Bunbury. Among the plants exhibited at the meeting were several type specimens from the coal-measures of the Sydney coal-field, Cape Breton; also some figured specimens from English rocks of Carboniferous and Jurassic age. One of the Jurassic species, *Pecopteris exilis*, Phill. was briefly described, and it was pointed out that Sir Charles Bunbury's account of this plant and his figure of the sporangia was entirely supported by a re-examination of the figured specimen. The generic name of *Klukia*, recently instituted by Raciborski for certain species of Mesozoic Schizaceous ferns, was therefore preferable to the older provisional genus *Pecopteris*, originally adopted for this Jurassic species.—Note on the liver-ferment, by Miss M. C. Tebb. By extraction with glycerin Claude Bernard obtained from liver a ferment which converted glycogen into sugar, but the properties of this sugar were not described. In the present research it was found that pig's liver, rapidly dried, produced dextrose when allowed to act on starch or glycogen. In all cases whether an extract or the dried tissue itself was used, the product of the action on starch or glycogen always gave crystals of phenyl glucosazone with phenyl hydrazin, and the reducing power increased *only slightly* on boiling with acid; hence the conclusion was drawn that one product of the action is *dextrose*. As far as they have gone, experiments with fresh liver have yielded the same result.

DUBLIN.

Royal Irish Academy, February 25.—Dr. J. K. Ingram, President, in the chair.—A paper was read by the Right Rev. Dr. Graves, on the discovery in the south of Ireland of a stone with a most perfect Ogham inscription.—Mr. Henry Dixon read some notes on the peculiar method of the development of the axillary buds of *Vanda teres*. The buds in developing break through the lower part of the petioles, and appear below the laminæ of the subtending leaf opposite to the lamina of the leaf next below it. This manner of development was also found in *Dendrobium ærides* and several species of *Vanda*. The chains of cells, with siliceous bodies found accompanying the sclerenchymatous fibres of the bundles in many Monocotyledons, were detected in the leaves but not in the stem of this orchid. The development of these cells was found to be

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need not necessarily be alternations of transparency and opacity in order to produce the desired effect. Very close contact between the film and the grating is essential.—On atmospheric polarisation, by M. A. Hurion.—Researches on the higher alcohols and other impurities in vinic alcohol, by M. Émile Gossart.—On the general relations which exist between the coefficients in the fundamental laws of electricity and magnetism, by M. E. Mercadier.—On the reflection of electric waves at the end of a linear conductor, by M. Birkeland.—Multiplication of the number of periods of sinusoidal currents, by M. Désiré Korda.—On the hygroscopic properties of several textile fabrics, by M. Th. Schlœsing fils.—Contribution to the study of the Leclanché cell, by M. A. Ditte.—Attempt at a general method of chemical synthesis; formation of nitrogen compounds, by M. Raoul Pictet.—On the stereochemistry of the malic compounds, and the variation of the rotatory power of liquids, by M. Albert Colson.—On a chlorobromide of iron, by M. Lenormand.—On the saccharates of lime, by M. Petit.—On a new soluble ferment doubling trehalose into glucose, by M. Em. Bourquelot.—On the circulatory apparatus of *Mygale Cæmentaria*, Walck, by M. Marcel Causard.—Influence of the pressure of gases upon the development of vegetables, by M. Paul Jaccard.—On the ammonite layers of the inferior Malm in the county of Montejunta, Portugal; little known phases in the development of the mollusca, by M. Paul Choffat.—On the mode of reproduction of the parasites of cancer, by MM. Armand Ruffer and H. G. Plimmer.—M. Lippmann presented to the Academy, in the names of MM. Auguste and Louis Lumière, coloured photographs obtained by the interference method.

BERLIN.

Physical Society, March 10.—Prof. Kundt, President, in the chair.—The President gave an account of some researches undertaken as an introduction to the study of Hall's phenomenon. As is well known, this is directly proportional to the intensity of the primary current, but inversely proportional to the pressure of the plates; on the other hand, it is not strictly proportional to the magnetising current in the case of the several metals so far examined, and it appeared probable that it might more possibly be proportional rather to the magnetisation of the plate. Prof. Kundt wished to test this possibility in the case of iron, nickel, and cobalt, employing transparent metallic films of these metals magnetised to 28,000 units, whose magnetisation could be tested directly by means of their rotatory power. It was found that the Hall effect increased hand in hand with the increase of rotatory power, and therefore proportionally to the magnetisation of the plates. The effect was, as Hall had already shown, positive in the case of iron and cobalt, negative in that of nickel. Bismuth deposited electrolytically in a transparent film gave very feeble or no results, whereas, when drawn out into a thin plate the effect was considerable.—Dr. Wren spoke on Maxwell's proposition that waves of light exert pressure in the direction of their transmission, as proved in a certain case by Boltzmann. He deduced, under certain assumptions, a formula for the calculation of temperature based upon a determination of maximal energy.

AMSTERDAM.

Royal Academy of Sciences, March 25.—Prof. van de Sande Bakhuysen in the chair.—Mr. Pekelharing spoke of the peptone of Kühne. Some years ago he argued there was not a real difference between the substances called peptone, and the substance called propeptone or hemialbumose. The researches of Kühne and his disciples afterwards proved that what was called peptone by Schmidt-Mülheim and by Salkowski, contained albumose. But it was not proved by Kühne that the substance called by himself peptone was really free from albumose. Out of a solution of Kühne's peptone, saturated with ammoniumsulphate, there can be precipitated by metaphosphoric acid, and more fully by trichloracetic acid, a substance which has the properties of albumose. It gives the biuretreaction, it is precipitated, the reaction may be acid, neutral, or alkaline, by ammoniumsulphate, it is precipitated by picrinic acid, and, in acid solution, by saturation with natriumchlorid. So it is clear that there is no ground for believing with Kühne that the substance called by him peptone is a substance *sui generis*, and not an impure albumose.—Mr. Bakhuis Roozeboom dealt with the cryohydrates in systems of two salts. Three cases are to be considered. The first is that the two salts may exist without combination. Then there is a cryohydratic point in which the two salts A and B exist with ice next the solution. This point is a minimum temperature. Besides, there are two cryohydratic lines, representing the series of solutions which may exist with ice and A or ice and B as solids. In the other cases when A and B form a double salt D, there are two cryohydratic points, one for the solution in equilibrium with ice + D + A, the other for ice + D + B; and three cryohydratic lines for the solutions in equilibrium with ice + D, ice + A, ice + B. When the double salt is soluble without decomposition, the two cryohydratic points are both minimum temperatures, and therefore there must exist a maximum temperature on the line for ice + D; this maximum relates to the solution which presents the same relation A/B as in the double salt. All these conclusions may be deduced from thermodynamical rules; they were confirmed in experimental research by Mr. Schreinemakers.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Carlsbad, a Medico-Practical Guide: Dr. E. Kleen (Putnam).—Louis Agassiz, his Life and Work: Dr. Holder (Putnam).—Die Natürliche Auslese beim Menschen: O. Ammon (Jena, Fischer).—Public Health Laboratory Work: H. R. Kenwood (Lewis).—Annual Statement of Works carried out by Public Works Department (Sydney, Potter).—The Principles of Agriculture: G. Fletcher (Derby, Central Educational Company).—Science et Religion: T. H. Huxley (Paris, Baillière).—Au Bord de la Mer: Dr. E. L. Trouessart (Paris, Baillière).—Conférences Scientifiques et Allocutions—Constitution de la Matière: Lord Kelvin. Traduites et Annotées sur la Deuxième Edition: P. Lugol and M. Brillouin (Paris, Gauthier-Villars).—Premiers Principes d'Électricité Industrielle: P. Janet (Paris, Gauthier-Villars).—The Great Barrier Reef of Australia: W. Saville-Kent (W. H. Allen).

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CONTENTS.

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