the supposition that the traces of bands observed are true carbon bands. The author also investigated the spark spectrum of oxygen produced by a dynamo and transformer, and compared the bright lines found with the solar iron lines found in the same positions. The result showed that the oxygen lines, if present in the sun, are not sufficient to cover even the faintest iron absorption lines. Still, the author inclines to the view that the sun's light is due to carbon vapour in an atmosphere of oxygen.—On the determination of the division errors of a straight scale, by H. Jacoby. The author compares every division, and set of divisions, microscopically with every division on a duplicate scale. This is Gill's method. But he improves it by counting the "weight" of each observation according to its true value, instead of assigning the same weight to all readings without distinction.—Röntgen rays not present in sunlight, by M. Carey Lea. The author proved this by trying to obtain radiographs from the sun's light through one hundred leaves of a book, or through aluminium foil. No trace of Röntgen rays was found in sunlight, nor was any found in the light from a Welsbach incandescent gas burner.—On numerical relations existing between the atomic weights of the elements, by M. Carey Lea. It has already been shown that elements whose ions are always colourless can be arranged in vertical lines so that the horizontal lines contain each a natural group. Also that the elements whose ions are always coloured, form series with the atomic weights immediately following one another. If the atomic weights in the first vertical column are subtracted from those in the second, the second from the third, and so on, certain standard differences are found to recur. One of these is about 16, the other about 46, and the third about 88. The elements with ions always coloured are outside of this rule. Their behaviour is altogether anomalous. The colourless elements, beginning with hydrogen, fall into four series of nine each, interrupted by four coloured groups, and followed by an alternate series, Hg, Tl, Pb, Bi, Th and U.

Bulletin of the American Mathematical Society, April.—A two-fold generalisation of Fermat's theorem, a paper presented to the Society at its February meeting, is stated by the author, Prof. E. H. Moore, to be one-fold generalisations of two known theorems, of which one may be looked at as a theorem in the ordinary Gauss-congruence theory, while its generalisation is a theorem in the Galois-field theory. It is naturally highly symbolical. Prof. J. Pierpont gives an interesting and valuable note on the Ruffini-Abelian theorem. Gauss, in 1799, rigorously established the fundamental theorem that every equation of degree n possesses n roots real or imaginary. When n is less than five, it had been long known that these roots could be expressed as explicit algebraic functions of the coefficients. Between the years 1799 and 1813 an Italian mathematician, Ruffini, made several attempts to establish the justice of the doubts that the roots of equations of degree greater than four possessed this property. His reasoning, however, has not been judged to be conclusive, and the question remained open until the publication of Abel's argument in 1826. Prof. Pierpont, in addition to the preceding statement, gives several other historical notes, and states that his object is to give a demonstration of the theorem which shall be as direct and *self-contained* as possible. In addition he gives demonstrations, one of which is a modification of Ruffini's form, and the other Kronecker's modification of Abel's form.—On certain subgroups of the general projective group, is a paper, read before the January meeting, by the author, Prof. Henry Taber. It is on the lines of recent previous papers by the author in the *Bulletin*, the *Proceedings* of the London Mathematical Society, and the *Mathematische Annalen*. The "Notes" give the courses for the summer semester at Berlin and Göttingen. A synopsis is also published of the first volume of a work of great originality, viz. the Geometrie der Berührungstransformationen, Dargestellt von Sophus Lie und G. Scheffers. A long list of new publications closes the number.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 30.—"On some Palæolithic Implements found in Somaliland by Mr. H. W. Seton-Karr." By Sir John Evans, K.C.B., F.R.S.

In the course of more than one visit to Somaliland, Mr. Seton-Karr noticed, and brought home for examination, a number of worked flints, mostly of no great size, which he laid before the Anthropological Section of the British Association, at the meeting last year at Ipswich.[1] Although many of these specimens were broad flat flakes trimmed along the edges so as to be of the "le Moustier type" of M. Gabriel de Mortillet, and although the general *facies* of the collection was suggestive of the implements being of Palæolithic age, they did not afford sufficient evidence to enable a satisfactory judgment to be formed whether they undoubtedly belonged to the Palæolithic period.

On returning to Somaliland, during the past winter, Mr. Seton-Karr was fortunate enough to meet with a large number of specimens in form absolutely identical with some from the valley of the Somme and other places.

Of this identity in form there can be no doubt, and though at present no fossil mammalian or other remains have been found with the implements, there need be no hesitation in claiming them as Palæolithic. Their great interest consists in the identity of their forms with those of the implements found in the Pleistocene deposits of North Western Europe and elsewhere.

The discovery aids in bridging over the interval between Palæolithic man in Britain and in India, and adds another link to the chain of evidence by which the original cradle of the human family may eventually be identified, and tends to prove the unity of race between the inhabitants of Asia, Africa, and Europe, in Palæolithic times.

May 7.—"The Electromotive Properties of the Electrical Organ of *Malapterurus electricus*." By Francis Gotch, F.R.S., and G. J. Burch.

The conclusions drawn by the authors from the experiments on the isolated organ and on the entire uninjured fish may be summarised as follows:—

(1) The isolated organ responds to electrical excitation of its nerves by monophasic electromotive changes, indicated by electrical currents which traverse the tissue from the head to the tail end; this response commences from 0·0035″ at 30° C. to 0·009″ at 5° C. after excitation, the period of delay for any given temperature being tolerably constant.

(2) The response occasionally consists of a single such monophasic electromotive change (shock) developed with great suddenness, and subsiding completely in from 0·002″ to 0·005″, according to the temperature; in the vast majority of cases the response is multiple, and consists of a series of such changes (shocks) recurring at perfectly regular intervals, from two to thirty times (peripheral organ rhythm); the interval between the successive changes varies from 0·004″ at 30° C. to 0·01 at 5° C., but is perfectly uniform at any given temperature throughout the series.

(3) Such a single or multiple response (in the great majority of cases the latter) can also be evoked by the direct passage of an induced current through the organ and its contained nerves, in either direction heterodromous (*i.e.*, opposite in direction to the current of the response) or homodromous.

(4) The time relations of the response are almost identical whether this is evoked by nerve-trunk (indirect stimulation), or by the passage of the heterodromous induced current.

(5) There is no evidence that the electrical plate substance can be excited by the induced current apart from its nerves, *i.e.* it does not possess independent excitability.

(6) The organ and its contained nerves respond far more easily to the heterodromous than to the homodromous induced current, and the period of delay in the case of the latter response is appreciably lengthened.

(7) The peripheral organ rhythm (multiple response) varies from about 100 per second at 5° C. to about 280 per second at 35° C.

(8) One causative factor in the production of the peripheral rhythm is the susceptibility of the excitable tissue to respond to the current set up by its own activity (self-excitation).

The authors further conclude that, since each lateral half of the organ is innervated by the axis cylinder branches of one efferent nerve cell, and has no independent excitability, the specific characters of the reflex response of the organ express far more closely than those of muscle the changes in central nerve activity, and are presumably those of the activity of a single efferent nerve cell.

The single efferent nerve cell, the activity of which is thus for the first time ascertained, shows—

(*a*) A minimum period of delay of 0·008″ to 0·01″.

(*b*) A maximum rate of discharge of 12 per second.

[1] Report 1895 p. 824.

(*c*) An average rate of discharge of 3 to 4 per second.

(*d*) A susceptibility to fatigue showing itself in the discharge failing after it had recurred from two to five times at the above rates.

Physical Society, May 22.—Prof. Ayrton, Vice-President, in the chair.—Mr. R. Appleyard read a paper on dielectrics. The author has particularly investigated the effect of temperature on dielectric resistance. He has employed for this purpose condensers insulated with mica and paraffined paper. In order to eliminate some of the effects of surface leakage, Price's guard-ring arrangement was made use of in all the experiments. The author finds that the capacity of a paraffin condenser varies irregularly with the temperature, but that to within the accuracy attainable with his instruments (1 per cent.), the capacity of a mica condenser is constant between 33° F. and 110° F. If the resistance of paraffin at a temperature t is represented by $R_t = R\alpha^t$, the mean value for log α deduced from all the author's measurements is $\bar{1}\cdot96344$. Experiments made with a parallel plate condenser with paraffin as the dielectric, show that when the temperature reaches within about 20° of the melting point the resistance rapidly falls; when melting commences there is a rapid drop, but while melting is in progress the resistance remains constant. Prof. Ayrton said he could bear witness to the extreme value of Mr. Price's device, as it completely did away with the necessity for the extreme care previously necessary to prevent errors due to surface leakage. He regretted that he had not had an opportunity of comparing the author's numbers with some obtained some years ago by Prof. Perry and himself (Prof. Ayrton).—A paper by Prof. Viriamu Jones, on the magnetic field due to an elliptical current at a point in the plane of the ellipse and within it, was taken as read. Prof. Silvanus Thompson said that this paper was of interest not only on account of the application which others might make of the author's method, but also in that the correction when applied to Prof. Jones's results brought the international ohm more nearly into accord with the true ohm. Mr. J. J. Walker said he considered that the paper was more suited to the Mathematical Society. The integration which the author reduced to elliptic integrals might be more easily performed by another method. Prof. Ayrton said that Prof. Jones's value for the true ohm was now 106·302 cm. of mercury.—Mr. Campbell read a paper on new instruments for the direct measurement of the frequency of alternating or pulsating electric currents. The author employs two arrangements, in one of which a steel wire, the tension on which is variable, and the other a steel spring of variable length, clamped at one end, are acted upon by an electro-magnet, through which the periodic current is passed. The tension or length, as the case may be, is varied till maximum resonance is obtained, a small contact piece being employed to detect when this occurs. The instrument exhibited was capable of measuring the frequency of periodic currents of from 40 to 150 double vibrations per second. Mr. Watson said he thought that in the case of the steel spring there would be a considerable temperature correction, and he suggested a method by which this might be compensated. Mr. Blakesley asked if the author had found that the spring became magnetised and thus gave the octave. Mr. Carter asked whether elastic fatigue influenced the results, and said that a synchronous motor and a speed indicator could be used to measure the frequency. Prof. Silvanus Thompson suggested that it might be preferable to employ a polarised apparatus, since to avoid the impression of forced vibrations on the spring it was better, as was done in the case of tuning-forks, to make it massive. It had been found in other cases, such as in Hughes' telegraph and the telephone, that better results were obtained with polarised apparatus. He (Prof. Thompson) had used a telephone, placed anywhere near a magnet traversed by the periodic current, together with a tuning-fork, which gave beats with the note produced by the telephone, to measure frequencies. The variations in frequency ordinarily met with in practice were much greater than was generally suspected. Mr. Blakesley said he considered that the advantage of the author's instrument over a telephone and tuning-fork was that it was continuously variable over a large range. Mr. Enright asked if the author had been troubled by the spring or wire breaking into overtones. In some experiments in which rather long wires were used, he had been troubled in this way. Prof. Ayrton said that he did not think that it was possible to get the wire or spring to respond to the octave unless the alternating current contained a component of the frequency of the octave; in fact, he had himself used such a stretched string as a wave analyser. He had used a telephone to prove that the note given by a hissing alternate current arc corresponded in frequency to that of the current. In the instrument used by Prof. Perry and himself, a polarised arrangement was always employed, since the alternating current was passed either through a wire in a constant magnetic field, or through an electro-magnet which acted on a wire through which a constant current was passed. The author, in his reply, said that the instrument responded, though feebly, to the octave, and this response might be made use of to check the accuracy of the scale.—The Society then adjourned till June 12.

Entomological Society, May 6.—Prof. Meldola, F.R.S., President, in the chair.—Mr. Champion exhibited specimens of *Amara famelica*, Zimm., from Woking, Surrey, a recent addition to the British list. He also exhibited, on behalf of Mr. Dolby-Tyler, a series of *Eburia quadrinotata*, Latr., from Guayaquil, Ecuador, showing variation in the number of the raised ivory-white lines on the elytra.—Mr. Horace Donisthorpe exhibited a specimen of *Pterostichus gracilis* with three tarsi on one leg, taken near Weymouth last April.—Mr. G. T. Porritt exhibited a series of *Arctia menthrastri* which he had just bred from Morayshire ova; the ground-colour of the specimens varied from the usual white, through shades of yellow, to dark smoky-brown.—Mr. Merrifield exhibited specimens of *Gonepteryx rhamni* bred from larvæ found in North Italy and Germany, the pupæ of which had been subjected to various temperatures. He stated that high temperature appeared to cause an increase of yellow scales in the female, and low temperatures generally reduced the size of the orange discal spot on the forewings of both sexes.—Mr. Merrifield said that the effects on the imago produced by temperature were being made the subject of systematic research by Prof. Weismann, Dr. Standfuss, Mr. E. Fischer, and others.—Mr. Kirkaldy exhibited and made remarks on ova of *Notonecta glauca* var. *furcata*.—Mr. Tutt exhibited living larvæ of *Apamea ophiogramma*, together with the grass on which it was feeding.—Mr. Goss read a communition from Mr. E. Meyrick on the subject of Prof. Radcliffe-Grote's criticisms, contained in his paper published in the *Proceedings* of the Society, 1896, pp. x.-xv., on the use of certain generic terms by Mr. Meyrick in writing on the Geometridæ.—Mr. McLachlan opened a discussion as to the best means of preventing the extinction of certain British butterflies. He referred to the extinction of *Chrysophanus dispar*, *Lycæna acis*, and *Aporia crataegi*, and to the probable extinction, in the near future, of *Papilio machaon*, *Melitæa cinxia*, and *Lycæna arion*. He stated that one of the objects he had in view in bringing this matter forward was to see whether some plan could not be devised to protect those specially localised species which were apparently in danger of being exterminated by over-collecting.—Prof. Meldola said he fully sympathised with the remarks of Mr. McLachlan, and thought that a resolution passed by the Society, possibly in conjunction with kindred Societies, might produce some effect. Mr. Goss stated that *Papilion machaon*, although apparently doomed to extinction in its chief locality in Cambridgeshire (Wicken Fen), would probably linger on in the country in smaller fens, such as Chippenham, where the larvæ had been found feeding on *Angelica sylvestris*. It would certainly survive in the Norfolk Broads, both from the irreclaimable nature of the fens there and the extensive range of the species in the district. He stated that *Melitæa cinxia*, although gradually disappearing from most of its old localities in the south of the Isle of Wight, was still found in the island further west, where he had seen it in numbers in May 1895. He added that *Lycæna arion* was far from extinct in Gloucestershire, and was distributed over a much wider area in the extreme south-west of England than was generally supposed.—Mr. Elwes stated that *L. arion* formerly occurred in several places on his own property in Gloucestershire, but had disappeared of late years, although not collected. Its disappearance was probably due to changes of climate.—Colonel Irby said that *L. arion* had disappeared many years ago not only from Barnwell Wold, Northamptonshire, but from another part of the county, on the estate of Lord Lilford, not accessible to the public, and that its disappearance there was no doubt caused by the destruction of the food plant and other herbage by burning the pasture, and by the grazing of sheep. Mr. Crowley, Mr. Tutt, Mr. Waterhouse, and Mr. Blandford continued the discussion.—Mr. Guy A. K. Marshall communicated a paper entitled "Notes on Seasonal Dimorphism in South African Rhopalocera."—Mr. P. Cameron communicated a paper entitled "Descriptions of new species of Hymenoptera from the Oriental Region."

Geological Society, May 13.—Dr. Henry Hicks, F.R.S., President, in the chair.—An account of a head or gateway driven into the Eastern Boundary-fault of the South Staffordshire coal field, by William Farnworth. The author described certain peculiarities observed during the driving of a head towards the fault separating the Coal-Measures and Permian rocks, from a pit situated four miles east of Walsall, at the southern extremity of the Cannock Chase coal field.—On the geographical evolution of Jamaica, by Dr. J. W. Spencer. The object of the paper was to set forth the physical and geological characteristics of Jamaica which bear upon the problem of its late high elevation and former connection with the continent, and to trace across the neighbouring seas and islands to the mainland the evidences of the former linking of Jamaica to North and South America. The first part of the paper treated of the growth of the island. The second part of the paper treated of the continental connections of Jamaica. The author gave details of the submerged plateaus and drowned valleys which are analogous to those still existing above sea-level. They indicate that the former altitude of the West Indian plateau, and some portions of the adjoining continent, reached two and a half miles. But the floors of the Mexican Gulf and Honduras and the Caribbean Sea formed low plains draining into the Pacific Ocean, for at that time the eastern region was high, while the Mexican area was generally low.—Dundry Hill: its upper portion, or the beds marked as Inferior Oolite (G 5) in the maps of the Geological Survey, by S. S. Buckman and E. Wilson. The authors gave an account of previous geological work relating to Dundry Hill, especially that which refers to the correlation of its strata. Then they described the different exposures on the hill, together with the results of various excavations carried out by quarrymen under their superintendence for the purpose of the present communication. Besides demonstrating the sequence of the strata of Dundry Hill, the authors were able to show a number of results of special interest.

Zoological Society, May 19.—Sir W. H. Flower, K.C.B., F.R.S., President, in the chair.—Mr. Sclater exhibited a daguerreotype portrait of what was believed to be the first gorilla that was ever brought alive to Europe. It was living in Wombwell's menagerie in 1855. This portrait had been lent to Mr. C. Bartlett by Mr. Fairgrieve, formerly associated with Mr. Wombwell, who had sent with it an account of the animal and its habits.—A communication was read from Mr. G. E. H. Barrett-Hamilton, on a variation in the pattern of the teeth of a specimen of the common field-vole (*Microtus agrestis*).—A second communication from Mr. Barrett-Hamilton contained remarks on the existence in Europe of two geographical races or sub-species of the common field-vole. Mr. Barrett-Hamilton considered the field-voles of England, Belgium, and the North of France, and possibly of a large part of the continent, as distinct from the Scandinavian animals, which would remain the typical *Microtus agrestis*, while the British and western continental form should be called *Microtus agrestis neglectus*, Jenyns. This view agreed with that of De Selys-Longchamps in 1847.—Mr. F. E. Beddard, F.R.S., read the third of his contributions to the anatomy of Picarian birds. The present paper related to the variations in pterylosis and in anatomy of the *Alcedinidæ*, of which he had examined specimens. Although this family was so uniform in external structure, it presented considerable differences when the pterylosis and anatomy were examined.—Mr. de Winton described a new rodent of the genus *Lophuromys* from British East Africa, which he named *L. ansorgei*.

Royal Meteorological Society, May 20.—Mr. E. Mawley, President, in the chair.—Mr. R. H. Curtis read a paper on the exposure of anemometers, in which he gave the results of a comparison of the records from the three anemometers at Holyhead, viz. the Robinson, the bridled, and the pressure-tube anemometers. It was clearly shown that the force of the wind is greatly affected by surrounding objects. The author is of opinion that for anemometrical records to be trustworthy and of value, not only must the instrument be exposed in an open place, free from local obstructions, but it is also absolutely essential that the stand which carries it shall offer practically no resistance to the wind, and that the instrument should not be placed on the roof of a house. The paper was illustrated by a number of lantern slides.—An interesting collection of photographs of clouds, sent to the Society by Mr. H. C. Russell, F.R.S., of the Sydney Observatory, was also exhibited.

CAMBRIDGE.

Philosophical Society, April 27.—Prof. J. J. Thomson, President, in the chair.—On photographing the whole length of a spectrum at once, by Prof. Liveing. Prof. Liveing exhibited photographs of a variety of spectra in which the whole length of the spectrum between the wave-lengths 550 and 214 was depicted on a celluloid film at one operation. A concave grating of 10½ feet radius was used, with the slit in the centre of curvature, and the slide which held the sensitive film formed part of a cylinder with a radius of 5¼ feet, so that, when the axis of this cylinder was midway between the slit and grating, every part of the spectrum was perfectly focused on the film.—On dioxymaleic acid and its derivatives, by Mr. Fenton. This paper contains a brief summary of the author's recent work upon oxidation products of tartaric acid.—(*a*) On the atomic weight of oxygen; (*b*) on the combining volumes of carbon monoxide and oxygen, by Mr. A. Scott. Mr. Scott gave a short account of the present state of our knowledge as to the atomic weight of oxygen, and said that it might be regarded as conclusively proved that if H = 1, O = 15·87 to 15·88. Morley determined the densities of hydrogen and of oxygen, the ratios by volume in which the gases combine (by a somewhat indirect method), and finally combined known weights of hydrogen and weighed the water produced. Thomsen made similar determinations, but with far less pretension to the highest accuracy attainable. The results were:

	Morley.	Thomsen.
Weight of a litre of oxygen at 0° C. and 760 mm. at sea-level, lat. 45°.	1·42900	1·42906
Ditto for hydrogen	·089873	·089947
Ratio of densities	15·9002	15·8878
Ratio of combining volumes	1 : 2·00269	1 : 2·00237
Atomic weight of oxygen	15·879	15·869

The ratios by volume in which the gases combine agree well with that published by the author directly three years ago, viz. 1 : 2·00245 at about 15° C., and 1 : 2·00285 at 0° C. Mr. Scott also described some preliminary experiments made to determine the ratio by volume in which carbon monoxide and oxygen unite to form carbon dioxide and to determine at the same time the volume of the latter gas in terms of the others. Experiments so far showed that the ratio was very nearly 2 : 1 for the combining gases, but that satisfactory determinations of the volume of carbon dioxide produced had not been obtained as yet.—On the active principles of Indian hemp, by Messrs. Wood and Easterfield. The authors have examined a sample of charas, the exuded resin of Indian hemp, with a view to isolating the physiologically active constituent. They find that charas contains a compound $C_{18}H_{24}O_2$, B.P. 265°–270° C. at 15 mm. pressure (31 per cent.), to which they attribute the physiological action of the hemp plant. This active compound, which the authors name *Cannabinol*, is a red semi-solid substance at ordinary temperature, but is quite liquid at 60° C.; it yields a monacetyl and monobenzoyl derivative, and can be nitrated. The same compound has been isolated by the authors from the usual medicinal preparations of *Cannabis indica*.—Note on the pharmacological action of hemp resin, by Mr. Marshall. The pharmacologically active compound of charas is the compound, cannabinol. In doses of 0·1 g. to 0·15 g. it produces decided intoxication characterised by fits of uncontrollable laughter, slurring speech, and ataxic gait, a complete loss of time relation, and a sense of extreme happiness: sensation is diminished somewhat, and the pulse-rate rises: as a rule, there are no hallucinations. The acute symptoms last about three hours Smaller doses (0·05 g.) produce similar effects, but to less marked degree. Animals appear to be less susceptible to its influence than man, and herbivorous animals than carnivorous.

PARIS.

Academy of Sciences, May 18.—M. A. Cornu in the chair.—Second note on the theory of gases, by M. J. Bertrand. A critical analysis of Maxwell's second demonstration of the formula giving the distribution of the velocities between the molecules of a gas.—On the *rôle* of the ring of iron in dynamo-electric machines, by M. A. Potier. Remarks on a note by M. Marcel Deprez. The experiment quoted by M. Deprez is only in apparent contradiction to the ordinary rule, the principles involved having been already utilised in the construction of dynamos.—Emission of new radiations by metallic uranium, by M. Henri Becquerel. Metallic uranium gives off invisible rays possessing properties similar to the salts of that metal previously

studied.—Preparation and properties of uranium, by M. H. Moissan.—The significance of an axis of symmetry in plants, by M. A. Chatin.—On the transformation of fat into carbohydrate in unfed animals, by M. A. Chauveau. During hibernation it has been noticed that the animal may increase in weight. This can be accounted for by the partial oxidation of the stearin to glucose, carbon dioxide, and water. If this is really the case the respiratory constant should be about 0·27.—On the integration of the differential equation of the radius vector of a certain group of small planets, by M. O. Backlund.—On a family of left-handed curves, by M. Jules Andrade.—The area of parabolas of higher order, by M. P. H. Schoute.—On some properties of the X-rays penetrating ponderable media, by M. C. Maltézos. A mathematical proof that if the X-rays be regarded as hyper-ultra-violet rays, the different absorptive power of various substances may be explained by supposing that the index of refraction is not exactly unity, but a number very near this value, and depending on the density.—On the application of the formula of Clapyron to the melting point of benzene, by M. R. Demerliac. An experimental study of the lowering of the melting point of benzene by pressure. The manometer used had been calibrated against a mercury column directly, and the alterations in temperature were measured to ·001° by the changes in resistance of an iron wire forming an arm of a Wheatstone's bridge. The alteration in melting point for an additional pressure of one atmosphere calculated from Clapyron's formula is 0°·02936; the experimental figure is ·0294, the difference being less than the errors of observation.—Remarks on the reply of MM. Benoist and Hurmuzescu, by M. Aug. Righi.—Observations on the X-rays, by M. T. Argyropoulos.—On a new ozone generator, by M. G. Seguy.—On a new apparatus for electrolysis, by M. D. Tommasi. In the apparatus described the advantages claimed are the suppression of polarisation, that the deposited metal is removed from the oxidising action of the bath, and that the electrical resistance of the bath is considerably reduced.—Researches on nickel cyanide, by M. Raoul Varet. A thermochemical study of nickel cyanide and its double salts. The thermal data show that the compounds undissociable by dialysis, may be looked upon as salts of a complex acid, hydronickelocyanic acid, differing only from ferrocyanides in stability.—On a crystallised tetrachromite of barium, by M. E. Dufau.—On the chloraloses, by M. Hanriot. Galactose forms a compound with chloral similar to the chloraloses previously prepared. The acetyl and benzoyl derivatives and the acid obtained on oxidising with potassium permanganate are described. The corresponding reactions with levulose were also examined.—On some aromatic symmetrical derivatives of urea, by MM. P. Cazeneuve and Moreau. Carbonate of guiacol serves as the starting point for these compounds, aniline giving diphenyl-urea, paratoluidine, di-paratolyl-urea, and ortho-toluidine, diorthotolyl-urea.—On the ratios which exist between the chemical constitution of organic compounds and their oxidisability under the influence of laccase, by M. G. Bertrand. The degree of oxidation of the aromatic polyphenols studied appears to depend upon the facility with which they can be transformed into quinones.—Characterisation and separation of the chief vegetable acids, by M. L. Lindet. For the separation of citric and malic acids advantage is taken of the different solubility in methyl alcohol of their acid quinine and cinchonine salts.—On the internal appendages of the female genital organs of the Orthoptera, by M. A. Fenard.—On the general relation connecting the degrees of sensation and luminous intensity, and on the laws of simultaneous contrast of lights and tints, by M. C. Henry.—On the browning of the cuttings of the vine, by MM. P. Viala and L. Ravaz—Researches on the carpellary venation in the bicarpellary Gamopetalæ of Bentham and Hooker, by M. Paul Grélot.—On the siphons of springs and underground rivers, by M. E. A. Martel.—The *Cadurcotherium*, by M. Marcellin Boule.—Measurements of the variation in length of glaciers in the French region, by Prince Roland Bonaparte.—Method for defining the position of the surface of emission of the X-rays, by M. Stcherbakof.

BERLIN.

Meteorological Society, April 14.—Prof. Börnstein, President, in the chair.—Dr. Schwalbe spoke on the investigation and most important theories of atmospheric electricity, and added an account of experiments he had made on the dissipation of electricity by vapour. A metal plate insulated, charged to ten volts, and connected with a Thomson's quadrant electrometer, discharged itself in exactly the same time when dry as when wetted with water or other easily vaporised fluid. Sprinkling with finely pulverised quartz greatly hastened the discharge; coarsely powdered glass to a less extent. The time of discharge was the same for a rough as for a polished plate. He considered that these experiments had settled the fact that vapour does not discharge an electrified body, but that fine powders do.

Physical Society, April 17.—Prof. Warburg, President, in the chair.—Prof. König spoke on the number of visual units existing in the human retina. The acuteness of vision was measured by the distance at which a grating made of regular rectilinear wires begins to appear wavy. Starting at the *foveæ* it diminishes towards the periphery, and in such a way that the curves of equal visual acuteness form concentric ellipses. The area of each retinal field by which two wires are seen as two, increases towards the periphery. If such a field be called a visual unit, then their total number for the whole retina is 50,000. If it be assumed that each unit can perceive three kinds of colour, of which the resulting impulse is conveyed to the brain by a separate nerve fibre, then there must be 150,000 fibres in the optic nerve. As a matter of fact, histologists give them as 400,000 to 500,000 in number. He further discussed the experiments he had made in conjunction with Dr. Zumpf, which had shown that objects of different colour must be perceived at different depths in the retina. The difference of these depths for red and blue rays was found to be so great, that one lay in the pigment layer, which must hence be regarded as a sensory organ. As a matter of fact, quite recently an English anatomist has described the existence of spherules in this layer united to a nerve-plexus from the rods and cones. He finally gave an historical retrospect of Purkinje's phenomenon, in which two coloured (red and blue) fields of equal luminosity as seen by daylight appear unequally luminous at twilight, the red disappearing much sooner than the blue. After this phenomenon had been studied by a whole series of observers, and its importance insisted upon, Prof. Hering had quite recently found that it is really an exceptional phenomenon. It can only be observed in dark surroundings; in daylight and bright surroundings the differently coloured fields remain equally luminous, while the intensity of their illumination is reduced down to a point at which colour perception ceases. Prof. König had satisfied himself of the truth of the above observation, so that Purkinje's phenomenon has now lost all its supposed significance.

May 1.—Prof. von Bezold in the chair.—Dr. du Bois spoke on the magnetising and hysteresis of various kinds of steel and iron, basing his remarks on experiments made in conjunction with Mr. E. T. Jones. The discrimination of different samples of iron by means of their hardness has now lost all its importance; the real criterion is rather hysteresis, coercitive power, residual and maximal magnetisation, which had been determined, together with other magnetic properties, for a large series of samples. Chemical composition is of less importance than the mode of treatment during manufacture from ore to metal. The magnetic constants of the material are of importance to physicists and technologists. The speaker then gave the results of his measurements for three kinds of iron with maximal, and three with minimal hysteresis. As a general rule hardening increases hysteresis and coercitive intensity, whereas residual magnetism is lessened. Krupp's cast-iron is distinguished by its low hysteresis and small coercitive intensity.

PHILADELPHIA.

Academy of Natural Sciences, April 14.—In connection with the presentation of a collection of recent and fossil Strombidæ, Mr. H. A. Pilsbury discussed the ancestry of *Strombus costata* and *Melongena subcoronata*, their relations fossil species being illustrated by large suites of intermediate forms.—Mr. James Willcox commented on the influence of environment on the species as illustrated by the specimens presented. It was apparent that those from the southern coasts of Florida swept by the Gulf Stream were all of a dwarfed type.—Dr. Benjamin Sharp related the plentiful occurence of a Ctenophore, *Mneopsis Leidyi* in a fresh-water pond near Nantucket. The embryos had been swept in by an accession of salt water, and had accustomed themselves to their new environment. The species did not, however, persist in the pond, in consequence probably of the severity of the winter. Specimens of the species referred to were beautifully preserved in a 2 per cent. solution of formaline.—Mr. Pilsbury announced the finding by Mr.

Charles Johnson, for the first time in the Eocence of Texas, of a representative of the genus Scalpellum. It is a new species for which the name Chamberlaini was proposed, in recognition of the services of the Rev. L. T. Chamberlain to palæontological science.

NEW SOUTH WALES.

Linnean Society, March 25.—The President, Mr. Henry Deane, in the chair.—The President delivered the annual address, in the course of which the subject of forestry, especially in relation to the needs and resources of Australia, was brought forward, and the experiments of other countries were summarised, as a safe guide to be followed. The question of the origin of the Australian flora was also dealt with at some length, critical objections being offered to Ettingshausen's views on the characters of the Australian Tertiary flora, based upon no more satisfactory evidence than is afforded by leaf-remains. The address concluded with a summary of the salient points of interest in the recently issued first instalment of the "Report of the Horn Expedition to Central Australia" (Zoology, part ii., edited by Prof. Baldwin Spencer), a work which, in its completed form, promises to be the most comprehensive and elaborate account of the natural history of any portion of the continent ever issued in a self-contained form.—The following papers were read:—A contribution to the structure and relations of the organ of Jacobson in the horse, by Dr. R. Broom.—Descriptions of further highly ornate boomerangs from New South Wales and Queensland, by R. E. Etheridge, jun.—Note on the occurrence of callosities in *Cypræa* other than *C. bicallosa* and *C. rhinocerus:* and on the presence of a sulcus in *Trivia australis*, by Agnes F. Kenyon.—On a new genus and species of Australian fishes, by J. D. Ogilby. The genus *Apogonops* is proposed for a small fish of puzzling affinities from Maroubra Bay. At a first glance it would seem to be naturally referable to the family *Apogonidæ*. But this view is precluded by the absence of vomerine teeth and the number of its dorsal spines, unless it is to be considered as an aberrant Apogonid with sciænoid affinities.—Catalogue of the described Coleoptera of Australia. Supplement. Part ii. *Dytiscidæ* and *Staphylinidæ*, by George Masters.

GÖTTINGEN.

Royal Academy of Sciences.—The *Nachrichten* (mathematico-physical series) part 1 for 1896 contains the following memoirs contributed to the Society.

January 11.—Pendulum observations at Freden and Alfeld, by A. von Koenen.—The movement of the spinning-top, by F. Klein.

January 25.—Discovery of *Ceratites nodosus aut.* in the Vicentine Trias, and its stratigraphical significance. A new demonstration of Kronecker's fundamental theorem on Abelian *Zahlenkörper*. A letter of Gauss to Gerling (on Bolyai's geometry), by Paul Stäckel. Continuous groups of quadratic transformations of the plane, by G. Bohlmann.—On the representation of finite groups by means of Cayley's colour-diagrams.

February 8.—Researches conducted in the Göttingen University laboratory (III.), by O. Wallach. (1) A new heptylamine. (2) Ketones from propenyl-compounds. (3) On reuniol. (4) On pinol hydrate. (5) On isothujone and thujamenthone. (6) Refractive and dispersive powers of a series of isomeric camphors.

March 7.—The theory of the formation of petroleum, by Fr. Heusler.—On a theorem in the analysis of position, by A. Schoenflies.

AMSTERDAM.

Royal Academy of Sciences, April 18.—Prof. Van de Sande Bakhuyzen in the chair.—On four-dimensional prismoids, by Prof. Schoute.—On the equilibrium of radiation in the case of doubly-refracting bodies, by Prof. Lorentz.—Prof. Kamerlingh Onnes presented a paper to be published in the report of the meeting, and entitled "a contrivance for lighting up scales for mirror-reading," and also, on behalf of Dr. L. H. Siertsema, a communication on measurements of the magnetic rotation of gases. This communication is a continuation of those published in the *Transactions*, 1893-94, p. 31, and 1894-95, p. 230. After supplementing the descriptions of the apparatus, the method of observation, and the manner of calculation—a plate being added for illustration—the author communicated the results with respect to air, oxygen, nitrogen, carbonic acid, and nitrogen monoxide. The results for the first two gases have been deduced from the same observations as the previous ones, but have been re-calculated, a better determination of certain constants having been obtained. Moreover, the rotations have been expressed in minutes, by means of a provisional reduction factor. The results for CO_2 and N_2O must only be considered as provisional, as the pressure was not measured with sufficient accuracy.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—The Alternate Current Transformer: Dr. J. A. Fleming, Vol. 1, new edition (*Electrician* Company).—Physics for Students of Medicine: Dr. A. Daniell (Macmillan).—The Flora of Dumfriesshire: G. F. Scott-Elliot (Dumfries, Maxwell).—Through Jungle and Desert: W. A. Chanler (Macmillan).—The Frog: Prof. A. Milnes Marshall, 6th edition, edited by Dr. G. H. Fowler (Nutt).—The Great Rift Valley: Dr. J. W. Gregory (Murray).—A Manual of North American Birds: R. Ridgway, 2nd edition (Lippincott).—Fur and Feather Series. The Hare: Macpherson, &c. (Longmans)—Press-Working of Metals: O. Smith (Chapman).—Mars: P. Lowell (Longmans).—How Plants Live and Work: E. Hughes-Gibb (Griffin).—Official Year-Book of the Scientific and Learned Societies of Great Britain and Ireland, 13th annual issue (Griffin).—Reminiscences of a Yorkshire Naturalist: Prof. W. C. Williamson (Redway).—Miscellaneous Papers: Prof. H. Hertz, translated by D. E. Jones and G. A. Schott (Macmillan).—A System of Medicine: edited by Prof. T. C. Allbutt, Vol. 1 (Macmillan).—Catalogue of the Madreporarian Corals in the British Museum (Natural History), Vol. 2: H. M. Bernard (London).—Catalogue of the Snakes in the British Museum (Natural History), Vol. 3: G. A. Boulenger (London).—Lehrbuch der Ökologischen Pflanzengeographie: Dr. E. Warming, Deutsche vom Verfasser Genehmigte Durchgeschene und Vermehrte ausgabe: Dr. E. Knoblauch (Berlin, G. Borntraeger).—The Indian Calendar: R. Sewell and S. B. Dikshit (Sonnenschein).—Results of Rain, River, and Evaporation Observations made in New South Wales, 1894 (Sydney).

PAMPHLETS.—Die Grenzen Geistiger Gesundheit und Krankheit: Dr. P. Flechsig (Leipzig, Veit).—Thoughts on Evolution: P. G. F. (Sonnenschein).

SERIALS.—Quarterly Journal of Microscopical Science, May (Churchill).—Bulletins de la Société D'Anthropologie de Paris, 1895, No. 6 (Paris, Masson).—Mémoires de la Société D'Anthropologie de Paris, tome 1, 3e série, 4e Fasc. (Paris, Masson)—Journal of the Institution of Electrical Engineers, May (Spon).—Quarterly Journal of the Geological Society, May (Longmans).—Natural Science, June (Rait).—Longman's Magazine, June (Longmans).—Himmel und Erde, May (Berlin).—Illustrations of the Zoology of H.M. Indian Marine Surveying Steamer *Investigator*, 5 parts (Calcutta).—Good Words, June (Isbister).—Sunday Magazine, June (Isbister).

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