

with a total of about 100 memoirs and papers, while the Polytechnics have contributed about a score. In concluding his report, the Principal remarked: "It is time that London should realise that it is not the want of men, or a dearth of intellectual effort, which has hindered the University of London from taking its place as a great centre of teaching and research. Our needs are organisation, which shall make the results of the work of the teachers, their assistants and students more fruitful and better known as results of which London may be proud, and funds to supply them with the materials for their work."

SCIENTIFIC SERIALS.

American Journal of Science, May.—Notes on living Cycads, by G. R. Wieland. A study of *Zamia floridana*. Particular attention is drawn to the presence on one of the cones of a pinnule of normal form and structure which had grown out from beneath the outer hexagonal tip of one of the upper abortive sporophylls. As in a similar example described by Sir W. T. Thiselton-Dyer, this structure is regarded as a reversion, exhibiting evolutionary stages which may be found in fossilised forms. To speak of these growths as "monstrous cones" is regarded as almost misleading.—On crystals of Croconite from Tasmania, by R. G. Van Name.—Notes on unusual minerals from the Pacific States, by R. W. Turner. Among the phosphates found were pyromorphite, apatite and monazite, the latter occurring in abundance in the Idaho basin.—On the use of the stereographic projection for geographical maps and sailing charts, by S. L. Penfield. A continuation of previous papers on the same subject.—Note on the application of the phase rule to the fusing points of copper, silver and gold, by T. W. Richards. It has been found by Holborn and Day that gold gives a very constant melting point, copper two constant points at 1065° and 1084° C., whilst silver gives no fixed point. It is shown that all these results could have been deduced by the application of the phase rule.—The initiative action of iodine and other oxidisers in the hydrolysis of starch and dextrans, by F. E. Hale.—Note on the possibility of a colloidal state of gases, by C. Barus.—Some glacial remains near Woodstock, Connecticut, by J. W. Eggleston.

American Journal of Mathematics, vol. xxiv. No. 2, April.—L. E. Dickson, on the canonical form of a linear homogeneous transformation in an arbitrary field of rationality. In a previous paper (*A. J.* xxii. p. 121) the author obtained a reduction to a canonical form for transformation in a Galois field; it is here proved that the same process applies when the field is arbitrary.—H. B. Newson, a new theory of collineations and their Lie groups. A geometrical theory of collineation in the plane, independent of Lie's analytical method of transformation-groups.—L. P. Eisenhart, infinitesimal deformation of surfaces. A discussion of the transformation $x' = x + \epsilon x_1$, $y' = y + \epsilon y_1$, $z' = z + \epsilon z_1$, with $dx dx_1 + dy dy_1 + dz dz_1 = 0$, and ϵ a small constant, of which the square is neglected.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 6.—"On the Spark Discharge from Metallic Poles in Water." By Sir Norman Lockyer, K.C.B., F.R.S.

In this paper various modifications produced in the spectra of metals by alterations of the conditions under which the substances are volatilised are discussed and new observations made at the Solar Physics Observatory are described. The investigation was undertaken partly in consequence of a suggestion put forward by Dr. Wilsing, of Potsdam, to the effect that certain conditions, viz. the production of spark spectra in liquids, gave rise to the formation of structural peculiarities in the constituent lines which are characteristic of the spectra of new stars.

One of the chief characteristics of the spectra of Novæ is the occurrence of a series of double lines, each consisting of a bright and a dark component, the latter being always situated on the violet or more refrangible side of the bright line and in contact with it. The usual interpretation of this appearance has been to consider the composite spectrum produced by two bodies in relative motion, but the necessary velocity is greatly in excess of

other known cosmical motions. Recent experiments dealing with the spectra of elements under pressure having shown that by this means the wave-lengths of the lines are altered, Dr. Wilsing suggested that if the pressure were sufficiently great, displacements might be obtained of equal magnitude to those observed in the case of new stars. As the direct application of high pressures is attended with difficulties, he utilised the fact that exceedingly high tensions are produced when electric sparks are discharged in liquids.

Using an induction coil, with jar and air break in the secondary circuit, a brilliant discharge is produced in water, giving a very intense continuous spectrum crossed by faint metallic lines. In this way Dr. Wilsing obtained the spectra of iron, nickel, platinum, copper, tin, zinc, cadmium, lead and silver, and from the examination of the photographs he arrived at the conclusion that displacements of lines and double lines occurred which were in every way similar to those in the spectra of Nova Aurigæ, and that therefore, in all probability, pressure is the cause of the duplication and broadening of the lines in the spectra of new stars.

On examining the first few spectra obtained under these special conditions, the appearances presented were so suggestive of many of the well-known effects of reversal that a further inquiry was advisable. It has long been known that in ordinary arc spectra many instances occur in which the absorption line is asymmetrical with respect to the emission line; and reference is made in the paper to communications by the author to the Royal Society more than a quarter of a century ago describing these peculiarities in certain silver and rubidium lines.

The experiments at the Solar Physics Observatory were made first with the large Spottiswoode coil, capable of giving a 42-inch spark in air, this being intensified by the insertion of a large glass-plate-condenser in the secondary circuit, so that the sparks obtained were about 3 mm. long in air and 0.5 mm. in water.

Later a 10-inch coil was used with a smaller condenser in circuit, and about the same sparking conditions. The photographs of the spectrum were taken on a large scale by means of a 6-inch Rowland concave grating of 21.5 feet radius, with 14,438 lines to the inch. The first-order spectrum was employed, arranged to photograph the region from λ 3800 to λ 4800, occupying a length of 18 inches on the plate. Distilled water was used in all cases.

Of the metals examined (iron, silver, lead, copper, zinc and magnesium) only iron, magnesium and zinc showed reversals, and those of zinc were extremely weak. In all cases the lines of the spectrum of the spark in water are much broader than the corresponding lines in the spectrum of the air-spark. From an examination of several plates of different intensity, however, it appeared that the broadening was, for the most part, of similar nature to that observed in the arc spectrum in air when an excess of material is introduced between the poles.

When the cases of non-symmetrical absorption were considered, it was noted that very different appearances were presented according to the exposure of the spectrum. For example, in the best exposed plate of iron, the line at λ 4260.64 is well reversed in the water-spark, with the part of the emission line towards the red several times stronger than the portion on the violet side of the absorption. An even diminution of the whole composite line, as shown by photographs of less exposure, results in the persistence of the less refrangible portion only of the emission line, which alone would suggest the presence of a line greatly displaced towards the red with regard to the original spark line in air. Several of the iron lines show the intermediate stage, where the violet component is on the verge of visibility, and in these cases the appearance is suggestive of a bright line with a dark companion on its more refrangible border. It is important to note, however, that in these cases the absorption line is usually normal with the position of the original line, the bright component being displaced towards the red.

In the water-spark spectrum of copper it is only with difficulty that any existing line spectrum can be distinguished from the intense continuous emission, and the few lines so recorded present the appearance of broad bands, displaced towards the red. The probability of their being produced in the manner suggested, however, is rendered feasible by the fact that, although no actual absorption is visible, their more refrangible edges are fairly sharply defined, while the other edges are quite diffuse.

A general classification of the phenomena which are thus presented under varying conditions is put forward, the grouping being as follows:—

- (1) *Broadened bright line.* Examples of this stage are presented in the spectrum of copper and the under-exposed spectrum of iron.
- (2) *Broadened bright line with central absorption line.* Well shown in the central line of the violet triplet of iron, λ 4063.76.
- (3) *Broadened bright line with non-symmetrical absorption (maximum of emission towards red).* A good example of this is the iron line at λ 4260.64.

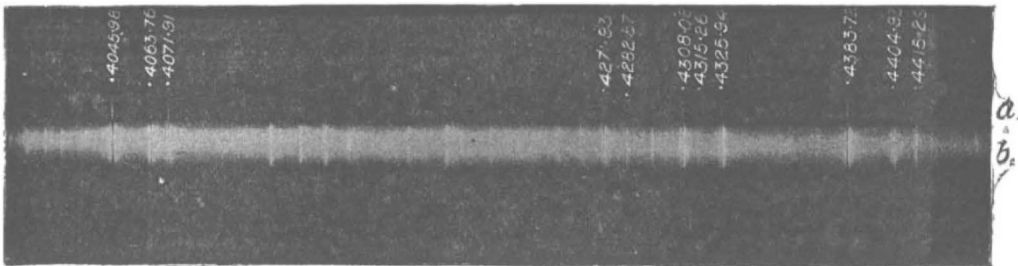
An additional feature of the water-spark spectrum is that many of the lines show inversion of intensity with respect to the air spark spectrum. This is well shown in the lines of iron at $\lambda\lambda$ 4422.74 and 4427.48.

From these considerations it appears that, if suitable exposures are given, lines may be photographed in the spectrum of iron, say, which show all the phenomena described by Dr. Wilsing, but so related to each other and the complete stage—that of reversal, symmetrical or unsymmetrical—that it is impossible to regard them as anything abnormal.

Again, when these appearances are contrasted with the structure peculiar to the spectra of Novæ, many divergences of vital importance are found.

In the water-spark the position of the absorption undergoes little if any change of position, while in the case of non-symmetrical reversals, a bright line may be observed greatly displaced towards the red. In the new stars, on the other hand, the absorption lines are greatly displaced, the accompanying

formula the probable error of measures of stars on photographs, and considered the question of personality in estimating the centre of star photographic images. The paper gave rise to some discussion, in which Mr. Hinks, Prof. Turner and others took part.—Father Cortie read a paper by Father Sidgreaves on the spectrum of Nova Persei from September 6, 1901, to February 12, 1902, and showed photographs on the screen. During the period mentioned, the lines of the spectrum had remained very broad and preserved their relative intensities.—Father Cortie read a paper on visual and spectroscopic observations of the sun-spot group of May and June 1901. It appeared that the disturbed area of the corona of May 18, as shown on the eclipse photographs, corresponded with the region in which the spot group had its origin, and marked the time of the outburst, though the region had been disturbed quite a solar rotation before the birth of the spot. In this case of the only great sun-spot in an otherwise quiet year there appeared no correspondence between solar storms and terrestrial magnetic disturbance. The most widened lines in the red end of the spectrum of sun-spots are always faint lines, chiefly of vanadium and titanium. The author concluded that the level of sun-spots is that of the upper, more diffused gases, which give the flash spectrum in solar eclipses. In the discussion which followed, doubt was thrown upon the presence of vanadium in the flash spectrum.—Mr. Dyson described the Greenwich photographic observations of the satellite of Neptune, and also gave an account of a paper by Mr. Cowell on a method of reduction of extra-meridian observations. The method was a general one, suitable for observations at any azimuth, and the computation was facilitated by tables.



bright lines occupying in comparison normal positions. Thus, in the case of Nova Aurigæ the emission lines had practically normal wave-lengths, but the displacements of the dark lines at H_e were about 10.7 tenth-metres towards the violet, indicating a velocity of approach of about 500 miles per second. The recent new star in Perseus exhibited the same normal positions of the bright lines, and indications of even greater displacements of the dark lines, at one time amounting to 15 tenth-metres at H_e , representing a velocity of approach of the body producing the dark-line spectrum of more than 700 miles per second. These values differ enormously from those produced by pressure.

It appears then that the known direct effect of pressure on the radiation or absorption lines is the same, in quality, in water as in air, that is, displacements are obtained in the opposite direction to those the dark lines are observed to occupy in the spectra of Novæ; moreover, the amount of shift observed in the spectra of new stars differs, not only in this respect, but also in degree, thus:—

Spark in water.	New stars.
1. Absorption lines least shifted.	Absorption lines most shifted.
2. Radiation lines most shifted.	Radiation lines least shifted.
3. Absorption shift small.	Absorption shift enormous.

It would thus appear that the pairs of bright and dark lines shown in the spectra of new stars do not arise from the cause, presumably pressure, which produces the appearances presented in the spectrum of the spark discharge in water.

Royal Astronomical Society, May 9.—Dr. J. W. L. Glaisher, president, in the chair.—Mr. H. C. Plummer read a paper on the accuracy of photographic measures, in which he criticised M. Lœwy's recent memoir on the subject. Mr. Plummer doubted the possibility of expressing by a single

Linnean Society, May 1.—Prof. S. H. Vines, F.R.S., president, in the chair.—Mr. J. E. Harting exhibited photographs of a living specimen of the African shoe-bill (*Balaeniceps rex*), forwarded from Cairo by Sir William Garstin, K.C.M.G., and gave some account of the bird and of the different views which had been expressed by zoologists regarding its affinities and systematic position.—On the cerebellum of the lemurs, by Dr. Elliot Smith. In this paper, to be published as an addendum to that on the cerebrum read on March 6, the author introduces a revised terminology. Resolving the cerebellum into three main lobes—anticus, medius and posticus, he discards the term "fissura horizontalis magna," since the fissure so named is found to be inconstant and sometimes absent, and substitutes for "preclival" the term *prima*, regarding the fissure thus named, which divides the lobus anterior and medius, as the deepest and as constant for all mammalian forms. The detailed characters of the lemuroid cerebellum are described, and the cerebellum of *Notoryctes* is incidentally shown to be the simplest for all mammals.—On the brain of the elephant shrew (*Macroscelides elephantopus*, Shaw), by Dr. Elliot Smith. The brain of *Macroscelides* is shown to be marsupial in the existence of a dorsal fornix commissure of crescentic type, unique in the coexistence with this of a distinct and independent callosum, equal in extent to that of the higher Primates. Comparison is drawn with the cerebrum of those higher Metatheria in which the fusion of callosum and fornix commissure (psalterium) is the rule; and the author concludes that the examination microscopically of well-preserved material, of which he is expectant, will reveal a connection between these two which may not necessarily contain nerve-fibres, and may thus realise a condition he has previously described for the *Hapalidæ*.—On the early condition of the shoulder-girdle of the polyprotodont marsupials *Dasyurus* and *Perameles*, by Dr. R. Broom. The author shows that in the mammary foetus of the native cat of Tasmania and Victoria

(*Dasyurus viverrinus*), the cartilaginous coracoid reaches the sternum, as he has previously proved to be the case in the foetal *Trichosurus*. At a later stage, an elongation of the spine and clavicle is all conspicuous, with accompanying withdrawal of the coracoid. In the mammary foetus of the bandicoot (*Perameles obesula*) described, the coracoid is found to exhibit no connection with the sternum, and the scapula to be essentially similar to that of the adult, the clavicle reduced.

Geological Society, April 30.—Prof. Charles Lapworth, F.R.S., president, in the chair.—Mr. J. E. Marr exhibited some specimens from a metamorphosed metalliferous vein several inches wide, which he had discovered in the basic andesites near the Shap Granite, in a quarry close to the high road, north of the spot where it crosses Longfell Gill.—Mr. H. W. Monckton exhibited a flint implement which he had himself found on a heap of gravel, in a pit 278 feet above Ordnance datum, at Englefield (Berkshire). The gravel is part of an elongated patch mapped "Plateau-Gravel." Mr. O. A. Shrubsole remarked that the implement was of Palæolithic type, and of an advanced form of that type, as it had a cutting-edge all round. It had not been greatly rolled, and was probably made not far from the spot where it was found. Its patination showed that it belonged to the gravel in which it was found.—The origin and associations of the jaspers of south-eastern Anglesey, by Mr. Edward Greenly. Red jasper and jaspery phyllite are widely distributed in the southern and south-eastern parts of Anglesey, in the districts of Newborough, Pentraeth and Beaumaris. They are associated with limestones, diabases, serpentines, and with grits and shales. They have been much modified by earth-movements, which have produced brecciated and schistose structures; but where original structures have survived, the true relations of the rocks can often be seen. The diabases have the same characters as the pillowy and variolitic rocks so often associated with radiolarian cherts and jaspers in many parts of the world, and at several different geological horizons; and the relationships of the jaspers and igneous rocks resemble those seen in the radiolarian cherts of southern Scotland. It is inferred that the jaspers are altered radiolarian cherts.—The mineralogical constitution of the finer material of the Bunter pebble-bed in the west of England, by Mr. H. H. Thomas. Specimens were collected at intervals, from Budleigh Salterton, in Devon, to Fitzhead, near Milverton, in Somerset, and other sands, for comparison, were taken from the red rocks above and below. The sands, on the whole, contain a very small percentage of minerals with a specific gravity of more than 2.8; while the proportion of material over, to that under, 2.58 is about 70 or 80 to 30 or 20 per cent. A list and description of twenty minerals found in the sands is given, with, in some instances, the chief characters by which they were identified. The gradual decrease in the percentage of heavy minerals from Budleigh Salterton to Uffculm indicates the carriage of sediment by a southerly current, and this view is strengthened by the decrease in staurolite and a gradual diminution in the size of the tourmaline-grains. The increase in proportion of heavy grains from Uffculm to Milverton, and the further decline northward, together with the incoming of an assemblage of minerals markedly different from the normal southerly type, indicates an additional source of supply, perhaps a westerly current. The mass of material seems to have been furnished by a highly metamorphosed area, differing widely in its character from any now exposed in the south-west of England. The most probable source of much of the material is the Armorican massif of Triassic times.—Revision of the Phyllocarida from the Chemung and Waverly groups of Pennsylvania, by Prof. C. E. Beecher. The specimens described in the paper, as well as those on which the original descriptions were based, were all obtained in the vicinity of Warren, Philadelphia. The chief horizon is in the shale-beds of the Upper Chemung group, about 50 feet above mean water-level in the Allegheny River. The deposits are called by the writer the "Phyllocarid-Beds." Additions and emendations to the original diagnoses of several genera and species are given.

MANCHESTER.

Literary and Philosophical Society, May 13.—Mr. Charles Bailey, president, in the chair.—A paper on the luminous organs in *Pterygoteuthis margaritifera*, a Mediterranean cephalopod, by Mr. W. E. Hoyle, was laid upon the table.—Prof. Boyd Dawkins, F.R.S., brought before the Society the collection of specimens discovered in 1901 in Crete by Mr.

Hogarth in the course of the exploration of the Mycenaean remains of that island. The skulls exhibited belong to the oval-headed, well-developed type termed Mediterranean by Sergi and closely allied to the Iberic type of Spain and of Britain. They bear unmistakable marks of civilisation in the thinness of their walls and the extent to which the sutures are drawn out by the growth of the brain, as well as by the badness of their grinders and the small size of their canines. They probably represent a small, dark race, and were in the Bronze stage of civilisation. Among the remains from the Dictæan cave are the skulls of a goat and a hog, portions of those of the fallow-deer, and the forehead with two horn-cores of a domestic ox, for which Prof. Dawkins proposes the provisional name of *Bos buticus*, as it cannot be identified with any species on record.

PARIS.

Academy of Sciences, May 12.—M. Bouquet de la Grye in the chair.—Notice on the works of M. Lazare Fuchs, by M. Camille Jordan.—A study of lithium silicide, by M. Henri Moissan. The discovery of a silicon hydride of the constitution Si_2H_6 suggested the possibility of the existence of a series of corresponding metallic silicides, and in the present paper the preparation and properties of the lithium silicide, Si_2Li_6 , are described. A mixture of silicon with lithium in slight excess is heated in a vacuum at a low red heat for two or three hours and the excess of lithium distilled off between 400° and 500° C. The silicide formed, the analysis of which gave figures corresponding to the formula Si_2Li_6 , forms deep blue crystals. With a small quantity of water, this silicide reacts very violently, a spontaneously inflammable mixture of hydrogen and hydrogen silicide being given off. The slow decomposition with water furnishes only pure hydrogen. It was noted that although a solution of hydrochloric acid gas in dry ether was without action on the compound, the addition of a small quantity of water caused a rapid decomposition.—On the earthquake of May 6, 1902, by M. Michel Lévy. Two records from seismographs show earthquakes on May 6, one at Grenoble at 3h. 4m. 40s., and the other at Floirac at 3h. 5m. 30s. On the supposition of a velocity of transmission of 3 kilometres per second, the epicentre should be in the Mediterranean, east of Murcie and south of Minorca.—On viscous compressible fluids, by M. P. Duhem.—The black coloration of the rocks forming the cataracts of the Nile, by MM. Lortet and Hugouenq. The specimens of granite and porphyry at the cataracts of Ouadi-Halfa and Assouan present a uniformly black and highly polished surface, facts difficult to explain from the composition of these rocks. The polish is attributed to the scouring action of the sand brought down by the water, the black colour to black oxide of manganese. The latter does not exist in the rock mass and must have been formed from the manganese silicates present.—On a project for the organisation of a service of scientific exploration in Indo-China. The committee appointed to consider this question recommend the appointment of a permanent commission under the control of the Academy, the subjects of geology (with mineralogy), botany, zoology and anthropology being represented.—Remarks by M. Janssen on presenting to the Academy photographs of the solar corona taken at the Isle of Reunion during the total eclipse of May 17, 1901, by M. Jean Binot. The photographs from this station were of especial importance on account of the want of success due to climatic conditions at the other places of observation. A whole-page reproduction of this photograph accompanies the note.—The influence of instrumental errors on the rectilinear coordinates of star photographs, by M. Ch. Trépid.—On some orthogonal systems and their application to the problem of the deformation of the paraboloid of revolution, by M. de Tannenberg.—On a class of transformations of partial differential equations of the second order, by M. J. Clairin.—On the prediction of the minimum yield of the sources of the Vanne, by M. Edmond Maillet. If the rainfall of a given winter season is plotted as an abscissa against the yield of the springs for the second quarter following, the results for a number of years fall on regular curves, which can thus be applied to the prediction of the supply for the coming season.—On the continuous spectrum of electric sparks, by M. B. Eginitis. The spectrum of ordinary electric sparks between metallic electrodes is usually accompanied by a continuous spectrum, the intensity of which is usually very small compared with the intensity of the line

spectrum. The intensity of this continuous spectrum varies in different places, and also varies with the self-induction of the circuit. It is very intense in the case of certain metals such as magnesium, iron, cobalt, nickel and manganese. For all the metals examined, the continuous spectrum can be completely eliminated by choosing particular values for the self-induction.—On a magnetic perturbation observed on May 8, by M. Th. Moureaux. A magnetic disturbance, affecting chiefly the horizontal component, was recorded at the Observatory of Val-Joyeux, near Saint-Cyr, at a time corresponding to the catastrophe of Martinique.—On a rain of ink on May 7, 1902, by M. Th. Moureaux.—On the conditions of formation and stability of the hydrides and nitrides of the alkaline earths, by M. Henri Gautier. In the case of the hydrides of barium and strontium, certain phenomena were observed which appeared to point to the possible existence of a higher hydride than BaH_2 or SrH_2 , but on further examination these results were found to be due to the simple absorption of hydrogen by the hydrides without the formation of any definite compounds. Calcium hydride does not possess this property. The nitrides were found to be much more stable than the hydrides, commencing to form only at temperatures above $600^\circ C.$, and remaining undecomposed at $1000^\circ C.$, a temperature at which the hydrides are strongly dissociated.—On some derivatives of anthraquinone obtained by the action of sodium peroxide upon the aloins and their halogen derivatives, by M. E. Léger.—On a new dimethylglutaric acid, by M. E. E. Blaise.—The synthesis of menthone, by M. Georges Leser. The synthesis was effected by the action of potassium dissolved in absolute alcohol upon a mixture of isopropyl iodide and acetylmethylcyclohexanone.—On the composition and age of the metamorphic rocks of Crete, by M. L. Cayeux. The metamorphic series of western Crete belongs to the Trias of the Mediterranean type, probably to the Upper Trias.—On certain chromatic reactions of the red corpuscles in the blood of diabetics, by M. J. Le Goff.

NEW SOUTH WALES.

Linnean Society, March 26.—Mr. J. H. Maiden, president, in the chair.—The president delivered the annual address.

Ordinary meeting.—Note on two species of *Astraliium* from Port Jackson, by Mr. H. Leighton Kesteven. The author finds that *Astraliium fimbriatum*, Lamarck, and *A. tentoriforme*, Jonas, have, in Port Jackson, been united under the latter name. He finds that in the nepionic stage the former is very depressed, almost discoidal, and perspectivevely umbilicate; whilst the latter is trochiform and not umbilicate, at the same stage. They present the anomaly of two species easily separable in the nepionic stage, becoming so alike in the adult condition that only by their opercula can some specimens be identified.—Studies on Australian Mollusca, part vi., by Mr. C. Hedley. Material from tropical Queensland furnishes two genera, *Congerina* and *Mecoliotia*, new to Australia, as well as sundry small forms of *Pyrgulina*, *Crossea* and *Liotia*, new to science.

DIARY OF SOCIETIES.

THURSDAY, MAY 22.

INSTITUTION OF ELECTRICAL ENGINEERS (Society of Arts), at 8.—Annual General Meeting.

FRIDAY, MAY 23.

ROYAL INSTITUTION, at 9.—The Ethical Element in Shakespeare: Rev. Canon Ainger.

PHYSICAL SOCIETY, at 5.—On the Ebullition of Rotating Water: a Lecture Experiment: T. C. Porter.—The Conservation of Entropy: J. A. Erskine.—Rational Units of Electromagnetism: Sig. G. Giorgi.

MONDAY, MAY 26.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Anniversary Meeting.
VICTORIA INSTITUTE, at 4.30.—Annual Meeting. Address by Sir Chas. W. Wilson, K.C.M.G., K.C.B.

TUESDAY, MAY 27.

ROYAL INSTITUTION, at 3.—The Laws of Heredity, with Special Reference to Man: Prof. K. Pearson, F.R.S.

SOCIETY OF ARTS, at 8.—Pageantry and the Masque: May Morris.

ROYAL STATISTICAL SOCIETY, at 5.

WEDNESDAY, MAY 28.

CHEMICAL SOCIETY, at 5.30.—Taxim: T. E. Thorpe, C.B., F.R.S. and E. Stubbs.

GEOLOGICAL SOCIETY, at 8.—(1) On the Red Sandstone Rocks of Peel (Isle of Man); (2) The Carboniferous, Permian and Triassic Rocks under the

Glacial Drift in the North of the Isle of Man: Prof. W. Boyd Dawkins, F.R.S.—The Plutonic Complex of Central Anglesey: Dr. Charles Callaway.

THURSDAY, MAY 29.

ROYAL SOCIETY, at 4.30.—*Probable papers*: The Effect of Daylight on the Propagation of Electro-magnetic Impulses over Long Distances: G. Marconi.—The Minute Structure of Metals and other Plastic Solids: G. Beilby.—The Influence of Varying Amounts of Carbon Dioxide in the Air on the Photosynthetic Process of Leaves and on the Mode of Growth of Plants: H. T. Brown, F.R.S., and F. Escombe.—On the Influence of an Excess of Carbon Dioxide in the Air on the Form and Internal Structure of Plants: Prof. J. B. Farmer, F.R.S., and S. E. Chandler.—On the Structure of the Gills of the Lamellibranchia: Dr. W. G. Ride-wood.

SOCIETY OF ARTS, at 4.30.—Western Australia: its Progress and Resources: Hon. H. W. Venn.

INSTITUTION OF MINING ENGINEERS (Geological Society), at 11.—Working Coal under the River Hunter, the Pacific Ocean and its Tidal Waters, near Newcastle, New South Wales: A. A. Atkinson.—Lead and Zinc Deposits of the Mississippi Valley, U.S.A.: Prof. C. R. Van Hise and H. Foster Bain.—The Campbell Coal-washing Table: Clarence R. Claghorn.—The Mining, Concentration and Analysis of Corundum in Ontario: Dr. W. L. Goodwin.—Re-opening of Hartley Colliery: R. E. Ornsby.—Deposits of Hydroborate of Lime: its Exploration and Refinement: Carlos A. Lynes Hoskold.—Remarks on Mr. M. Walton Brown's "Report on Mechanical Ventilators": Prof. A. Rateau.

FRIDAY, MAY 30.

ROYAL INSTITUTION, at 9.—The Progress of Electric Space Telegraphy: G. Marconi.

INSTITUTION OF MINING ENGINEERS (Geological Society), at 10.30.—The Training of Industrial Leaders: Prof. J. Wertheimer.—Smelting in British Columbia: W. Denham Verschoyle.—Treatment of Low-grade Copper-ores in Australia: J. J. Muir.—The Tarkwa Gold field, West Africa: A. R. Sawyer.—Gold-dredging: T. Ross Burt.—Gold-dredging in Otago, New Zealand: F. W. Payne.—Electric Traction on Roads and Mineral Railways: W. R. Cooper.—The Analytical Valuation of Gas-coals: G. P. Lishman.

EPIDEMIOLOGICAL SOCIETY, at 8.30.

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