

logy is of vital importance to the well-being of the industries of the district and county, the executive committee of the Manchester District Branch of the Federation of British Industries confidently commends the appeal for 150,000*l.* (of which 26,000*l.* has been promised absolutely and conditionally) to extend the College of Technology to the sympathetic consideration of all Lancashire producers, being of opinion that lack of whole-hearted support will be to the prejudice of Lancashire industry." This welcome change in the attitude of great industrial firms towards technical training and research leads to the hope that this appeal may meet with the cordial support which its serious and essential importance demands.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 4.—Sir J. J. Thomson, president, in the chair.—A. M. Williams: The adsorption of gases at low and moderate concentrations. Part i.: Deduction of the theoretical adsorption isostere and isotherm. Part ii.: Experimental verification of the form of the theoretical isosteres and isotherms.—A. M. Williams: The adsorption of gases at low and moderate concentrations. Part iii.: Experimental verification of the constant in the theoretical adsorption isostere.—T. R. Merton: The secondary spectrum of hydrogen. It has been found that the presence of a large quantity of helium in vacuum tubes containing hydrogen modifies the secondary hydrogen spectrum in the sense that the relative intensities of the lines are completely altered, some lines being extremely weak in the spectrum of the mixture, whilst others are greatly enhanced and a number of new lines appear. Measurements have been made of the lines which are enhanced or unaffected by the admixture of helium; the changes are shown in a reproduction of a photograph of the two spectra in juxtaposition with a wave-length scale, by means of which the lines which are weaker in the spectrum of the mixture can be identified by reference to Watson's measurements of the spectrum. The secondary hydrogen spectrum is of such complexity that the segregation of its lines into series of mathematically related lines is a task which offers great difficulties. These difficulties can doubtless be lessened by the aid of physical methods of separating the lines into different classes.—T. R. Merton: The spectra of isotopes. (1) Interferometer measurements of the principal line in the spectrum of ordinary lead and lead from pitchblende show that in the latter case the line is less refrangible by $0.0050 \text{ \AA.} \pm 0.0007 \text{ \AA.}$, in close agreement with the results of Aronberg. (2) In the case of lead from Ceylon thorite it has been found that the line is more refrangible than in ordinary lead by $0.0022 \text{ \AA.} \pm 0.0008 \text{ \AA.}$ (3) The positions of the lines are arranged in the order of their atomic weights. (4) Spectroscopic measurements seem to provide a favourable method of distinguishing isotopic elements. (5) A comparison has been made of the wave-lengths of the principal line in ordinary thallium and thallium from pitchblende residues. The wave-length of the line in the spectrum of thallium from pitchblende has been found to be more refrangible than the line in ordinary thallium by $0.0055 \text{ \AA.} \pm 0.0010 \text{ \AA.}$ In the case of thallium the measurements may possibly be affected by certain disturbing factors which do not apply to the measurements of the lines of lead. Unless the results are affected by these disturbing factors, it would seem likely that the thallium in pitchblende is an isotope of ordinary thallium.—E. F. Armstrong and T. P. Hilditch: A study of catalytic actions at solid surfaces. Part ii. It is shown that the catalytic

action of metals, like that of certain enzymes, is reversible; in other words, compounds which are saturated in the ordinary sense are capable of interacting with the metal to form a system which breaks down into a more stable equilibrium consisting of hydrogen and a less saturated compound. This is readily demonstrated in the case of cyclohexanol; when a mixture of cyclohexanol and methyl cinnamate is heated at 180° in presence of nickel, a considerable transference into cyclohexanone and methyl β -phenyl propionate is effected. It is necessary that both components of the system should be present in the liquid state. Dehydrogenation has also been effected in the case of hexahydroxylene and dihydropinene mixed with methyl cinnamate in presence of nickel; in these cases a temperature of 230° is required. At this temperature small quantities of an ethyl oleate of unknown structure are obtained from ethyl stearate.—F. Horton and Ann C. Davies: An experimental determination of the critical electron velocities for the production of radiation and ionisation on collision with argon atoms. The critical velocities for electrons in argon were investigated by methods similar to those employed in a previous research for the determination of the corresponding values in helium, the earlier form of apparatus being modified somewhat to facilitate the detection of the beginnings of radiation and ionisation. As the result of many experiments under different conditions, the values 11.5 volts and 15.1 volts were obtained for minimum radiation velocity and minimum ionisation velocity respectively. No sudden increase of radiation at the second critical velocity was detected, and it was shown that no detectable amount of ionisation was produced at 11.5 volts. The limiting wavelength of the argon spectrum, calculated from the value, 15.1 volts, found for the minimum ionisation velocity, is in agreement with the limit observed spectroscopically in the recent experiments of Lyman.

Royal Microscopical Society, November 19.—Mr. J. E. Barnard, president, in the chair.—H. M. Carleton: Note on the Cajal formalin-silver nitrate impregnation method for the Golgi apparatus. The theory of silver impregnation in general was briefly outlined and the technique of the Cajal method described. Mention was made of the impregnation of cell-constituents other than the Golgi reticulum, while the problem of the production of artefacts by the various methods used for demonstrating the Golgi apparatus was discussed. Finally, mention was made of the various changes undergone by the Golgi apparatus during certain physiological processes, i.e. glandular secretion, intracellular fat formation, ossification, etc.—F. I. G. Rawlins: Report on the collection of metallurgical specimens recently presented by Sir Robert Hadfield, Bart. In 1918 a suggestion was made that the society might further interest, and perhaps research, in metallography. To this end Sir Robert Hadfield presented the society with a collection of specimens. These were polished at the Royal School of Mines by permission of Prof. Carpenter, and it is intended that they shall be available for microscopic examination by fellows, in much the same way as the general collection. A catalogue is being prepared, which will be ready shortly, giving brief details of the microstructures, etc.

Linnean Society, November 20.—Dr. A. Smith Woodward, president, in the chair.—Dr. G. C. Druce: The occurrence in Britain as native plants of *Ajuga genevensis* and *Centaurium scilloides*, Druce, var. *portense* (Brot.). Although there are previous records of *Ajuga genevensis* from Britain, the records are probably mistakes for *pyramidalis* or other species, and in one instance due to a garden-escape of the true plant.

This discovery of *genevensis* on the Berkshire downs is an undoubted evidence of it as a British species. *Centaureum scilloides* is the *Erythraea diffusa* of Joseph Woods, who discovered it near Morlaix, in Brittany. It occurs on the edge of a headland near Newport, Pembroke.—Prof. R. C. McLean: Sex and soma. The author enlarged upon the recently discovered phase of multinucleosis in the developing soma cell of higher plants. The genetic interest of the phenomenon has not received sufficient consideration, and the present paper was designed to direct attention to the possibilities involved.

Aristotelian Society, December 1.—Prof. Wildon Carr, vice-president, in the chair.—G. Cater: The nature of inference. The logic of the concrete universal as the medium of judgment and inference was criticised. It was shown by analysis of examples that it does not really succeed in making contact with its differences; their content is only imputed to it. On the other hand, the instrument of inference is always an intermediating representation, particular and not universal. Absolutism, the outcome of the theory that the active dominant concrete universal is the instrument of inference, ends in the concept of reality, under the form of eternity, as an exhaustive system of differences, without character, a contentless limit.

PARIS.

Academy of Sciences, November 24.—M. Léon Guignard in the chair.—L. Maquenne and E. Demoussy: The richness in copper of cultivated soils. The soils examined were in two classes, ordinary arable soil and soil on which fruit-growing had been carried out, and which was therefore liable to contain copper from the liquids used for spraying. All the soils contained copper, but the arable soils some millionths only of their weight. The soil from vineyards was compared with soil from the same district untreated with preparations, and the results from a considerable number of districts are tabulated. One fact was brought out by these investigations: the copper applied in spraying is mainly found in the surface layers, and penetrates the ground with great difficulty. At 30 cm. below the surface the soil of a vineyard contains no more copper than soil from a similar depth in a field growing cereals.—A. Blondel: The amplitude of the oscillating current produced by audion generators.—Ch. D. Walcott was elected a foreign associate in succession to the late M. Metchnikoff.—E. Kogbetliantz: The unicity of ultra-spherical developments.—L. E. J. Brouwer: The classification of closed ensembles situated on a surface.—M. Portevin: Study of the influence of various factors on the creation of internal longitudinal strains during the rapid cooling of steel cylinders. The determination of the internal longitudinal strains was carried out by measuring the variations in length produced during the removal of concentric layers of the cylinder by turning. The strains produced depend on a number of factors, including the temperature of immersion, the nature of the liquid (oil, water), the temperature of the water, time of immersion, and diameter of the cylinders. The results are summarised qualitatively in the present communication; full numerical data will be published elsewhere.—R. Bayeux: The ozogenic power of the solar radiation at the altitude of the Mont Blanc Observatory. At an altitude of 4360 metres sunlight does not produce ozone from oxygen. Hence it is concluded that the ozone found at lower altitudes is not formed by the direct action of the sun, and the therapeutic effects of the sun-cure cannot be attributed to ozone.—E. Henriot: The calculation of double refraction.—M. de Broglie: The X-ray spectrum of tungsten.—MM. Ledoux-Lebard and

A. Dauvillier: The reticular distance of calcite and its influence on the determination of *h*. A recalculation of some data given in an earlier communication.—G. Baume and M. Robert: Some properties of pure nitrous anhydride and of its solution in nitrogen peroxide. The fusibility diagram of the system ($N_2O_3-N_2O_4$) is normal, with a single eutectic near the freezing point of pure nitrogen peroxide. Pure nitrous anhydride does not appear to be capable of existence except at very low temperatures in the solid state, or in the liquid state under a pressure of nitric oxide. At temperatures above $-100^\circ C$. N_2O_3 dissociates, the liquid phase containing N_2O_4 , and the gaseous phase NO .—W. A. Noyes, jun.: The potential necessary for electrolyzing solutions of iron. In a cell composed of iron anode and cathode and a solution of a ferrous salt absolutely free from ferric salt, it is impossible to deposit iron with a lower voltage than 0.66 volt. This is reduced by increase of temperature, falling to a minimum value of 0.13 at $109^\circ C$.—L. Chelle: The detection and estimation of traces of hydrocyanic and thiocyanic acids in a complex medium. Hydrocyanic acid can be completely removed by a rapid current, and retained by washing the air with alkali. Chromic acid converts thiocyanic acid into hydrocyanic acid. The results of quantitative experiments are given.—A. Goris and Ch. Vischniac: The constitution of primeverose, primeverine, and primulaverine.—J. Bougault and P. Robin: The oxidation of the hydramides. A study of the oxidation of benzhydramide, anishydramide, and piperhydramide by iodine and sodium carbonate. The corresponding cyanidine is produced in each case.—G. Mouret: Some effects of the lamination of rocks observed in the western part of the Central Massif of France.—P. Morin: The coefficients of flow of the watercourses in the Central Massif.—M. Dechevrens: Modification and complement to the method of observation of telluric currents with the aid of naked subterranean conductors.—L. Daniel: Experimental researches on the causes of the immersion of the leaves of the water-lily. The immersion of the leaves instead of floating on the surface is not due, as has been suggested, to the effect of the depth of water.—M. Molliard: The action of acids on the composition of the ash of *Sterigmatocystis nigra*.—H. Guillemot: The second postulate of the calculus of probabilities and the law of option in the evolution of living matter.—L. Boutan: The rotation of the anal region of the larval shell in Gasteropods.—A. Pézard: The modifying factor of normal growth and the law of compensation.—M. Barthélémy: The definite survival of dogs bled white, obtained by a means other than blood transfusion. The solution injected was a 6 per cent. solution of gum arabic containing 6 parts of sodium chloride per 1000.

SYDNEY.

Linnean Society of New South Wales, September 24.—Mr. J. J. Fletcher, president, in the chair.—K. G. Blair: Notes on the Australian genus *Cestrinus*, Er. (fam. Tenebrionidæ), and some allied genera. The paper discusses the synonymy of the somewhat obscure genus *Cestrinus*, Er. (fam. Tenebrionidæ), as well as *Achora*, Pasc., and *Adelodemus*, Haag.—Dr. H. S. H. Wardlaw: The venous oxygen content of the alkaline reserve of the blood in pneumonic influenza. The skin of persons suffering from pneumonic influenza often assumes a distinctly bluish or plum-coloured tinge, and several hypotheses have been put forward to account for this. One question which arises is whether this colouring of the skin is a cyanosis in the generally accepted sense of the word, i.e. whether the colour is due to an abnormally large

proportion of reduced hæmoglobin in the blood. In the paper the results are given of investigations involving determinations of the oxygen capacity and degree of oxygen saturation of the venous blood of persons suffering from pneumonic influenza; in some cases the acidity and reactivity were determined by means of the hydrogen electrode. The samples of venous blood from cases of pneumonic influenza showed no indication of decreased oxygen capacity or of deficient oxygenation. The concentration of hydrogen ion produced by the addition of a measured quantity of acid showed no indication of acidosis; the alkaline reserve was not reduced.—Dr. R. J. Tillyard: The Panorpid complex. Part 3: The wing-venation. Amongst the new discoveries may be mentioned the proof that the basal cell of the forewing in the butterflies is an *areocol* of very specialised construction, and that all the higher groups have had the venation of the anal area of the hindwing reduced, not by loss of 3A, as hitherto supposed, but by loss of 1A after fusion with 2A to form a Y-vein. A summary is given of the phylogenetic results, and a phylogenetic table with the positions of the more important fossils marked along the lines of descents. The Trichoptera and Lepidoptera are shown to be very closely allied, being a true dichotomy from a common ancestral stem, probably in the Trias. The Megaloptera and Planipennia are even more closely allied, and can only doubtfully be kept as separate orders. The Diptera are traced back to the Triassic Paratrachoptera, themselves an early offshoot of the older Mecopteran stem. The three orders Mecoptera, Paratrachoptera, and Diptera differ from all the rest in having the cubitus only two-branched, and thus lie outside the main line of advance of the complex.

BOOKS RECEIVED.

Calculation of Electric Conductors. By W. T. Taylor. Pp. 34. (London: Constable and Co., Ltd.) 10s. 6d. net.

The Present Position of the Theory of Ionisation. Pp. 178. (London: The Faraday Society.) 12s. 6d.

Action de la Chaleur et du Froid: Sur l'Activité des Êtres Vivants. By G. Matisse. Pp. ii+556. (Paris: E. Larose.)

The Theory of Relativity. By H. L. Brose. Pp. 32. (Oxford: B. H. Blackwell.) 1s. 6d. net.

Timbers and their Uses. By W. Winn. Pp. vii+333. (London: G. Routledge and Sons, Ltd.) 10s. 6d. net.

The Adventurer's Handbook: Being the Manual of the Order of Woodcraft Chivalry. Pp. xiv+119. (London: The Swarthmore Press, Ltd.) 2s. 6d. net.

The Hill of Vision: A Forecast of the Great War and of Social Revolution with the Coming of the New Race. By F. B. Bond. Pp. xxv+134. (London: Constable and Co., Ltd.) 7s. 6d. net.

The Coal Consumption of Power Plants, and Bonuses for Coal Saving. By R. H. Parsons. Pp. 23. (London: The Electrical Review, Ltd.) 1s. net.

Musings of an Idle Man. By Sir R. H. Firth. Pp. xii+359. (London: John Bale, Ltd.) 7s. 6d. net.

Engineering Descriptive Geometry and Drawing. By Capt. F. W. Bartlett and Prof. T. W. Johnson. 3 parts. Pp. vii+206; v+207-374; v+375-617. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd.) 27s. 6d. net.

The Psychology of the Future. By E. Boirac. Translated and edited, with an introduction, by W. de Kerlor. Pp. xiii+322. (London: Kegan Paul and Co., Ltd.) 10s. 6d. net.

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Pictorial Atlas of English History. Arranged by E. J. S. Lay. Pp. 48. (London: Macmillan and Co., Ltd.) 1s. 6d.

Experiments with Plants. By J. B. Philips. Pp. 207. (Oxford: At the Clarendon Press.) 3s. net.

DIARY OF SOCIETIES.

THURSDAY, DECEMBER 18.

ROYAL SOCIETY OF ARTS, at 4.30.—P. J. Hartog: Some Problems of Indian Education.

ROYAL SOCIETY OF MEDICINE (Dermatology Section), at 5.

ROYAL INSTITUTE OF PUBLIC HEALTH, at 5.—Dr. J. D. Grant: Tuberculosis of the Larynx: Treatment, especially in the Home.

INSTITUTION OF MINING AND METALLURGY (at Geological Society), at 5.30.—Adjourned Discussion on A Contribution to the Study of Flotation, H. L. Sulman.

INSTITUTION OF ELECTRICAL ENGINEERS (at Institution of Civil Engineers) at 6.—D. M. W. Hutchison and W. J. Wayte: Electricity in Tin Mining.

CONCRETE INSTITUTE, at 7.30.—M. S. R. Adams: The Use of Elliptical Vaulting as a Primary Factor in Contemporary Architecture.

SOCIETY OF ARCHITECTS, at 8.—Prof. H. Adams: The Need for More Care in Warehouse Design.

ARISTOTELIAN SOCIETY (at 22 Albemarle Street), at 8.—Dr. G. E. Moore: External and Internal Relations.

CHEMICAL SOCIETY, at 8.—Prof. J. Walker: War Experiences in the Manufacture of Nitric Acid and the Recovery of Nitrous Fumes.

FRIDAY, DECEMBER 19.

INSTITUTION OF MECHANICAL ENGINEERS, at 6.—G. W. Burley: Cutting Power of Lathe Turning Tools, Part II.

JUNIOR INSTITUTION OF ENGINEERS (at Royal United Service Institution), at 7.30.—Sir E. Tennyson d'Eyncourt: The Influence of the War on Engineering (Presidential Address).

ROYAL SOCIETY OF MEDICINE (Electro-therapeutics Section), at 8.30.—Dr. J. C. Mottram: The Leucocytic Content in Radium Workers.

—Adjourned Discussion on Major Cooper's Paper: The Artificial Stimulation of Muscle, with Demonstration of a New Form of Faradic Coil.

SATURDAY, DECEMBER 20.

PHYSIOLOGICAL SOCIETY (at St. Thomas's Hospital), at 4.30.

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