

Early Science at the Royal Society.

July 17, 1661. Sir Paul Neile having mentioned, that the king had, within four days past, desired to have a reason assigned, why the sensitive plants stir and contract themselves upon being touched; it was resolved, that Dr. Wilkins, Dr. Clarke, Mr. Boyle, Mr. Evelyn, and Dr. Goddard, be curators for examining the fact relating to those plants.

July 20, 1664. Notice being given, that some ships were ready for Guinea, it was desired, that such, as had inquiries to be made in those parts, might prepare them against the next meeting.

1687. Mr. Hooke shewed the experiment of vibration of the rods, as a pendulum, which was by suspending a large Indian-cane of about thirty feet long by two pack-threads about eight feet in length: by which it was plain how the weight of such rods or poles for communication of traction or pulsion at a distance might not only be made to move freely and with ease, but also be in the nature of a sway. The same thing was also tried with a large scaffold-pole of about forty feet long.

July 22, 1663. Sir Robert Moray mentioned, that the king had made an experiment of keeping a sturgeon in fresh water in St. James's Park for a whole year: it was moved to kill it, and to see how it would eat.—He related that prince Rupert had made a new kind of gunpowder, in strength so far exceeding the best English powder, that trial being made with a powder-trier, it was found to be in the proportion of 21 to 2. It was desired, that a trial of it might be made before the society.

1669. The society being made acquainted by Mr. Oldenburg, that Mr. Edward Diggs intended to go shortly to Virginia, and offered his services for philosophical purposes; it was ordered that the inquiries formerly drawn up for that country should be recommended to him.

July 23, 1662. The amanuensis was ordered to translate from the French Monsieur Huygen's letter to Sir Robert Moray, dated at the Hague, July 14, 1662, containing some objections to some parts of Mr. Boyle's "Defence of the doctrine touching the spring of the air" against Franciscus Linus and Mr. Hobbes.

1684. Upon a complaint of Mr. Flamstead, that he had been reflected upon by Mr. Hooke in the minutes of the society, it was ordered that a line should be drawn through the places complained of, and that there should be written on the side, "cancelled by order of council": and that the journal-book should be brought to the next meeting of the council, who should see it done.

July 24, 1679. Mr. Haak produced a book intitled "Propositions of Optic Glasses," printed at the theatre at Oxford. Mr. Hooke who had read something of the book, said, that he had not found anything in it, which was new, and that it contained some propositions about the place of the image, which were not true: that it came far short of the theory of optics now well known, which he conceived to have been first well understood by Kepler, and highly improved by Des Cartes.

July 25, 1667. The experiment of opening the thorax of a dog made at the last meeting not having succeeded, it was ordered to be made again at the next; and Dr. King was desired to bring in writing an account of that whole operation, though it failed.

July 26, 1682. Dr. Grew read a letter from Dr. Coga, Vice-chancellor of the university of Cambridge, wherein he mentioned, that Hevelius's last book was not to be found in that university.

Societies and Academies.

LONDON.

Physical Society, June 13.—Mr. F. E. Smith in the chair.—G. E. Bairsto: On a method for the synchronous and instantaneous illumination of objects rotating or vibrating at very high speeds. It is capable of giving instantaneous photographic records, and gives a precision of the order of half a microsecond. It is much more precise and able to give a more intense spark than any contact breaker and coil method.—E. A. Owen, N. Fleming, and Miss W. E. Fage: The absorption and scattering of γ -rays. The absorption and scattering of γ -rays from radium filtered through 23 mm. of lead have been measured in magnesium, aluminium, zinc, tin, and lead. Assuming that the mean effective wave-length of the radiation employed is 0.021 Å, the experimental results are consistent with the following statements: (i.) When γ -rays traverse matter, the characteristic radiations of the absorbing medium are excited; (ii.) the atomic fluorescent absorption coefficient of γ -rays depends upon the wave-length of the incident radiation and the atomic number of the absorber according to the law $\tau/\rho \cdot \omega = K\lambda^3 N^4$, which holds for X-rays; (iii.) the radiations which accompany this fluorescent absorption are the characteristic radiations of the K, L, M, . . . series of the absorbing elements; (iv.) the absorption of γ -rays in light elements is due almost entirely to scattering; (v.) the pure atomic scattering absorption coefficient is proportional to the atomic number of the absorber; (vi.) in addition to fluorescent and scattering absorption, a true absorption exists, the atomic coefficient of which is proportional to the atomic number. Compton's formulæ would account for the experimental results if the wave-length of the incident radiation were 0.020 Å. Jauncey's formulæ would require the wave-length to be 0.029 Å.—W. N. Bond: The flow of compressible fluids, treated dimensionally. The method of dimensions treatment that is applicable to the pressure gradient at a point in a system through which non-compressible fluids of finite viscosity are passed, is extended by means of the thermo-dynamical equations for gas flow to the case where appreciable changes in density of the fluid occur, but where no heat passes across the walls of the system. The theory is developed in detail only for the case of flow through a straight parallel-walled tube, and has been tested by experiments in which water and air at high velocities pass through small tubes. The air in some experiments had a velocity of more than two-thirds of the velocity of sound in the air. Errors due to moisture, pulsating flow, heat conduction through the walls, and proximity to the entrance to the tube are small; an error of moderate amount is attributed to the partial neglect of the variation of the variables over the transverse section of the tube.—D. B. Deodhar: Note on Israj, a remarkable Indian stringed instrument.

Aristotelian Society, June 16.—Prof. T. Percy Nunn, president, in the chair.—A. D. Lindsay: Sovereignty. The theory of sovereignty is the storm-centre of political theory. For one school it is inherent in the very conception of government, for another it is nothing but a stone of stumbling, an anachronistic theory to be got out of the way as the essential preliminary to any solution of social questions. Austin approaches the doctrine of sovereignty with the purpose of defining law. Law is essentially a command and depends therefore on a distinction between the sovereign and the subjects. The originality of his theory is that he gives up all attempts to derive the

right of the sovereign from a supposed social contract, and bases it on the previous relation between him who commands and him who obeys. The command is a law consisting in the fact that the person who obeys has been in the habit of obeying the person who commands. Sovereignty is thus based on fact. As constitutional government developed, political theorists tried to describe it in terms of sovereignty. They invented a new kind of person, the people, the general will, the state or the nation, which they distinguished from the individuals composing the community. Bosanquet's "Philosophical Theory of the State" is a theory of sovereignty which he describes as "the general will" and represents as diametrically opposed to the Austinian. He is dealing, however, with a quite different question. He is showing that the real basis of law, as of everything else in society, is the whole of society. What is wanted is a link between this common life of society and the political machinery. The true theory of the sovereignty of the constitution maintains that the link between the social and juristic aspect of the State is the adherence by the great mass of the members of a society to a definite principle of settling differences.

Mineralogical Society, June 17.—Dr. H. H. Thomas, vice-president, in the chair.—Miklós Vendl: The chemical composition and optical properties of a basaltic hornblende from Hungary. Complete determinations were made, all on the same sample of material, of crystals of a black hornblende occurring in volcanic tuff near Lake Balaton. The mineral is rich in titania, alumina, ferric iron, and alkalis, and the composition is expressed by the mixing of simple metasilicate molecules (including 14.62 per cent. H_2SiO_3) with aluminates (14.40 per cent. $MgAl_2O_4$) and ferrate (4.32 per cent. $MgFe_2O_4$).—G. Abbott and W. A. Richardson: The micropetrography of the structures of the magnesian limestone of Fulwell. The structures of the magnesian limestone show a wide variety of forms ranging from simple spherical concretions to highly complex coral-like masses. The more complex types are built up by a combination of rods, tubes, and bars. The microstructure shows more uniformity. The prevailing type is finely granular but crystalline. Where impurities or lines of pigmentation are present the matrix becomes quite microcrystalline as a rule, whilst on the borders of cavities there is a coarser growth. Banded pigmented forms show the same structure as banded chert. Spheroids have either a coralloid structure, or if solid are microcrystalline at the centre with a radial crystallisation towards the surface. The microstructure by itself throws little light on the origin.

Royal Statistical Society, June 17.—J. Hilton: An inquiry by sample: an experiment and its results. At the end of 1923 a need was felt of a more detailed and intimate analysis of the million and a quarter or more workpeople in Great Britain who were then being returned week by week as unemployed; and it was evident that such an investigation must be by sample, and that the information desired was of a kind that necessitated personal interviews. It was decided to "tab" every hundredth claim on the live claim file at each Exchange, and invite the claimants thus indicated to attend in the manager's room for interview. Every Exchange was given a different point on its live claims file at which to start, and the starting points were distributed as evenly as possible over the whole occupational classification. The interviews took place in the week ended November 10, 1923, and 9997 reports were received. Comparison with the results of previous inquiries showed that the 1 per

cent. sample is nowhere very wide of the mark, and has answered most of its purposes quite as well as a 10 per cent. or 33 per cent. inquiry. The sample only becomes untrustworthy when very small absolute numbers are involved.

Royal Meteorological Society, June 18.—Mr. C. J. P. Cave, president, in the chair.—C. K. M. Douglas: Further researches into the European upper air data, with special reference to the life history of cyclones. The temperature in the troposphere is much higher over a Bjerknes' "warm sector" than over the other parts of a cyclone. This leads to the conclusion that a cyclone is superficial in its initial stages. Relevant observations are few, since the development of a cyclone usually takes place in the Atlantic. A large part of the great increase of kinetic energy observed when a cyclone develops is supplied by a convective overturning between adjacent warm and cold masses of air. The cold mass must have a depth of fully 6 or 7 kilometres, or about the depth of the troposphere in high latitudes in winter. In an appendix it is shown, by means of a criterion due to L. F. Richardson, that an inversion can only exist at a very small angle with the horizontal without becoming increasingly turbulent, a conclusion which is confirmed by observation. In a developing cyclone, the slope of the surface of separation between the cold and warm masses is of the order of 1 in 50, and the inversion is inevitably destroyed by mixing.—Miss L. F. Lewis: The effect of the source of air on its temperature at 4000 feet and 10,000 feet. During the winter months, the chief factor in determining the temperature of the air up to 2000 feet is its passage over a large expanse of land or sea. Air from the Continent is cold, while air from the Atlantic is relatively warm. On the Atlantic, however, some polar effect is shown when the path of the air is followed back for two days or more. At 4000 and 10,000 feet the chief factor is now the north to south component of the air's path, while the land and sea effect is small. Trajectories show that it is the latitude of the air two days before or even longer that determines the temperature.—L. H. G. Dines: A simple electrical time-marking system for use with self-recording meteorological instruments. The simple system of synchronous electrical time-marking installed a few years ago at Valencia Observatory, Cahirciveen, Co. Kerry, is described. A central clock operating hourly and minute contacts in series closes an electrical circuit once an hour. The circuit includes electro-magnets acting on suitable portions of the recording mechanism of the self-recording instruments which it is desired to include in the scheme. By this means time marks are easily obtained to an accuracy of a second or less.

Linnean Society, June 19.—Dr. A. B. Rendle, president, in the chair.—C. E. Salmon: A hybrid between *Carex remota* and *C. divulsa*. This occurred near Mayfield, in Sussex, in one large clump with a quantity of *C. remota* and a little *C. divulsa*. It differs from *C. remota* by its more scabrous stem, only one (or at most two) bracts, spikelets male at the summit, or even wholly male, and in other particulars. *C. remota* × *divulsa* seems extremely uncommon and is perhaps new.—T. A. Dymes: The seed of *Orchis latifolia*. The seeds of the British Dactylorhizids fall into two groups: (1) *Maculatae*, and (2) *Latifoliae*. A form, agreeing in other respects with *O. latifolia* L., the seeds of which are obviously pure, has been found. The seeds belong to group (2) *Latifoliae*, and are very like those of *O. pratensis* Druce, and it seems probable that the two forms are close allies of the same species.—J. H. Priestley and Miss Lorna I. Scott: Leaf and stem anatomy of *Tradescantia fluminensis*

Vell. Vascular development in the leaf is first basifugal and afterwards basipetal, and the backward development of the subsidiary veins through the leaf sheath is associated with the subsequent development of the system of peripheral bundles, which lie in the sclerenchyma very near the periphery of the adult stem. Thus the functional vascular supply to the leaf passes through two stages in the stem. In the young internode, communication is maintained by means of the medullary and perimedullary bundles; as the growing internode extends in length the xylem of these bundles is disorganised, but at this time the peripheral bundles are differentiated throughout the internode and become functional.—T. B. Blow: Charophyta collected during a recent visit to Madagascar. These plants are interesting by reason of their affording a possible means of preventing the spread of malaria by acting as larvicides. The country covered was the east coast line, where are great marshes and much water, and where malaria is rampant, the higher ground around the capital, Tananarive, where the climate is much healthier, the mountainous portions near Antsirabe, where mosquitoes scarcely exist, and the district of the great Lake Alaotra, which is probably the most malarious part of Madagascar. It was noticed in connexion with several species of Chara that, where they abounded, there were rarely any mosquito larvæ in the water. The species that seemed to keep the water quite free of mosquito larvæ were as follows: *Chara Zeylanica*, *C. gymnopitys*, *Nitella Roxburghii*, and some other species of *Nitella* probably new.

DUBLIN.

Royal Dublin Society, May 27.—Prof. E. A. Werner in the chair.—W. R. G. Atkins: Notes on the filtration and other errors in the determination of the hydrogen ion concentration of the soil. As a general rule, the effect of increasing or decreasing the soil to water proportion, within limits, does not alter the P_H value by as much as 0.1 for soils between P_H 6 and P_H 8. With more acid or more alkaline soils larger alterations are thus caused. For lightly buffered acid soils one part of soil to two parts of water seems a safe proportion to adopt; for other soils a one to five proportion is convenient and, apparently, trustworthy. The P_H value of some soil extracts is markedly modified by filtration, even when a first filtrate is rejected. Both untreated and acid-extracted filter-papers may reduce the acidity. The use of large volumes, about 160 c.c., of filtrate, and a filter appropriate to the soil, reduces these errors: where possible, cleaning by the centrifuge is desirable. The fibres of acid-extracted papers act towards indicators as if as acid as P_H 4.8, but washing was not found to render them less acid. Unextracted papers are at about P_H 7.0-7.6, and give up traces of alkali to distilled water. The indicator brom-cresol green is to be preferred to methyl red for the same P_H range.—J. L. McWhinney: The soil fauna of a permanent pasture. A census of the invertebrate fauna resident on the surface, and in the soil to a depth of nine inches, of a permanent pasture forming part of the experimental farm of the Albert Agricultural College, Glasnevin, Co. Dublin, reveals a considerably greater density of population than has been found by other workers elsewhere. If the soil be dried before the count is made, numbers of the smaller species may be overlooked.

EDINBURGH.

Royal Society, June 2.—Prof. F. O. Bower, president, in the chair.—D. A. Allan: The igneous geology of the Burntisland district. Penetrating the Lower Carboniferous rocks of this area is a group of

eleven volcanic necks, one of which is recorded for the first time. An examination of the boulders in the agglomerate has failed to produce material younger in age than the surrounding rocks. The lava flows comprise olivine basalts of the Dalmeny and Hillhouse types, together with a pyroxene-rich variety now designated as being of the Kinghorn type. From a consideration of the variation of the lavas, it has been possible to establish upon broad lines a series of zones. The intrusions include olivine basalts, teschenites, olivine dolerites, olivine-free dolerites, and quartz dolerites, the last named being probably the latest in development.—Ada M. Malcolm: The magnetic quality of very pure nickel. A nickel bar was examined by the magnetometric method (a) in a horizontal position, (b) in a vertical position, with and without an additional stress of $\frac{1}{2}$ kgm. weight—the magnetising fields being of very low order. With the same bar in the horizontal position, complete hysteresis cycles were made, the field being increased in one case step by step, and in the other being continuously varied. The constant values of the susceptibility (K) and the permeability (μ) were calculated: $K=4.17$ to 4.20 ; $\mu=53.53$ to 53.77 . A circular coil of nickel wire was also used, and its saturation point determined by means of a ballistic galvanometer. The graph tended to become straight in the neighbourhood of a field of 100 gauss. The purity of the nickel was not less than 98.5 per cent.—Winifred J. Smith: The law of recurrence and decay of after-images. The sequence of colours observed, after exposing the eye to white light for a given period, can be represented graphically by the combined effect of three exponentially decaying periodic curves, representing the sensations of red, of blue, and of green. Differential equations were derived from the curves chosen to represent the experimental results. The form of these differential equations suggests two different physical analogies, one to the interaction of three condensing electric circuits, and one to the motion of elastically connected masses.—H. Briggs: Apparatus to facilitate the use of an oxygen-carbon dioxide mixture on the treatment of carbon monoxide poisoning. The orthodox treatment by means of oxygen of a case of carbon monoxide poisoning is not especially effective, being apt to bring about sub-normal breathing at a time when the reverse is needed. Henderson and Haggard, of Yale University, have developed the method of treatment by oxygen plus 5 per cent. of carbon dioxide, a mixture which has not the same disadvantage. It stimulates breathing from the moment of application, and reduces the chance of serious sequelæ. The mixture is now obtainable commercially in America under the name of "carbogen." As carbogen cannot yet be bought in Great Britain, it was necessary to devise an apparatus to make it. The liquid carbon dioxide in a large-sized "Sparklet" bulb can be discharged into an oxygen cylinder of 290 litres capacity, the cylinder being then charged with oxygen to the standard pressure of 120 atmospheres. The mixture so made contains 5 per cent. carbon dioxide.—R. S. Vaidyanathaswamy: On mixed determinants. This paper deals with the extended determinants, containing suffixes of two different kinds (the "signants" and "non-signants" of Rice), and leads up to the concept of "inert suffixes" of matricular invariants, and the concept of "extensional invariants." Some features of the determinant-theory advanced are: (1) a new account of the "decomposition" of a determinant into determinants of lower dimensions, as a quoted development by linkage of "suffixes"; (2) a systematic use of "one-dimensional determinants"

as the ultimate entities of determinant-theory; (3) a new and improved version of the theory of multiplication of determinants.

PARIS.

Academy of Sciences, June 16.—M. Guillaume Bigourdan in the chair.—Louis Gentil: The structure of the *Dorsale Tunisienne*.—Charles Richet and Mme. A. Le Ber: The relation between the time of action and the concentration of a sterilising substance (hydrogen peroxide). In sterilising a culture with an antiseptic two factors intervene, the concentration of the antiseptic and the period of time during which it is allowed to act. Results of measurements of the minimum sterilising dose of hydrogen peroxide are given for times varying between 3 minutes and 15 hours.—E. Leclainche and H. Vallée: Symptomatic anthrax and gas gangrene in cattle. Clinical and bacteriological studies of *B. septicus* and *B. chauvæi*, and their pathological and immunising effects on cattle and horses.—A. Desgrez, H. Bierry, and L. Lescœur: A mode of differentiation of sulphurous waters.—Ch. Depéret and L. Mayet: Reply to the observations of S. Stefanescu on the phylogeny of elephants.—Jean Effront: The absorbing power of vegetable pulps.—Paul Vuilemin: Anomalies of leaves caused by alloplasy.—de Montessus de Ballore: The unsymmetrical curves of Gauss.—V. Illavaty: Remark on the quasi-asymptotic curves of Bompiani.—J. A. Schouten: The conformal and projective connexions of Cartan and the general linear connexion of König.—R. H. Gernay: Application of the method of successive approximations to a lemma of Weierstrass and to its generalisation.—Georges J. Rémoundos: Couples of functions which satisfy an algebraic equation.—A. Bloch: The theorems of M. Valiron on integral functions, and the theory of uniformisation.—R. Gosse: Explicit integrals of equations of the first class, $S = f(x, y, z, p, q)$, which admit an intermediate integral of the first order.—André Metz: Concerning the geometry of a disc turning in a Galilean system.—C. Kolossoff: The torsion of prisms having a right-angled triangle as base.—A. Gros: Finite bending of a circular ring compressed diametrically.—J. Seigle: Some observations relating to the effects of permanent torsions on steels.—Louis Roy: Electrodynamical and electromagnetic induction in continuous media in motion.—Y. Rocard: Extension of some results of the kinetic theory of gases.—G. Athanasiu: The distribution of energy in the mercury arc spectrum. Measurements were made on three groups of lines, using a spectrometer with a quartz optical system, and a thermocouple for reading the energy of the radiations. The mercury arc lamp was maintained with a current of 3.75 amperes, the voltage varied between 30 and 80 volts. It was found that the energy curves of lines belonging to the same series had the same general shape. The ratio between the intensities of two lines of the same series remained practically constant when the energy consumed by the arc lamp varied between 100 and 300 watts.—Jean Lecomte: Quantitative studies on the infra-red absorption spectra of organic substances. In the infra-red region the opacities of the different substituting groups are not additive.—A. Dauvillier: Spectrographic researches on the A. H. Compton effect. The Compton effect only appears in the case where the selective absorption is very small, and it is far from having the generality predicted by the theory.—Max and Michel Polonovski: The derivatives of eserine obtained by hydrogenation.—Léon Guillet: The influence of the velocity of cooling on the properties of commercial aluminium. The mechanical pro-

erties and the electrical resistance of aluminium are modified by the velocity of cooling, at least, if the percentage of silicon is a little high. The properties of commercial tempered aluminium do not sensibly change on keeping.—K. v. d. Grinten: Adsorption and cataphoresis. An application of the method of electric transport observed with the ultramicroscope.—Sir William J. Pope and F. G. Mann: 1.2.3 triaminopropane. Its preparation; formation of complex metallic derivatives. The method of preparation of this triamine given by Curtius and Hesse is tedious and not without danger. The new method involves the following steps: citric acid, acetone dicarboxylic acid, di-isonitroso-acetone, diaminoacetone, diacetyldiaminoacetoxine, 1.2.3 triaminopropane. The yields are good throughout, and with the base thus obtained the complex cobalt and rhodium compounds $[\text{Co}(\text{NH}_2 \cdot \text{CH}_2 \cdot \text{CH}(\text{NH}_2) \cdot \text{CH}_2\text{NH}_2)_2]\text{Cl}_2$ and $[\text{Rh}(\text{NH}_2 \cdot \text{CH}_2 \cdot \text{CH}(\text{NH}_2) \cdot \text{CH}_2\text{NH}_2)_2]\text{Cl}_2$ have been prepared. The stereo-chemical study of this new type of metallic complex is being carried out.—Marcel Delépine: The origin of fenchol in the reaction of Bouchardat and Lafont. Turpentine treated with either mineral acids or organic acids always gives a mixture of borneol and fenchol esters.—C. Vournazos: The formation of the bismuthamines.—H. Gault and Y. Alchidjian: The dissociation of hexadecene at high temperatures.—R. Locquin and L. Leers: The dehydration of some new pinacones. Starting with the pinacones $\text{R}(\text{CH}_3)_2 \cdot \text{C}(\text{OH}) \cdot \text{C}(\text{OH}) \cdot (\text{CH}_3)_2$, hydration by Meerwein's method yielded the ketones $\text{R}(\text{CH}_3)_2 \cdot \text{C} \cdot \text{CO} \cdot \text{CH}_3$ (R being normal propyl, butyl, or amyl) with no indication of the presence of the isomeric $(\text{CH}_3)_3 \cdot \text{C} \cdot \text{CO}$. R. Ketones of the latter type were prepared by another method for the purpose of comparison.—E. Raymond and G. Clot: The acetyl index of fatty materials. The method proposed is based on the volume of methane produced by the action of magnesium methyl iodide in anisole solution on the dried fat, with correction for fatty acid present.—P. Lebeau and J. Marmasse: The quantity and nature of the gases evolved by solid combustibles under the action of heat and a vacuum: lignites.—L. Cayeux: The felspathic grits of the Hercynian Chain and the products of Permo-Triassic evaporation.—Gaston Astre: The tectonic units of the Sierras del Cadi, of Port del Compte and of some adjacent massifs (Catalanian Pyrenees).—M. de Lamothe: The tectonic evolution of the relief of the southern Vosges during the Quaternary, and solution of the problem of Noir-Gueux.—Ch. Mourain, E. Salles, and G. Gibault: The value and variations of the terrestrial field at Val-Joyeux, near Paris. Curves summarising results obtained with the self-recording apparatus installed at the Val-Joyeux Observatory, showing the annual variation of the terrestrial electric field as a function of the period of the year, and also of the time of day.—E. Bauer, A. Danjon, and Jean Langevin: Crepuscular phenomena on Mont Blanc.—W. Kopa-czewski and M. Bem: The electrical conductivity of mineral waters as a means of their control.—H. Colin: The sugar beet and the forage beet.—Mme. B. Brilliant: The water content in leaves and assimilating power.—Fernando de Buen: The biology of the sardine in Galicia (Spain).—Louis Fage: A new type of Mysidacea in the subterranean waters of the island of Zanzibar.—André Leroy: The transparency of the shells of hen's eggs, and the modifications which it undergoes with time.—Ch. Pérard: Researches on the coccidia and coccidoses of the rabbit.—T. Muter-milch: The nature of the heterologue hæmolysins (Forssmann).—N. Ishimori and T. Metalnikov: The immunisation of the caterpillar of *Galleria melonella* by non-specific substances.

WASHINGTON, D.C.

National Academy of Sciences (Proc. Vol. 10, No. 5, May).—E. Tomanek and E. B. Wilson: Is pneumonia increasing? Statistics have been gathered of all forms of pneumonia in the United States registration area for the period 1900-1920. Making due allowances for the increase of registration area during that period, for the changed standard of life and economic conditions, and for difficulties of diagnosis, it is inferred that the disease is neither increasing nor decreasing.—G. A. Miller: Prime power substitution groups whose conjugate cycles are commutative.—R. L. Moore: (1) An extension of the theorem that no countable point set is perfect. (2) Concerning the prime parts of certain continua which separate the plane.—J. R. Kline: Concerning the division of the plane by continua.—F. B. Sumner: The partial genetic independence in size of the various parts of the body. Castle's figures for the correlation between total size and the size of individual organs or members are calculated from data from a "mixed population." Much lower correlations are obtained if sets of calculations are confined to a single race.—W. E. Castle: Are the various parts of the body genetically independent in size? A reply to the preceding paper. The calculations were based on a "mixed population" deliberately. It was sought to discover whether with change in general body size through genetic (not environmental) agencies there was a corresponding change in different parts of the body; hence it was desirable to start with differences in body size as great as possible.—L. L. Woodruff and E. L. Moore: On the longevity of *Spathidium spathula* without endomixis or conjugation. This organism was cultured by daily isolation in standard beef extract for 444 days, after which the animals suddenly appeared abnormal and died. The graph giving the average daily rate of division of the four lines of culture used shows only such fluctuations as may readily be accounted for by external factors. Pedigree cultures of *S. spathula* have shown progressive lengthening of life without endomixis or conjugation, and it is now considered that the organism can reproduce indefinitely in this way, given suitable environment.—D. L. Webster: A possible explanation of tertiary line spectra in X-rays. Objection is raised to the hypothesis of Clark and Duane on the grounds that the energy of the tertiary beam would be very small and that the narrow peak observed in the ionisation curve cannot result from reduction by filtering on emergence from the radiator of a continuous spectrum. It appears more probable that the atoms ejecting the photo-electrons are the source of the radiations. Data from the spectra of thin targets are in general agreement with this hypothesis.—G. L. Clark and W. Duane: On the theory of the tertiary radiation produced by impacts of photo-electrons. The short wave-length limits and the angles corresponding to them, calculated from Webster's theory, are not in accord with experimental and theoretical results obtained by Clark and Duane except for elements of low atomic number. This is to be expected since the difference between the theories resolves itself into a difference, which increases rapidly with the atomic number of the element, between a critical absorption frequency and that of a given emission line. Clark and Duane's theory also offers an explanation of the radiation found by de Broglie on the long wave-length side of radiations from a tungsten-carbon target.—S. K. Allison and W. Duane: Absorption measurements of certain changes in the average wave-length of tertiary X-rays. The "hump" of tertiary radia-

tion in Clark and Duane's experiments shifts towards longer wave-length with increase in the angle between the primary and secondary X-rays. Using the secondary radiation of maximum intensity and employing a polished silver plate as secondary radiator, the effects of tellurium, antimony and iodine screens were investigated. An appreciable quantity of radiation shifts over to longer wave-lengths at angles greater than 40° .—I. S. Bowen and R. A. Millikan: The series spectra of the stripped boron atom (B III.). All the lines which, from theoretical considerations, can be expected in any strength from a boron atom deprived of all valence electrons, have been identified. Lines hitherto not identified or now discovered occur at $\lambda\lambda$ 4499.0 Å, 2077.79 Å; another line at 677.1 Å is shown to a doublet with a separation of 0.15 Å (correct to at least 0.01 Å) or in frequencies, of 32.7 cm^{-1} . The line at 758.5 Å is the first term of the sharp series of B III.

Official Publications Received.

- Mellon Institute of Industrial Research of the University of Pittsburgh. Industrial Fellowships. Pp. viii+21. (Pittsburgh, Pa.)
- Bulletin of the National Research Council. Vol. 8, Part 2, No. 44: The Continental Shelf off the Coast of California. By Andrew C. Lawson. Pp. 23. (Washington, D.C.: National Academy of Sciences.) 25 cents.
- Fourth International Congress of Refrigeration, London, June 1924. First International Commission of the International Institute of Refrigeration. Reports and Communications presented by the President, H. Kamerlingh Onnes. Pp. viii+257. (Leiden: Edouard Jdo.)
- Smithsonian Institution: United States National Museum. Contributions from the United States National Herbarium, Vol. 22, Part 8: New American Asteraceae. By S. F. Blake. Pp. xi+587-661+plates 54-63. (Washington: Government Printing Office.) 20 cents.
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