Society is considering certain questions connected with the educational curriculum of pharmaceutical chemists and of chemists and druggists with the view of framing bye-laws in pursuance of the powers vested in them by the Poisons and Pharmacy Act, 1908. At the present time, candidates for the qualifying examination in pharmacy are not required to undergo a systematic course of instruction, and it is no part of the duty of the society to inquire how or where they were educated. In the absence of a compulsory curriculum, "cramming" is very prevalent in connection with this examination, the result being a high percentage of failures. Thus last year, out of 1027 candidates who entered for the examination, 620 were unsuccessful. Before actually proceeding to frame bye-laws, the council of the society has drafted a scheme, which has been submitted to pharmaceutical associations in all parts of the country and to the principals of schools of pharmacy, with the object of eliciting expressions of opinion on the matter. The draft scheme suggests that the examination be divided into two parts, and that a candidate desiring to enter for the intermediate examination shall produce evidence that, subsequent to passing the preliminary examination and being registered as a student, he has attended, in a teaching institution approved by the council, not fewer than 50 lectures in botany, 100 lectures in chemistry, and 25 lectures in physics, and has done 25 hours' work in practical botany and 300 hours' work in practical chemistry. As to the final examination, it is proposed to require candidates—who must have been engaged for three years in the ordinary work of pharmacy under the supervision of a pharmacist—to produce evidence of having attended at a recognised institution 60 lectures and demonstrations in materia medica, 30 lectures in pharmacy, and 20 lectures in dispensing and prescription Latin, and of having done 200 hours' work in practical pharmacy and 100 hours' work in practical dispensing. The proposals have already been discussed by a number of pharmacists' associations, and divergent opinions have been expressed. While some are in favour of adopting the scheme, others are pressing more especially for a modification of that part of the proposed curriculum which precedes the intermediate examination, and the council is being urged to consider the advisability of accepting the certificates of other examining bodies in lieu of the intermediate examination.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 16.—Sir Archibald Geikie, K.C.B., president, in the chair.—W. **Rosenhain** and S. L. **Archbutt**: The constitution of the alloys of aluminium and zinc. In connection with researches on light alloys, carried out on behalf of the Alloys Research Committee of the Institution of Mechanical Engineers, the authors have studied the constitution of the Al-Zn alloys by pyrometric and microscopic methods, including the study of specimens after prolonged annealing at definite temperatures and after quenching. The results are represented in an equilibrium diagram differing materially from those previously put forward. The principal points of difference are:—(1) The liquidus curve shows a small break at a concentration of 85 per cent. of zinc, this break being connected with the formation of a definite compound of probable formula Al_2Zn_3. (2) In alloys under conditions of complete equilibrium the occurrence of eutectic ceases at a concentration of about 78 per cent. of zinc, although in ordinary slowly cooled alloys the eutectic can be traced down to the vicinity of 50 per cent. zinc. (3) At a concentration of about 78 per cent. of zinc, the solidus curve of the alloys rises abruptly from the eutectic line (380° C.) to a horizontal line of arrest points at 443° C. This line commences at the break in the liquidus curve already mentioned, and extends to about 37 per cent. of zinc; between 78 and 40 per cent. this line represents the solidus, but near 40 per cent. the solidus bends upwards towards the melting point of pure aluminium. The reaction indicated by this line of arrest points is the formation of a compound (Al_2Zn_3) by the reaction of crystals of a solid solution of zinc in aluminium with the residual liquid. (4) A second horizontal line of arrest points of considerable intensity has been found at 256° C. in alloys containing 99 to 35 per cent. of zinc. These heat evolutions are due to decomposition of the compound (Al_2Zn_3) into two phases, one of which is the saturated solid solution of Zn in Al, while the other is practically pure Zn. (5) The existence of a definite compound is indicated, stable only between 443° C. and 256° C., and having a zinc content of about 78 per cent., most nearly represented by Al_2Zn_3. Evidence for its existence is derived from the termination of the eutectic line and the position of maximum intensity of the line of heat evolutions just mentioned; this is strikingly confirmed by the micro-structures, which show the compound in the form of characteristic hexagonal dendrites. When decomposed (at or below 256° C.), it exhibits a duplex laminated "pearlitic" structure strikingly resembling the pearlite of carbon steel.—R. **Whiddington**: The production and properties of soft Röntgen radiation. Röntgen rays from ordinary bulbs are usually produced at generating potentials of between 10,000 and 100,000 volts. It is possible by using a special tube with a very thin aluminium window to experiment with rays generated at only a few hundred volts. The rays dealt with in this paper were generated at 1000 to 3600 volts. It has been found that such soft Röntgen rays have much the same properties as the harder rays usually experimented with. They produce ionisation in air, affect photographic plates, and can excite secondary radiations when incident on solid bodies. Their range in air, however, is not many centimetres. For many purposes a Röntgen radiation is sufficiently defined by a knowledge of (1) the total energy; (2) the penetrating powers in absorbing screens. These two properties have therefore been investigated in some detail, with reference particularly to the influence exerted by (1) the material of the antikathode; (2) the potential at which the rays are generated. The antikathodes used fall naturally into two groupings:—Group A.—Al, Pt. Group B.—Ag, Cd, Cu, Fe, Ni, Pb, Sb, Sn, Zn. The antikathodes of Group A emit secondary radiations, those of Group B do not. Experiment indicates that Al emits a soft characteristic radiation of λ/ρ 580 (in Al). In order to arrive at a common explanation of a number of experimental results, it is suggested that this Al radiation disobeys the law of "Röntgen ray fluorescence" recently advanced by Barkla.—Prof. J. **Eustice**: Experiments on stream-line motion in curved pipes. In a paper on the flow of water in curved pipes, the author has shown that during the flow of water through a pipe, if a change is made from a straight to a very slightly curved form, there is an increased resistance to flow, which is very marked at velocities below the critical velocity. In order to find the cause of the increase in resistance, an apparatus was designed which provides for the distribution of six variously coloured filaments of dyed water into a glass pipe through which water is flowing. The positions of the filaments can be so arranged that in the passage of water from a straight to a curved pipe the directions of the stream-lines in any part of the tube can be investigated. The experiments show that the curvature of a filament is less than the curvature of that part of the pipe in which the filament is flowing, and if the velocity of flow increases the curvature of the filament increases. The filaments impinge on the outer wall of the pipe, and, flattening into bands, follow the surface of the pipe and cross over to the inner wall, where the filaments start again in their path along the main stream, until (if the pipe is sufficiently long) the filaments again meet the outer wall, when the return flow along the surface is repeated. A filament flowing in the central plane of the pipe, when reaching the outer wall, divides into two parts, which come together on the inner wall of the pipe; the other filaments flow through the loop which is thus formed. A filament not in the central plane remains on that side of the plane in which it enters the curved pipe. The experiments were extended to angle pipes, and the velocities were increased until turbulent motion was obtained. After flowing through a curved pipe or angle, vortices are generated which persist in a contiguous straight pipe.

Challenger Society, January 25.—Dr. G. H. Fowler in the chair.—Commander Campbell **Hepworth**: Remarkable displays of phosphorescence in the sea. These displays took the form of rapidly moving curved bands of lumin-

escence, separated by dark or non-luminous bands: they appeared to radiate from a centre on the horizon, round which they seemed to rotate with increasing brilliancy and velocity. In one case they overtook the ship. The writer attributed them to the stimulation of phosphorescent organisms by tide-ripplings.—G. P. **Farran**: The breeding seasons of *Calanus finmarchius*. Though found over much of the North Atlantic, the species is only abundant shoreward of the isohaline of 35·25 per mille. In the end of the year a small stock, consisting of the penultimate stage V is found. In early March maturity has been attained and rapid reproduction sets in. By May immense shoals are formed, consisting mostly of the youngest stages, but with some adults. Reproduction slackens gradually, and by November has ceased.

Royal Meteorological Society, February 15.—Dr. H. N. Dickson, president, in the chair.—R. **Cooke** and S. C. **Russell**: Variation of the depth of water in a well at Detling, near Maidstone, compared with the rainfall 1885–1909. This well is on the chalk formation at the foot of the range of the North Downs, 358 feet above sea-level; its present depth is 118 feet. Weekly plumbings of the water in the well have been taken without interruption since 1885, and the authors have compared these plumbings with the rainfall of the previous week. The extreme variation of the water-level during the whole period was 30 feet 3 inches. Successive weeks of steady rainfall exercise a far greater effect upon raising the water-level than weeks of heavy but intermittent rainfall. As a rule, the effect of the autumn rains is not felt on the well until the month of December, but the winter rainfall penetrates most readily. Following a series of wet years, a high limit of saturation is attained; and once this condition is thoroughly established, the water remains at an almost constant level throughout the seasons, excess or deficiency of rain causing very little effect.—A. W. **Clayden**: The actinograph—a new instrument for observing and recording changes in radiation.—K. M. **Clark**: New set of cloudiness charts for the United States.

EDINBURGH.

Royal Society, January 23.—Prof. J. C. Ewart, F.R.S. vice-president, in the chair.—James **Ritchie**: An entoproctan polyzoon (*Barentsia benedeni*) new to the British fauna, with remarks on related species. An account was given of the minute structure of individuals attributed to this species, colonies of which, obtained at Hull, were kept alive under observation for some time. The later development and the various forms of this and related species were described, and the conclusion was arrived at that a redundancy of species and of genera had been established among the entoproctan polyzoa. Some of these the author proposed to suppress.—The following three papers were from the Physiological Department of Glasgow University:—(1) Adam **Black**: A study of artificial pyrexia produced by tetrahydro-β-naphthylamine hydrochloride. Experiments on rabbits were given to show that the fall of temperature produced by ether anæsthesia was largely due to increased loss of heat, and that it was prevented if the loss of heat were checked. It was then shown that the ether prevented the development of pyrexia under the drug, the conclusion being that the drug acted largely by causing contraction of cutaneous vessels, and thus decreasing heat loss. The changes in the protein metabolism under the drug were studied in the dog, and it was found that the disturbance was small in comparison with the disturbance produced by fever-producing toxins. (2) Dr. Janie Hamilton **M'Ilroy**: The independence of the peripheral neurons of the retina. The nature of the neurons having been considered, the results of a series of experiments upon section of the optic nerve upon these neurons were described, and it was shown that the peripheral neurons having their cells in the inner and outer nuclear layers preserve their integrity for at least nine months after section of the nerve. On the other hand, another series of experiments showed that in aseptic autolysis these peripheral neurons disintegrated rapidly and at an earlier date than the neurons of the ganglionic layer. —(3) Dr. Williamina **Abel**: A description of the cerebral cortex of the guinea-pig. The histological examination of the cerebral cortex showed the presence of five types of cerebral lamination. The area, in which the lamination indicated a motor type of cortex, lay in the posterior half of the cerebrum, and was surrounded by sensory zones. Electrical stimulation supported the conclusion come to through histological investigation as to the position of this motor area. Consideration was given as to the significance of this special type of cerebral topography.

PARIS.

Academy of Sciences, February 15.—M. Armand Gautier in the chair.—C. **Guichard**: The deformation of quadrics. —M. **Gouy**: The periodic structure of the magneto-kathode rays. A further investigation of the fringes described in an earlier paper. A reproduction of a photograph of a set of fringes is given. According to the electron hypothesis of these phenomena, the figures described would be the caustics of the trajectories of the electrons, and the experimental results are not inconsistent with this view.—Lecoq **de Boisbaudran**: The dehydration of salts. It has been stated that there are no examples of salts, containing more than one molecule of water of crystallisation, losing a single molecule of water to form a lower hydrate. Examples are given from the sulphates of copper, iron, cobalt, magnesium, zinc, and nickel disproving this statement.—Paul **Sabatier** and A. **Mailho**: Direct esterification by catalysis. The preparation of benzoic esters. If a solution of benzoic acid in an alcohol is vapourised, and the vapours passed over a column of oxide of thorium heated to 350° C., a nearly quantitative yield of the corresponding benzoic ester is obtained. The benzoates of ethyl, propyl, isobutyl, isoamyl, and allyl have been prepared in this manner.—C. E. Guillaume was elected a correspondant for the section of physics in the place of M. Van der Waals, elected foreign associate.—Paul **Dienes**: Series of polynomials and the singularities of analytical functions.—N. **Saltykow**: The theory of characteristics and its applications.—Pierre **Weiss**: The magnitude of magneton deduced from the coefficients of magnetisation of solutions of iron salts. The mean figure, 1122·1, is practically identical with the 1123·5 deduced from experiments made at Leyden on the metals themselves in liquid hydrogen.—A. **Hanriot**: Adhesivity. When two strips of brown gold are heated within the limits of temperature of their transformation into ordinary gold, and the strips are allowed to come in contact, they become soldered to each other. The conditions under which this phenomena takes place have been experimentally studied, and the results are given in detail.—A. **Guntz** and J. **Minguin**: Contribution to the study of the ultra-violet radiations. An account of the mechanical, physical, and chemical effects of ultra-violet light on some organic substances.—J. **Boselli**: The velocities of reactions in gaseous-liquid systems.—Daniel **Berthelot** and Henry **Gaudechon**: The comparative action of the ultra-violet rays on organic compounds possessing linear and cyclic structure. The study of mineral salts in aqueous solutions. It has been shown in earlier papers that fatty compounds are decomposed with evolution of gas under the action of the ultra-violet rays. The treatment in a similar manner of a series of aromatic derivatives has given throughout negative results; no change is effected.—R. L. **Espil**: Some new anhydrous selenites.—A. **Verneuil**: The preparation of the black enamel of the Italo-Greek potteries. The secret of the preparation of this fine enamel has been lost, and numerous attempts to reproduce it in current times have been unsuccessful. The author finds that the use of finely divided metallic iron in the coating gives a black resembling that of the ancient pottery.—Marcel **Oswald**: The action of heat upon silver nitrite.—J. B. **Senderens**: Ketones derived from phenylpropionic acid. Mixtures of phenylpropionic acid and a fatty acid, passed over a column of thoria at about 460° C., give three ketones, the two symmetrical ketones derived from the phenylpropionic and fatty acids singly, and the mixed ketone. A description is given of several new ketones prepared by this method.—Charles **Moureu** and Amand **Valeur**: The preparation of isosparteine. The action of methyl iodide on this base.—M. **Grignard**: Two new methods for the synthesis of nitriles. Chloride of cyanogen or cyanogen itself reacts with organo-magnesium compounds, giving nitriles, the necessary condition being that the magnesium compound should be added drop by

drop, and never be in excess.—Marcel **Dubard**: Remarks on the classification of the genus Sideroxylon.—J. **Granier** and L. **Boule**: The phenomena of the conjugation of the chromosomes at the prophase of the first reducing kinesis.—Raoul **Bayeux**: Experiments made at Mt. Blanc in 1910 on gastric secretion at very high altitude. The experiments were made on a dog, and showed that the quantity of gastric juice secreted in a given time, the feeding being maintained constant, diminishes in a marked manner during a stay at a high altitude. The total acidity is only slightly diminished under the same conditions. The general activity of the gastric juice is also slowed down. The bearing of these results upon mountain sickness is discussed.—H. **Agulhon**: The action of the ultra-violet rays upon diastases. Eight diastases were studied, and all of them were more or less rapidly attenuated by the radiations passing through quartz and arrested by glass.—Samuel **Lifchitz**: The sonorous reproduction of a periodic curve.—A. **Conte** and C. **Vaney**: The experimental reproduction of acephalous Lepidoptera.—E. **Roubaud**: Biological studies on the Glossina of central Dahomey.—H. **Coutière**: The ellobiopsis of bathypelagic crayfish.—Fernand **Gueguen**: Cladosporian mycosis in man. Details are given of a diseased condition in man caused by a fungus of the genus Cladosporium, the first example of a pathogenic action of a member of this genus.—R. **Robinson**: The heterotopic theory in pathology.—Louis **Gentil**: The formation of the south Riffian isthmus.—Ph. **Négris**: The existence of the Trias and Cretaceous on Mount Voidias in the north of the Peloponesus.

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 23.

ROYAL SOCIETY, at 4.30.—Transmission of Flagellates living in the Blood of certain Freshwater Fishes: Miss M. Robertson.—Report on the Separation of Ionium and Actinium from certain Residues, and on the Production of Helium by Ionium: Dr. B. B. Boltwood.—The Secondary γ-Rays produced by β-Rays: J. A. Gray.—The Specific Heat of Water and the Mechanical Equivalent of the Calorie at Temperatures from 0° to 80° C. With Additional Note on the Thermoid Effect: W. R. Bousfield and W. E. Bousfield.—On the Measurement of Specific Inductive Capacity: Prof. C. Niven, F.R.S.

ROYAL INSTITUTION, at 3.—Problems of Animals in Captivity: P. Chalmers Mitchell, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Long Distance Transmission of Electrical Energy: W. T. Taylor.—Extra High Pressure Transmission Lines: R. B. Matthews and C. T. Wilkinson.

FRIDAY, FEBRUARY 24.

ROYAL INSTITUTION, at 9.—Mouvement Brownien et Réalité Moléculaire: Prof. Jean Perrin.

PHYSICAL SOCIETY, at 5.—Flames of Low Temperature supported by Ozone: Hon. R. J. Strutt, F.R.S.—The Movement of a Coloured Index along a Capillary Tube, and its Application to the Measurement of the Circulation of Water in a Closed Circuit: Dr. Albert Griffiths.—An Optical Lever of High Power suitable for the Determination of Small Thicknesses and Displacements: E. H. Rayner.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Design and Construction of Works for the Bacterial Purification of Sewage: R. J. Samuel.

MONDAY, FEBRUARY 27.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Labrador: Dr. Wilfred T. Grenfell, C.M.G.

ROYAL SOCIETY OF ARTS, at 8.—Brewing and Modern Science: Prof. Adrian J. Brown.

INSTITUTE OF ACTUARIES, at 5.—The Assurance Companies Act, 1909, some Explanatory Notes on such Portions of the Act as relate to the Business of Life Assurance: A. R. Barrand.

TUESDAY, FEBRUARY 28.

ROYAL INSTITUTION, at 3.—Crystalline Structure: Mineral, Chemical, and Liquid: Dr. A. E. H. Tutton, F.R.S.

ROYAL SOCIETY OF ARTS, at 4.30.—The Resources and Problems of the Union of South Africa: The Hon. Sir Richard Solomon, K.C.B.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Modern Railway-signalling: some Developments upon the Great Western Railway: A. T. Blackall.

WEDNESDAY, MARCH 1.

ENTOMOLOGICAL SOCIETY, at 8.—Persistence of Bacilli in the Gut of an Insect during Metamorphosis: A. Bacot.

SOCIETY OF PUBLIC ANALYSTS, at 8.—Examination of the Process of Shrewsbury and Knapp for the Estimation of Cocoanut Oil: R. Ross, J. Race, and F. Maudsley.—The Estimation of Iron by Permanganate in the Presence of Hydrochloric Acid: A. C. Cumming and A. Gemmell.—The Analysis of Sweetened Condensed Milk: A. Backe.—Note on Henry C. Frey's Method of Estimating Petroleum in Turpentine: H. S. Shrewsbury.—Note on the Formation of Hypoiodites and their Action on Sodium Thiosulphate—a source of error in certain Iodine Titrations: J. P. Batey.—New Form of Specific Gravity Apparatus: C. Butler Savory.

ROYAL SOCIETY OF ARTS, at 8.—Caisson Sickness and Compressed Air: Dr. Leonard Hill, F.R.S.

THURSDAY, MARCH 2.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: Reversal of the Reflex Effect of an Afferent Nerve by altering the Character of the Electrical Stimulus applied: Prof. C. S. Sherrington, F.R.S., and Miss S. C. Sowton.—Carbon Dioxide output during Decerebrate Rigidity (preliminary communication): Dr. H. E. Roaf.—The Alcoholic Ferment of Yeast Juice. Part VI. The Influence of Arsenates and Arsenites on the Fermentation of the Sugars by Yeast Juice: Dr. A. Harden, F.R.S., and W. J. Young.—Experiments to ascertain if certain Tabanidæ act as the Carriers of *Trypanosoma pecorum*: Col. Sir D. Bruce, F.R.S., and others.

LINNEAN SOCIETY, at 8.—Dermaptera (Earwigs) preserved in Amber, from Prussia: Dr. Malcolm Burr.—Report on the Marine Polyzoa of the Collection made by Mr. J. Stanley Gardiner in the Indian Ocean in H.M.S. *Sealark*: Miss Laura Roscoe Thornely.—On the Mysidacea and Euphausiacea collected in the Indian Ocean during 1905: W. M. Tattersall.

RÖNTGEN SOCIETY, at 8.15.—Some Experiments with a 10,000 volt. Storage Battery: A. A. Campbell Swinton.

FRIDAY, MARCH 3.

ROYAL INSTITUTION, at 9.—Scents of Butterflies: Dr. F. A. Dixey, F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Lagos Harbour Survey, 1909-1910: H. Ellis Hill.

SATURDAY, MARCH 4.

ROYAL INSTITUTION, at 3.—Radiant Energy and Matter: Sir J. J. Thomson, F.R.S.

MONDAY, MARCH 6.

SOCIETY OF ENGINEERS, at 7.30.—Petrol Air-gas: E. Scott-Snell.

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