

emphasises is that education should be made more practical, not only in technical institutes, but also in primary and secondary schools. Among special recommendations made in the report, the following may be noted:—(1) That the present system under which State technical scholarships are granted to Indians for education in technical institutions in England and elsewhere should be discontinued. That suitable stipends should be granted to Indians who have completed successfully their theoretical and practical education in India to enable them to be apprenticed for practical experience with firms of repute in England. (2) That minor technical institutes should be placed under the control of one central institution in each province. (3) That the education of skilled workmen should only be carried up to vernacular reading, sufficient elementary arithmetic for accounts and sufficient knowledge of drawing to understand a dimensioned sketch. (4) That the most promising method of training skilled workmen is to establish manual training schools for children in big centres and near big workshops; the boys to be apprenticed in workshops from the ages of twelve to fourteen years. During the apprenticeship they are to be obliged to attend afternoon classes to complete their literary education, and finally to obtain some theoretical knowledge of their work.

SOCIETIES AND ACADEMIES.

LONDON.

Institution of Mining and Metallurgy, October 17.—Mr. Edward Hooper, president, in the chair.—J. W. Ashcroft: The flotation process, as applied to the concentration of copper ore at the Kyloe Copper Mine, New South Wales. As a consequence of the oxidised ore at this mine being practically exhausted, the original method of treatment was found to be inadequate, and the present management introduced an experimental flotation process with the view of obtaining a better recovery and higher grade concentrate. As first planned, the plant for this flotation process was divided into a grinding section and a flotation section, and the paper deals at length with the defects which manifested themselves in the first experimental stages, and with the rearrangements dictated by experience. The chief defects were the excessive amount of oversize in the feed of the stirring boxes, the excessive dilution of the pulp, the irregularity of the overflow from the flotation chambers due to the irregularity of the feed and of the speed of the impellers, and a want of proper means to control the supply of oil. To remedy these, the grinding pans were altered to the positive feed type, and were arranged to discharge on to revolving screens, so as to keep the feed to the flotation machine more even in size; the pulp thickener was moved and placed between the screens and the flotation machine so as to keep an even feed to the stirring boxes and to regulate its density; the flotation machine was controlled by a sensitive governor to keep the speed of the stirrers constant, and an apparatus was devised to secure an even flow of oil. The results of this reorganisation proved satisfactory, and this paper gives interesting details of costs of operation, &c., and some observations on the successful working of the process.

Physical Society, October 25.—Prof. C. H. Lees, F.R.S., vice-president, in the chair.—Prof. H. Nagaoka and T. Takamine: The constitution of mercury lines examined by an echelon grating and a Lummer-Gehrcke plate. The authors have photographed the principal lines of mercury, using an echelon spectro-scope crossed by a Lummer-Gehrcke plate. They find that the 5790 line consists of eight, the 5769 line of four, the 5461 line of nine, the 4359

of eleven, the 4078 of six, and the 4047 of seven components, the positions of which in general agree with those found by recent observers. They point out a simple relation between the distances of the components from the principal line in each case, and a further relation between the quotient of each of these distances by the wave-length of the principal line, which holds for all the lines.—Prof. H. Nagaoka: Note on the mutual inductance of two coaxial circular currents. Methods are given for the rapid calculation of the mutual inductance of two coaxial circular currents. Maxwell's first formula is converted into theta-functions, and then expanded in a Jacobian q series. The logarithmic values of this series for various values of q have been tabulated in a previous paper by the author. When the circles are near one another a series for M is given in terms of q_1 , where q_1 is the complement of q . In this paper the author treats Maxwell's second formula in a similar way. A table of the values of these series found, computed to six decimal figures by T. Tishima, is given.—S. E. Hill: The absorption of gases in vacuum tubes. This paper is an account of experiments carried out to determine whether the absorption of gases caused by passing a discharge for some time through vacuum tubes is the result of a chemical action or is a mere physical absorption. In order to eliminate all electrode complications, the electrodeless discharge was used throughout. The bulbs examined were of soda, lead, Bohemia and Jena glass. The absorptions were noted at different pressures and curves plotted. Continued passage of a discharge causes a "saturation" effect in all the glasses. After two months none of the bulbs had recovered any of their absorptive power. That chemical actions are present is shown by peculiar deposits on the necks of the bulbs, these being unfortunately too small for analysis. The conclusion arrived at is that the disappearance is not due to physical absorption, but to definite chemical action.

MANCHESTER.

Literary and Philosophical Society, October 15.—Mr. Francis Jones, vice-president, in the chair.—A. Adamson: An apparatus which can be used for the exact trisection of an angle.—D. M. S. Watson: The larger Coal Measure amphibia. The author described the skulls of *Loxomma Allmani* and *Anthracosaurus Russellii* (Pteroplax), now preserved in Newcastle-on-Tyne Museum. The skulls had been previously described by Embleton and Atthey, but the important structure of the palate had not been made out. This was described in detail, and compared with that of other Carboniferous amphibia. It was shown that a solid, bony palate, with an articular connection between the large pterygoids and the basisphenoid, was characteristic of the group. The palatines and pre-momers bear large teeth with a characteristic mode of replacement. The pre-maxillæ and maxillæ are confined to the margin of the palate, and bear smaller teeth. The large vacuities of the later Stegocephalia are absent. The skulls present remarkable resemblance to those of Seymouria and also of the Crossopterygian fishes. The relations of the quadrate were clearly determined, and seemed to indicate that the tetrapod skull was not autostylic in the ordinary sense.

PARIS.

Academy of Sciences, October 28.—M. Lippmann in the chair.—E. Jungfleisch: Inactive and racemic dilactylic acids. The crude acid arising from the interaction of sodium ethyl lactate and ethyl α -chloropropionate is neutralised with magnesium hydroxide. The inactive magnesium salt, being much less soluble in hot or cold water than the racemic form, separates first. The crystallographic properties of these salts and of the corresponding acids are described.—Édouard

Heckel: Cultural bud mutation of *Solanum immitis*. The mutation of the tubercles was obtained after only one year's culture.—**A. Schaumasse**: The provisional elements of the comet 1912b.—**G. Fayet**: Probable identity of the new comet 1912b with the Tuttle periodic comet. By its approach to Jupiter the Tuttle comet would appear to have undergone perturbation which would account for its advance by eighty-six days.—**J. Guillaume**: Observations of the sun made at the Observatory of Lyons during the first quarter of 1912. Observations were possible on sixty days, and the results are summarised in three tables, showing the number of spots, their distribution in latitude, and the distribution of the faculæ in latitude.—**M. Borrelly**: Observations of the Gale comet (1912a) made with the comet-finder at the Marseilles Observatory.—**A. Petot**: Certain conjugate systems.—**Maurice Gevrey**: Remarks on certain theorems of existence. A discussion of a class of functions previously considered by Holmgren.—**Georges Rémondos**: The theorem of Picard and multiform functions.—**A. Guillet** and **M. Aubert**: An electrometric spark-gap consisting of two conducting spheres. Calculation of the charges, the potentials, the mutual action, and the disruption.—**Ch. Féry**: The principle of a new method of measuring the velocity of light. An application of the rotating mirror method, in which an electrically-controlled tuning-fork measures the angular velocity of the mirror.—**A. Boutaric** and **C. Leenhardt**: Cryoscopy in decahydrated sodium sulphate. Measurements of the molecular lowering of the freezing point with urea as the solute gave 32'05 as the value of the Van't Hoff constant; the figure 32'08 was obtained by the application of the usual formula to the latent heat of transformation of sodium sulphate.—**Paul Job** and **Marcel Boll**: The photochemical hydrolysis of very dilute solutions of chloroplatinic acids.—**M. Hanriot**: The tempering of metals. The author extends the meaning of a tempered metal to any metal which, after sufficient annealing, changes its physical properties, chemical changes being excluded.—**Daniel Berthelot** and **Henri Gaudechon**: The different modes of photochemical decomposition of glucose and galactose according to the wave-length of the radiations. A comparative study of the quantity and nature of the gases evolved from glucose and galactose in solution under the influence of ultra-violet light of three different wave-lengths.—**H. Baubigny**: Study of the double sulphites of mercury and the alkalis. The decomposition of solutions of the double sulphite of mercury and sodium differs from that of the corresponding salts of silver and copper in that no trace of dithionic acid is produced.—**Maurice Lantry**: The action of hydrogen peroxide upon dithienyl-thiophene.—**A. Guyot** and **A. Kovache**: The action of formic acid upon the triarylcarbinols. All triarylcarbinols, heated with a mixture of formic acid and a little dry sodium formate, are quantitatively reduced to the corresponding hydrocarbon, the amount of carbon dioxide produced being an exact measure of the reduction. The generality of the reaction is shown.—**André Meyer**: Some new derivatives of phenylisoxazolone.—**Marie Korsakoff**: Researches on the methods for the estimation of saponines.—**Leclerc du Sablon**: The influence of light on the transpiration of green leaves and of leaves without chlorophyll.—**M. Ringelmann**: Calculation of the yield of small water channels in irrigation.—**R. Fosse**: Researches on urea. Urea is frequently present in the higher plants, although in very small proportions. It cannot be considered as proved that the urea is a physiological product of the plant cell.—**Victor Henri**, **André Helbronner**, and **Max de Recklinghausen**: A new, very powerful lamp for the production of ultra-violet light and its utilisation for the sterilisation of large quantities of

water. The U-shaped lamp can be used on a 500-volt circuit, and requires 1150 watts, giving a candle-power of about 8000.—**Em. Bourquelot** and **M. Bridel**: Syntheses of glucosides of alcohols with the aid of emulsin. β -150Propylglucoside and β -150amylglucoside.—**M. Tiffeneau** and **H. Bosquet**: The rôle of caffeine in the diuretic action of coffee. Coffee loses the greater part of its effects on the renal secretions if the caffeine has been removed. Caffeine is the principal, if not the exclusive, agent of the diuretic action of coffee.—**Robert Odier**: Sensitised streptococcus and sarcoma.—**B. Sauton**: The mineral nutrition of the tubercle bacillus.—**Max Kollmann**: Some points on the anatomy of the male genital organs of Lemurs.

BOOKS RECEIVED.

- Homo Sapiens. By Dr. V. G. Ruggeri. Pp. viii + 198. (Vienna and Leipzig: A. Hartleben.) 5 marks.
 Medizinisch-chemisches Laboratoriums-Hilfsbuch. By Dr. L. Pincussohn. Pp. xi + 443. (Leipzig: F. C. W. Vogel.) 13.50 marks.
 New South Wales Department of Mines. Geological Survey. Mineral Resources. No. 16: The Antimony Mining Industry and the Distribution of Antimony Ores in New South Wales. By J. E. Canve. Pp. 54 + maps. (Sydney: W. A. Gullick.) 2s.
 Government of India. Department of Revenue and Agriculture. Agricultural Statistics of India for the Years 1906-7 to 1910-11. Vol. i. Pp. iii + 409. (Calcutta: Superintendent Government Printing, India.) 3s. 9d.
 Memoirs of the American Museum of Natural History. New Series. Parts i., ii., iii. Pp. 100 + plates. (New York: American Museum of Natural History.)
 Summary Report of the Geological Survey Branch of the Department of Mines for the Calendar Year 1911. Pp. x + 412 + 10. (Ottawa: C. H. Parmelee.)
 Internal Secretion and the Ductless Glands. By Prof. S. Vincent. Pp. xx + 464. (London: E. Arnold.) 12s. 6d. net.
 Landolt-Börnstein. Physikalisch-chemische Tabellen. New edition. Edited by Drs. R. Börnstein and W. A. Roth. Pp. xvi + 1313. (Berlin: J. Springer.) 56 marks.
 Nautical Astronomy. By W. P. Symonds. Pp. 130. (London: J. D. Potter.) 6s.
 The Fundamentals of Psychology. By B. Dumville. Pp. ix + 382. (London: W. B. Clive.) 4s. 6d.
 The Carbonisation of Coal. By Prof. V. B. Lewes. Pp. xiv + 315. (London: J. Allen and Co.) 7s. 6d. net.
 Leather Chemists' Pocket-book. Edited by Prof. H. R. Procter, assisted by Dr. E. Stiasny and H. Brumwell. Pp. xiv + 223. (London: E. and F. N. Spon, Ltd.) 5s. net.
 Outlines of Physical Chemistry. By Dr. G. Senter. Third edition. Pp. xix + 413. (London: Methuen and Co., Ltd.) 5s.
 The Elements of Geography. By R. D. Salisbury, H. H. Barrows, and W. S. Tower. Pp. viii + 616 + vii plates. (New York: H. Holt and Co.) 1.50 dollars.
 Pflanzenwachstum und Kalkmangel im Boden. By Prof. A. Wieler. Pp. vii + 235. (Berlin: Gebrüder Borntraeger.) 14 marks.
 Terza relazione annuale del Direttore dell' Ufficio Idrografico. By G. Margrini. Pp. 71 + plates + maps. (Venezia: C. Ferrari.)
 Customs of the World. Parts i. and ii. (London: Hutchinson and Co.) 7d. each.
 Papua, or British New Guinea. By J. H. P. Murray. Pp. 388. (London: T. Fisher Unwin.) 15s. net.
 Evolution and the Need of Atonement. By S. A.