

necessity remain unemployed, and the *Pioneer Mail* remarks that "an educated and unemployable residuum, ever growing bigger and bigger, may develop into a very real danger." The efforts which were made during Lord Curzon's Viceroyalty, and have been continued since, to make education in India more practical appear to have had rather slow growth, and it is to be hoped that further efforts will be made in this direction, as indicated by Dr. Ewing in his Convocation address.

A COPY of the calendar for 1915-16 of the University of Hongkong has been received. The historical sketch which the calendar contains shows that the idea of establishing a University in Hongkong was first suggested in 1905, but it was two years later before the matter took definite shape. In 1907 Mr. H. N. Mody offered to erect the necessary buildings at a cost of 30,000*l.*, and to give 6000*l.* towards an endowment fund. In 1908 it was proposed to accept this offer, and to erect a building in which the existing Hongkong College of Medicine and a Technical Institute should be located, and to incorporate a University under Ordinance. The scheme was somewhat modified in view of its cost, and Mr. Mody undertook to erect the buildings whatever the expense, but if this exceeded 36,000*l.* not to be responsible for any endowment or for furnishing. Before the end of 1909 the Endowment and Equipment Fund had reached 255,833*l.* The University was incorporated, and came into existence on March 30, 1911. By March, 1912, the main building was practically completed, and the University formally opened. Sir Charles Eliot, Vice-Chancellor of the University of Sheffield, was appointed principal and vice-chancellor, and arrived in Hongkong in June, 1912. The cost of the buildings and the preparation of the ground was 69,000*l.*; the value of the sites given by the Government is estimated at 35,260*l.*; the cost of the anatomical school is estimated at about 6000*l.*, most of which was raised separately by the Chinese. By the founding of the University a service has been rendered already to all the schools of South China, and the success of the University seems assured. Its interests are represented in London by a consulting committee, many members of which have been nominated by scientific and technical bodies.

THE ninth report of the Executive Committee of the Fund for Advanced University Education and Research at University College, London, has just been issued. Since the issue of the previous report the committee has been reorganised under the presidency of H.R.H. Prince Arthur of Connaught. The attention of the committee during the period under review (1914-15) has been chiefly directed to the completion of the new chemistry building. The work accomplished was the completion of the building itself and installation of the fixed fittings, such as benches and cupboards, and gas and water supplies. This enabled the transference of the department from its old quarters to take place during the summer vacation, 1915. The apparatus and chemicals now being used in the new department are the old and antiquated stock from the old building, and are hopelessly inadequate. The completion of the scheme for an up-to-date laboratory falls into two main sections. The first is the technical laboratory and the physical chemistry laboratories for teaching and research, to the completion of which the chemical staff attaches the greatest importance. These cannot be finished or equipped until the money, estimated at 10,000*l.*, is available. It may be pointed out that Germany's success in chemical industry has been largely due to the application of the methods and principles of physical chemistry to technical problems, and that

for the study of this branch of the subject laboratories have hitherto offered few facilities. For the equipment of the rest of the building a sum of 4000*l.* is required, and a further sum of 6000*l.* is considered necessary for the development of research during the next few years. Towards the estimated total cost of 20,000*l.* several donations have been promised; of these the most important is one of 5000*l.* by Sir Ralph C. Forster, Bart., provided that the balance of 15,000*l.* is subscribed promptly. Anyone interested in this development of opportunities for study in this important subject can obtain further information on application to the Provost, or to the Professors of Chemistry, at University College.

A NOTEWORTHY article by M. Paul Rivals, professor of industrial chemistry in the faculty of science at Marseilles, bearing upon the organisation of higher technical instruction in the universities of France appears in the *Revue Generale des Sciences* for March 30. It discusses a proposal submitted by M. le Senateur Goy for the establishment by law of new faculties of applied science, for the conversion of certain faculties of science into faculties of applied science, and for the transfer of the technical institutions now under the jurisdiction of the faculties of science to the control of the new faculties, the staffs of which would be appointed irrespective of academic diplomas and because of their technical attainments, and the students would be recruited from licentiates in science and from those possessing certificates of higher studies. The faculties would be empowered in certain cases to confer the degree of Doctor of Applied Science. The necessity for the reinforcement and enlargement of the means of higher technical instruction in France is admitted, and that the universities should co-operate in the work, but the proposed measures are not the best, says Prof. Rivals, to achieve this purpose. In the first place there should be established higher technical institutions fully recognised by the universities, and in the second place they should be autonomous institutions, the sole aim of which should be the training of the technician, whose ultimate worth would be established by his achievements in the workshop rather than by his researches in the laboratory. His object is not to become a *savant*, but to be a thoroughly sound, well-trained, and practical technician. There is an essential difference between pure science and scientific teaching, and technology and the training of the technician. They cannot be run in the same mould; nevertheless, there should be the closest relation between them, and they should equally enjoy the protection and encouragement of the university of which they form part. The director of the technical institution will be a technician who, with a mind sufficiently wide and cultivated, will be able and alert to utilise and co-ordinate the enormous and unsuspected resources which lurk in the least of the faculties of science, and yet able, because he is an acknowledged master in his own sphere, to inspire in the students the fullest confidence.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 18.—Sir J. J. Thomson, president, in the chair.—Hon. R. J. Strutt: An active modification of nitrogen. (1) The production of active nitrogen in various regions of the steady discharge has been studied. It is greatest near the kathode falls off to a minimum in the Faraday dark space, and increases again in the positive column to a value which is constant along that column, but less than that at the kathode. (2) With a given value of the current.

much more active nitrogen is obtained from the positive column in a narrow tube than in a wide one. (3) The yield of active nitrogen comes to a limit as the length of positive column traversed by the gas is increased. (4) A trace of oxygen (or almost any other admixture) is known greatly to increase the yield of active nitrogen. The amount of oxygen required to do this considerably increases the fall of potential at the kathode, but it does not measurably affect the fall of potential in the positive column. (5) Active nitrogen is produced by the spark at atmospheric pressure. (6) The metal scattered from a copper kathode when the discharge passes can be made to emit its line spectrum in a stream of active nitrogen.—Dr. R. A. **Houstoun**: A theory of colour vision. The paper explains the facts of colour-mixing by assuming the existence of *one* class of oscillators in the retina with a free period in the middle of the spectrum. Owing to disturbing influences, the vibrations of these oscillators are never monochromatic, but, when represented by a Fourier integral, contain a range of wavelengths. Thus, even if the incident light is pure red or pure green, the vibrations contain yellow as well. Hence, if the vibrations of the oscillators are identified with subjective light, simultaneous excitation of the eye with red and green produces yellow.—Col. R. L. **Hippisley**: Linkages illustrating the cubic transformation of elliptic functions. The linkage consists of three parts. First, a closed linkage consisting of three identical three-bar linkages in various phases of deformation connected together by bars equal in length to the traversing links, which, as has been described in the Proc. Lond. Math. Society, series 2, vol. xi., indicates the positions of the points where the poristic triangle touches its inscribed circle. Secondly, three positive Peaucellier cells which point out the positions of the vertices of the triangle. Thirdly, a closed linkage similar to the first, which gives the position of the orthocentre. This orthocentre describes a circle, and it can be shown by a few lines of vector geometry that its angular displacement is the sum of the angular displacements of the circumradii of the vertices of the triangle. The angles which these radii make with the axis are the double amplitudes of the elliptic functions which express the positions of the vertices, namely, $am(u + \frac{2}{3}s'K)(s' = 0, 1, 2)$.

Linnean Society, May 4.—Prof. E. B. Poulton, president, in the chair.—E. A. **Bunyard**: The origin of the garden red currant. The red currant has been cultivated from the early fifteenth century, and was at first pure *R. vulgare*; for 100 years no variations were recorded. *R. petraeum* was introduced into gardens in 1561 by Konrad Gesner, and a few years after Camerarius mentions the "old" red and a new variety, "baccis rubris majoribus." *R. rubrum* seems to have come into currant history at a later date. The author considers that interhybridisation of the three species—*R. vulgare*, *R. rubrum*, and *R. petraeum*—is sufficient to account for the numerous varieties of the red currant as grown in gardens to-day, and the supposed effects of cultivation need not in this case be invoked.—Dr. J. C. **Willis**: The dispersal of organisms, as illustrated by the floras of Ceylon and New Zealand. In two recent papers on the flora of Ceylon, and in a forthcoming one on the flora of New Zealand, the author had brought forward conclusions on geographical distribution which, if accepted, will remove that subject from the immediate realm of evolution, and show that it may be largely studied by arithmetical methods. Once a species is evolved, its distribution depends upon causes which act mechanically. As all families and genera behave alike, it seems to him that one cause only must be responsible for their behaviour,

but a combination of causes may be acting, though in that case each cause must act mechanically on all alike. The cause which seems the determining factor in dispersal is *age* within the country concerned.—R. J. **Tillyard**: A study of the rectal breathing apparatus in the larvæ of the Anisopterid dragonflies.—W. E. **Collinge**: Description of a new species of *Idotea* (Isopoda) from the Sea of Marmora.

Zoological Society, May 9.—Dr. S. F. Harmer, vice-president, in the chair.—Miss Dorothea M. A. **Bate**: A collection of vertebrate remains from the Har Dalam Cavern, Malta. Birds are most numerous represented, and include some bones of an Anserine bird showing a reduction in its powers of flight. It is believed to be a hitherto undescribed species, and is referred to the genus *Cygnus*. A list is given of all the species of vertebrates recorded from the Pleistocene cave and fissure deposits of the island.—Dr. J. C. **Mottram**: An experimental determination of the factors which cause patterns to appear conspicuous in Nature. A series of experiments was carried out with artificial patterns and backgrounds under controlled conditions of lighting, and a large number of determining factors were discovered, both as regards plain and patterned objects and backgrounds. Finally, the experiments showed that the most conspicuous shape and pattern which an object can have, when viewed against a series of plain and patterned backgrounds, was presented by a circular disc of black, with a central circular area of white. Having arrived at this conclusion, the Indian diurnal Lepidoptera were completely examined, in order to discover whether any species presented patterns approaching this ideal conspicuous pattern. It was found that a considerable number presented patterns scarcely removed from this ideal, and that a large proportion of these insects are considered to be "protected" species presenting "warning coloration."

Geological Society, May 10.—Dr. Alfred Harker, president, in the chair.—F. R. C. **Reed**: Carboniferous fossils from Siam. The fossils described in this paper were collected by the Skeat Expedition from Cambridge in the year 1899, at a locality called Kuan Lin Soh, in the Patalung district of Lower Siam, and were briefly mentioned in the "reports" of the British Association for 1900 and 1901. They occur in a pale, fine-grained, jointed siliceous rock, with an irregular or subconchoidal fracture. The field-relations of the beds have not been recorded. The general facies of the small fauna which the available material has yielded indicates a Lower Carboniferous age for the beds, and the affinities of the species seem to be European, and suggest the Culm Series.—H. G. **Smith**: The Lurgecombe Mill lamprophyre and its inclusions. A lamprophyre-dyke intrusive into Culm Shales has recently been exposed at Lurgecombe Mill, near Ashburton (South Devon). The rock is compact and fine-grained, small crystals of biotite imparting to it a characteristic lamprophyric appearance; vesicles with secondary minerals appear towards the margins. In thin section, idiomorphic biotite, olivine-pseudomorphs, and feldspars are seen to make up the bulk of the rock; chlorite and secondary quartz occupy the interstices. One of the thin sections was seen to contain crystals of blue corundum associated with magnetite, in a patch which was obviously foreign to the rock. With the object of obtaining additional examples many slices were cut, sections being made of those that seemed promising. In this way several of these inclusions were obtained, the largest being about 0.3 in. in diameter. All contain corundum and magnetite, but in some cases staurolite also is present and, more rarely, green spinel.

Royal Meteorological Society, May 17.—Major H. G. Lyons, president, in the chair.—L. C. W. Bonacina: The readjustment of pressure differences: two species of atmospheric circulation and their connection. The paper dealt with a dynamical connection between two essentially distinct types of atmospheric circulation, familiarly exemplified in cyclonic gales on one hand, and in thunderstorms on the other.

DUBLIN.

Royal Dublin Society, April 18.—Prof. Hugh Ryan in the chair.—Prof. G. T. Morgan: Utilisation of nitre cake. Among many sources of economic waste occasioned by the war, one of the most extensive is the loss of sulphuric acid and alkali involved in the throwing away of enormous quantities of nitre cake (crude sodium hydrogen sulphate), the by-product of the manufacture of nitric acid from Chili saltpetre. Many proposals have been made for the profitable disposal of this waste product, some of which have been put into practice. In experiments carried out by the author in the Royal College of Science for Ireland this nitre cake was converted into glass or into an insoluble frit suitable for making glasses or glazes. Nitre itself is difficult to transport or to store because of its highly corrosive nature. When fused with sand it is converted into an insoluble, innocuous frit. Preferably it can be fused with sand and limestone, when soda-lime glass is produced, and more than two-thirds of the contained sulphur can be recovered as sulphuric acid and free sulphur. Nitre cake can be used in making soda-lead glass, which, when tinted with coloured oxides, is suitable for ornamental glass. Nitre cake should certainly not be dumped into the sea, as at present practised, without the attempt being made to utilise its contained soda and sulphur in a profitable manner. The experiments were made largely on materials obtained in Ireland, namely, nitric cake from Arklow, sand from County Donegal, Skerries limestone, and lead from Ballycorus.

PARIS.

Academy of Sciences, May 8.—M. Camille Jordan in the chair.—G. Humbert: Certain principal circle groups connected with the quadratic forms of Hermite.—G. Lemoine: The catalysis of hydrogen peroxide in heterogeneous medium. Third part: Experiments with oxides. The catalytic effect of ferric oxide varied greatly with the physical condition of the oxide. Data are given for experiments with alumina, ceria, silica (in two forms), and thoria. The possibility of the formation of peroxides with the insoluble oxides is discussed.—H. Le Chatelier and F. Bogitch: The estimation of carbon by the Eggertz method. The experiments vary from the usual method of solution in that the nitric acid is always kept at its boiling point. Each of the factors—concentration of acid, speed of attack, exposure to light, comparison temperature, turbidity of the liquid, duration of heating, volume of the acid liquid, and purity of the acid—has been studied separately with respect to its effect on the colour produced.—W. Sierpinski: The theory of ensembles: a general property of ensembles of points.—M. Etienne: The working of the electrolytic detector.—G. Lecointre: Some results of a geological expedition in the Gharb (western Morocco) in 1914.—P. Lecène and A. Frouin: New researches showing the reality of latent microbism in cicatrised shot wounds. Twenty-four cases of wounded were examined for the presence of organisms, capable of cultivation, at the surface of projectiles enclosed in the tissues. In all of these the wounds were perfectly cicatrised, and after

several months there was no trace of inflammation. In three cases the projectile gave a sterile culture; in seventeen various micro-organisms, including staphylococci, streptococci, and bacilli, were obtained from the bullet. In four cases the projectile and the fibrous envelope were removed together, like a small tumour. The projectiles themselves proved to be sterile, but the internal wall of the fibrous clot gave both cocci and bacilli on cultivation. The bearing of these results on the surgical treatment of projectile wounds is discussed.

BOOKS RECEIVED.

Department of Commerce. U.S. Coast and Geodetic Survey. Serial No. 19: Results of Observations made at the U.S. Coast and Geodetic Survey Magnetic Observatory at Cheltenham, Maryland, 1913 and 1914. By D. L. Hazard. Pp. 98. (Washington: Government Printing Office.)

The Stars as Guides for Night Marching in North Latitude 50°. By E. W. Maunder. Pp. 72. (London: C. H. Kelly.) 2s. net.

The Respiratory Exchange of Animals and Man. By Dr. A. Krogh. Pp. viii+173. (London: Longmans and Co.) 6s. net.

Plants in Health and Disease. By Prof. F. E. Weiss, Dr. A. D. Imms, and W. Robinson. Pp. viii+143. (Manchester: The University Press; London: Longmans and Co.) 1s. 6d. net.

Agriculture after the War. By A. D. Hall. Pp. vii+137. (London: J. Murray.) 3s. 6d. net.

Tuberculosis and the Working Man. By P. C. Varrier-Jones. Pp. 47. (Cambridge: W. Heffer and Sons, Ltd.) 6d. net.

Board of Agriculture and Fisheries. Agricultural Statistics, 1915. Vol. 1., part 1. Acreage and Live Stock Returns of England and Wales. Pp. 75. (London: H.M.S.O.; Wyman and Sons.) [Cd. 8240.] 4d.

Department of Commerce. Circular of the Bureau of Standards, No. 58. Invar and Related Nickel Steels. Pp. 68. Technologic Papers of the Bureau of Standards. No. 71. Effect of Certain Pigments on Linseed Oil. Pp. 16. By E. W. Broughton. Scientific Papers of the Bureau of Standards, No. 273. General Design of Critically Damped Galvanometers. By F. Wenner. (Washington: Government Printing Office.)

The Effects of Radio-active Ores and Residues on Plant Life. Bulletin No. 7. A Report of the Second Series of Experiments carried out at Reading, 1915. Pp. 20. (Reading: Sutton and Sons.) 2s. 6d. net.

University of Hongkong. Calendar, 1915-16. Pp. 124. (Hongkong.)

Annuaire general de Madagascar et Dependances. (Modifications à l'Annuaire, 1914.) Pp. 227. (Tananarive.)

Department of Agriculture and Technical Instruction for Ireland. Programme of the Irish Training School of Domestic Economy. Session 1916-17. Pp. 21. (Dublin.)

The Brooklyn Institute of Arts and Sciences. Brooklyn Museum Science Bulletin, vol. iii., No. 1. Long Island Fauna. iv., The Sharks. By J. T. Nichols and R. C. Murphy. (Brooklyn, N.Y.)

Annals of Tropical Medicine and Parasitology. Vol. x., No. 1. April 29. Pp. 164. (Liverpool: University Press.) 7s. 6d. net.