

Throughout the reports of the inspectors the welcome information is made known that experimental work in science is becoming more common, but there is still much room for improvement. The supply of apparatus is being largely increased, and *laboratory accommodation is being extended*. The chief difficulty to be contended with at the present time is the insufficient education of the students who join the evening classes. Especially is there a lack of knowledge of scientific principles, and there is a difficulty in getting students to take up subjects which lie at the bottom of all technical subjects. On this point Dr. H. H. Hoffert says: "It is much to be desired that as Technical Institutes multiply, and permanent staffs of well-qualified teachers become appointed, more encouragement may be given to students of evening classes to take up definite courses of study. Such students too frequently attempt the study of the more purely technical and applied subjects, without having the necessary knowledge of the underlying sciences, and in consequence of this the teaching is largely based on rule-of-thumb methods of practice, and is lacking in scientific generality and educational value. There is an undue disproportion in number between classes on such subjects as applied mechanics, steam, and mining, and those in theoretical mechanics, elementary physics, chemistry and geology."

In addition to the reports on instruction in science and art, the Blue-book just issued contains as appendices reports on the Royal College of Science, the South Kensington Museum, and other museums in connection with the Department of Science and Art, supported by the State. There is also in it the Report of the Director-General of the Geological Survey of the United Kingdom and the Museum of Practical Geology, and a Report to the Solar Physics Committee on the work done in the Solar Physics Observatory at South Kensington.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE appointments, recently advertised, at the Northampton Institute, Clerkenwell, have been filled as follows:—Mr. John Ashford, Lecturer on Engineering at the Birmingham Technical Schools, to be Head of the Mechanical Engineering and Metal Trades Department; Mr. John Williams to be Head of the Artistic Crafts Department; Mr. C. V. Drysdale to be Chief Assistant in the Applied Physics Department; and Miss Mary A. H. Gibbs to be Head Teacher in the Domestic Economy School.

THE Technical Education Board of the London County Council has addressed a letter to the Councils of University and King's Colleges on the subject of the financial assistance to these institutions during the forthcoming session. It is pointed out in this letter that the Board cannot undertake to ensure regular annual grants towards either of these colleges. It is further recommended that the Councils of the two colleges should confer together before making any application for assistance, with a view to coordinating the work now specially carried on in connection with Oriental languages. A question has been raised with regard to King's College, as to whether the Board can legally make a grant to an institution of a denominational character. But since the discussion of these questions will take some time, it is proposed to continue the grants of £1500 to University College and £1000 to King's College for next year, on the understanding that such a conference shall be held.

THE following complaint, which has been made by *The Local Government Journal*, is not, we think, borne out by the reports of the technical education committees of those County Councils which administer the affairs of the agricultural counties, and which have been sent to us from time to time. The paragraph runs thus: "If technical education committees would bestir themselves and give lessons in thatching, hedging, ditching, sheep-shearing, and so on to the men, instead of providing an afternoon's amusement for labourers' wives in showing them how to make butter without having a cow to produce the milk, and similar instruction for farmers' wives and daughters when the ladies of the farm have no intention of making butter, or of bending their backs to skim the milk, much more good would be done than is accomplished at present, and a great waste of treasure would be obviated." More than one committee in

charge of technical instruction would be grateful to our contemporary for some successful method of getting farm-labourers together for the purpose of agricultural instruction, though we have our opinion of the wisdom of teaching the subjects named, even if these arts are not included in the well-known restriction of the Technical Instruction Act.

SCIENTIFIC SERIALS.

American Journal of Science, August.—Molluscan archetype considered as a *veliger*-like form, by A. E. Verrill. In the form of molluscan larva known as *veliger*, and in its slightly younger stages, we have organisms that swim free, often seek their own food, and seem to have claims to be considered the nearest living representatives of the ancestral molluscan archetype, or archetypes, for it is quite probable that the different classes of Mollusca have descended from distinctly differentiated *veliger*-like organisms. In general, it may be stated that nearly all Gastropoda, except certain terrestrial and fresh-water forms, pass through *veliger* stages. The same may be said of Bivalvia, Scaphopoda, and Pteropoda. Cephalopoda, on the other hand, seem to have an abbreviated development, like terrestrial Gastropoda, and leave the egg with the general structure of the adult. It is probable that each of these great classes were originally small, free-swimming forms, furnished with a ciliated locomotive organ similar to the velum of modern veligers. The primitive Cephalopoda had probably a similar origin from a *proveliger* like that of some pteropods and gastropods. On the other hand, it seems impossible to derive a cephalopod or a bivalve from a creeping chiton-like archetype such as Lankester has proposed.—An apparatus for the rapid determination of the surface tensions of liquids, by C. E. Linebarger. The apparatus is based upon Jäger's method of employing two capillary tubes of different bore immersed in the liquid, and measuring the difference of the depths to which they were plunged when air bubbles forced out of them at the bottom required the same air pressure. The tubes employed had bores ranging from 0.1 to 1.5 mm. Two tubes were mounted in clamps in a stand over a test tube containing the liquid, and immersed in a water or glycerine bath. Air pressure was applied, and the orifices were shifted until the liquid was pushed down to the orifices, and there the heights were carefully adjusted until equal streams of bubbles issued from both orifices. The surface tensions were found by the formula

$$\gamma = chs + s^2$$

when γ is the surface tension in dynes per cm., c the apparatus constant, h the distance between the ends of the tubes, and s the specific gravity.—Wardite, a new hydrous basic phosphate of alumina, by J. M. Davison. Mr. Packard's "variscite" from Utah occasionally leaves on decomposition some cavities in the nodules, and encrusting these cavities is a hydrous basic phosphate of alumina, which appears to be a new mineral. It is a light green or bluish green, with vitreous lustre, concretionary structure, hardness about 5, and density 2.77. Its formula is $Al_2(OH)_3PO_4$, and it forms a series with Peganite and Turquois.—On the existence of selenium monoxide, by A. W. Peirce. The author has been unable to find evidence of the existence of the monoxide, either gaseous or solid, and his experiments go to show that the peculiar smell of decayed cabbage, attributed by Berzelius to the monoxide, is only developed when selenium is heated in presence of moisture, if only a mere trace, and is probably due to selenium hydride.

Bulletin of the American Mathematical Society, vol. ii. No. 9, June.—The motions of the atmosphere, and especially its waves, is a translation, by Prof. Cleveland Abbe, of an address by Dr. E. Hermann, which was delivered before the Meteorological Section of the Association of German Naturalists at the annual meeting held in Vienna, September 25, 1894. The author states that the inadvisability of the views according to which the motions of the atmosphere consist in the development of independent cyclones and anticyclones is, of late years, more and more plainly recognised. This conclusion has been arrived at, not so much through a severe criticism of the fundamental basis upon which these erroneous views had been established, as by the power of the facts that resisted introduction into this artificial system. He traces this change of view

to the influence of a memoir by Hann, published some ten years since, and then points out that the idea was further developed in von Helmholtz's "Mechanics of the Earth's Atmosphere." He then expounds his own method, and closes with the hope that it may lead meteorology out of the region of vacillating ideas that now control it into a broader field, and "place it among the exact sciences, where everything is reduced to numerical computation, and thus, to an important extent, further its application to daily practice."—Prof. Osgood writes on some points in the elements of the theory of functions.—On the motion of a homogeneous sphere or spherical shell on an inclined plane, taking into account the rotation of the earth, by Prof. A. S. Chessin, discusses some interesting illustrations akin to Foucault's experiments with the pendulum and the gyroscope.—From the Notes we learn that the Council have arranged for a colloquium in connection with their summer meeting at Buffalo, at which are to be delivered two courses of six lectures each, viz. on the subject of linear differential equations and their application, by Prof. M. Bôcher, and on the Galois theory of equations, by Prof. J. Pierpont.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, August 10.—M. A. Cornu in the chair.—Researches on cyanic acid, by M. Berthelot. By studying the reaction between acetic acid and potassium cyanate it was found to be possible to separate the heat evolved by the simple replacement of the cyanic by acetic acid, from the heat evolved in the subsequent decomposition into ammonia and carbon dioxide. The value thus found for the heat of neutralisation of cyanic acid (12.25 calories) was confirmed by the observation that no reaction takes place between potassium cyanate and boric acid (heat of neutralisation, 11.6 calories).—Researches on the volatility of lævulic acid, by MM. Berthelot and André. Lævulic acid is slightly volatile *in vacuo* at ordinary temperatures. Analysis of the residual acid showed that its composition was not quite the same as the original acid, possibly owing to the formation of an anhydride.—On the reactions taking place in the cold between phosphoric acid and ether in the presence of water, by MM. Berthelot and André.—M. Marcellin Langlois presented two memoirs on thermochemistry.—On the lunar photographs offered to the Academy by M. Weinek, Director of the Prague Observatory, by M. Lœwy.—On the part played by the dielectric in the discharge by the Röntgen rays, by M. Jean Perrin.—Photography in the interior of a Crookes' tube, by M. G. de Metz. By the use of the method previously described, it has been found possible to draw up tables of relative permeabilities to X-rays and kathode rays. With the exception of lead, which is slightly more transparent for the kathode rays than for the X-rays, the two tables are identical, and even this exception appears to be capable of explanation. The kathode rays, like the X-rays, appear to be non-polarisable.—Remarks on the preceding communication, by M. H. Poincaré. In the experiments described in the previous paper, the kathode rays have to traverse a piece of card. It has still to be shown that this card does not give out X-rays.—Researches on the principles of vegetable digestion, by M. V. Poulet. The carefully-cleaned root-hairs of a number of plants gave, on pulverising and extracting with dilute acid, traces of ferrous tartrate. This appears to play an important part in the process of vegetable digestion; and it is suggested that, in the absence of iron in the soil, it is the non-formation of this salt which causes etiolation: that chlorophyll itself in the pure state contains no iron, being now well established.—On a new property of the corpuscle of the silk-worm disease, by M. J. M. Krassiltschik.—On the heterogamic fertilisation of the algæ *Ectocarpus secundus*, by M. C. Sauvageau.—Alteration in the elimination of phosphates, under the influence of the Röntgen rays, by M. L. Lecerle. The rate of elimination of phosphorus appears to be increased.

NEW SOUTH WALES.

Linnean Society, June 24.—Mr. Henry Deane, President, in the chair.—A new family of Australian fishes, by J. D. Ogilby. In this paper the author proposed to segregate in a new family, under the name *Melanoteniidae*, certain small fresh-water

percesocoid fishes belonging to the Austrogean region, which differ from all other members of that group by the structure of the first dorsal fin, which consists of a single stout and pungent ray followed by two or more flexible unarticulated rays; by the thoracic insertion of the ventral fins, &c.—New genera and species of Australian fishes, by J. D. Ogilby.—On the Australian *Clivinides* (Fam. *Carabidae*), by T. G. Sloane. Thirty-one new species of *Clivina* were described, bringing the total for Australia up to eighty-three, divisible into thirteen groups.—On the bag-shelters of certain lepidopterous larvæ of the genus *Teara*, by W. W. Froggatt. A general account is given of the curious bag-like diurnal shelters fabricated by the gregarious larvæ of moths of the genus *Teara*, with particulars of the life-history of *T. contraria* bred from nests obtained near Sydney.—Diatomaceous-earth deposits of the Warrumbungle Mountains, by Prof. T. W. E. David.—In the neighbourhood of the diatomaceous-earth deposits two formations are represented: (1) the permo-carboniferous coal measures and (2) trachyte lavas, dykes and tuffs, with which last are associated the deposits of diatomaceous-earth, and a seam of lignite. At one of the outcrops, fossil leaves (*Cinnamomum Leichhardtii*, Ettingsh.) occur on a horizon immediately above and intimately associated with the diatomaceous-earth. The latter is largely made up of diatoms (the genus *Melosira* predominating) and sponge spicules; and the age of the deposit is provisionally set down as early Eocene or late Cretaceous. The author emphasised and discussed the significance of the fact that all the diatomaceous deposits hitherto found in New South Wales occur in association with volcanic rocks.

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