

Education has now been published. The subjects included in the volume of 1176 pages relate to educational problems in all parts of the world, and prominence is given to the needs and condition of higher education in various countries. Among chapters likely to interest men of science may be mentioned the first instalment of a compilation of the general laws relating to colleges in the United States founded, under Acts of Congress, for the establishment and for the more complete endowment and support of colleges for the benefit of agriculture and the mechanic arts. An account of education in British South Africa reviews the facts with reference to Cape Colony, and enumerates the efforts being made in the Transvaal and the Orange River Colony to supply efficient education. Interesting particulars concerning university work in France are given in an article on education in France. It appears that the number of students in the French State universities rose from 17,605 in 1887-88 to 29,931 in 1901, of whom 3910 were registered in the faculty of sciences. It should be added that there are also in France 3500 students in State technical schools of a high order. A chapter on Italian education reveals evidence of the increasing favour in which technical instruction is held in Italy. In 1899-1900 there were 37,900 students attending the Government and private technical high schools, and of these 3900 were women. In Russia, according to an article by E. Kovalevsky, there are thirteen superior technical institutions with 8000 students. It is impossible even to enumerate the complete contents of this valuable report; it will provide students of education with material for much study and thought.

A SPECIAL subcommittee on technical instruction for women, appointed by the Technical Education Board of the London County Council, has issued a report. The subcommittee found that it could get little help from the study of foreign institutions, as the women's technical schools in Continental countries are day schools in which general education and technical training are given together. Technical classes like those carried on at London polytechnics, and work-girl students like those who attend such classes, are practically unknown on the Continent. The report first reviews the opportunities for technical instruction now open to women, and then proceeds to make suggestions for promoting further developments in such technical instruction. It is urged that, wherever possible, women teachers should be appointed for those trade classes which are reserved exclusively for women; that the attention of leading employers be directed to the action which has already been taken by certain firms in arranging for their apprentices to attend technical classes; and that the attention of girls in the elementary schools be directed to the opportunities for industrial training, and that every encouragement be offered to them to attend technical classes. Among the proposals—which number twenty-six—made by the subcommittee, a few seem of special importance. For instance, that classes be established for the training of women in hygiene and sanitation with the view of their taking up the occupation of sanitary, workshop, or public health inspectors, or of rent collectors; that in domestic economy schools more thorough instruction be given in the care and management of young children; that day classes for the training of daily servants or charwomen be conducted; and that technical day schools for girls, with a course planned to cover three years, be opened as opportunity offers.

SOCIETIES AND ACADEMIES.

LONDON.

Geological Society, January 6.—Sir Archibald Geikie, Sec.R.S., vice-president, in the chair.—On a Palæolithic floor at Prah Sands, in Cornwall: Clement **Reid**, F.R.S., and Eleanor M. **Reid**. Prah Sands lie about 7 miles east of Penzance, and have long been known as exhibiting a good section of "head" or rubble-drift, over raised beach, which rests on a wave-worn rocky platform. Recent storms have cleared away the talus at the foot of the cliff, and have exposed, between the "head" and the raised beach, a Palæolithic land-surface, consisting of loamy soil pene-

trated by small roots. In and above this occur black seams full of small fragments of charcoal and bone; these are particularly abundant round groups of large flat stones, which seem to have formed ancient hearths. The black seams contain implements made of vein-quartz. For a few feet above this land-surface the angular "head" consists mainly of loam with fragments of vein-quartz, some of which are worked. This seems to be the first record of Palæolithic man in Cornwall.—Implementiferous sections at Wolvercote (Oxfordshire): A. M. **Bell**. This section shows the following beds:—(1) Oxford Clay; (2) old surface, in which are pits or troughs chiefly filled with gravel and enveloped in weathered clay; (3) a large river-bed, containing gravel at the base, and layers of clay above; (4) Neolithic surface-layer, 2 feet thick. The gravel of the river-bed contains quartzite-pebbles, some of exceptional size, and is covered by a thin lenticular layer of peat and sand, yielding thirty flowering plants and many mosses; the clays over this have probably been formed in a lake, possibly due to a beaver-dam. In the gravel-bed are found implements formed of flint quarried from the Chalk, or of quartzite from pebbles of the Northern Drift, all remarkable for their size, beauty, and freshness, together with the remains of large mammals, including the mammoth. The old surface, from which the river-bed has been eroded, has also yielded implements associated with quartzites, quartz-pebbles, and lydianstone, gravel from the Thames Valley, limestone-pebbles. Oolitic fossils. and sand.

Zoological Society, January 19.—G. A. Boulenger, F.R.S. vice-president, in the chair.—A communication from Mr. Guy A. K. **Marshall**, entitled "A Monograph of the Coleoptera of the Genus *Hipporhinus*, Schh.," was read. It contained an enumeration of 138 known species of the genus, of which 50 were described as new.—Dr. Walter **Kidd** proposed the use of two additional characters in the description of genera and species of certain mammals. These were the arrangement of the hair on the naso-frontal region and the distribution of hair-whorls.—Dr. W. G. **Ridewood** read a paper on the skull of the giraffe, based on sections made in five different places through a skull of that animal.—Mr. F. E. **Beddard**, F.R.S., read a note on the brains of the potto (*Perodicticus potto*) and the slow loris (*Nycticebus tardigradus*), and made some observations upon the arteries of the brain in certain primates that had died in the society's menagerie.—Dr. C. W. **Andrews** read a paper on the pelvis and hind-limb of the ratite bird *Mullerornis betsilei*, and described a new struthious bird, from the Upper Eocene beds of the Fayum, Egypt.

Royal Meteorological Society, January 20.—Annual general meeting, Captain D. Wilson-Barker, president, in the chair.—The Symons gold medal for 1904, awarded to Hofrath Dr. Julius Hann, of Vienna, in consideration of his eminent services to the science of meteorology, was received by Count L. Széchenyi, First Secretary to the Austro-Hungarian Embassy, on behalf of Dr. Hann.—The **President** in his address dealt with the present condition of ocean meteorology, and began by referring to the early workers in meteorological science, Lieut. M. F. Maury in America and Admiral R. FitzRoy in England, also to the address on the same subject delivered to the society by Dr. R. H. Scott, F.R.S., in 1886. He then sketched the present state of our knowledge, illustrating his remarks by numerous maps. He reviewed the meteorological work of different nations, pointing out the energetic action of the United States in particular, and of Germany and England. He regretted the want of liberality shown by the Government in affording financial aid for the development of this important science, and in conclusion he urged the necessity of interesting the youth of the country in the matter by making it a special subject of school and college curricula.

Royal Microscopical Society, January 20.—Annual meeting, Dr. Hy. Woodward, F.R.S., president, in the chair.—The curator, Mr. C. **Rousselet**, exhibited an old microscope by Plössl, of Vienna, which had been sent on approval.—Dr. **Woodward**, the retiring president, gave his annual address, taking as his subject "The Evolution of Vertebrate Animals in Time."

Linnean Society, January 21.—Prof. S. H. Vines, F.R.S., president, in the chair.—Dr. Eric **Drabble** exhibited a lantern-slide showing diagrams of bicarpellary fruits of the French bean. The specimens of *Phaseolus vulgaris*, Savi, were obtained from a garden on the Middle Coal-measures of north Derbyshire.—The Rev. R. Ashington **Bullen** exhibited a finely preserved female specimen of the northern stone-crab, *Lithodes maia* (Linn.), from Aberdeen, and directed attention to the various organisms securely settled upon its carapace.—Biscayan plankton, part i., methods and data: Dr. G. H. **Fowler**. This formed the introduction to a series of reports from different hands dealing with the collections made by Dr. Fowler in the Bay of Biscay during a cruise of H.M.S. *Research*, and set out the objects of the cruise, the gear employed, and the records of weather, light, temperature, &c., kept in the naturalist's log.—The Crustacea obtained during the operations described in the preceding paper, entitled "Biscayan Plankton Collected on H.M.S. *Research* in July, 1900. Part ii. The Amphipoda and Cladocera, with Notes on a Larval Thyrostracan": Rev. T. R. R. **Stebbing**, F.R.S.—Dr. **Fowler** added some notes on the distribution of these Amphipoda, particularly in relation to the special points which the cruise was designed to study. No species, nor the Hyperideæ as a whole, showed any signs of the nocturnal rise and diurnal fall alleged to affect the epiplankton. Evidence was adduced to show that *Cyphocaris anonyx* and *Scina borealis* were Arctic and Subarctic forms, seeking the deep cold water of the mesoplankton at the lower latitudes of the Bay of Biscay.

PARIS.

Academy of Sciences, February 1.—M. Mascart in the chair.—Presentation of the atlas of solar photography carried out at the Observatory of Meudon: J. **Janssen**. The accumulation of the material summarised in this work has occupied twenty-seven years, upwards of 6000 photographs having been taken. The lenses of the telescope, made by Prazmowski, were constructed of a flint glass specially chosen to give a maximum in the HH' violet region, and the time of exposure was reduced to about 1/3000 second.—The action of carbon upon quicklime at the temperature of molten platinum: Henri **Moissan**. The experiment was carried out in a quartz tube, heated by the oxyhydrogen blowpipe, the material being placed in a graphite boat. It was found that an intimate mixture of finely divided quicklime and sugar charcoal was not attacked at the temperature of melting platinum, no trace of calcium carbide being formed. It was also proved experimentally that at its point of fusion calcium carbide is at a higher temperature than the melting point of platinum.—The direct reduction of aromatic halogen derivatives by finely divided nickel and hydrogen: Paul **Sabatier** and Alph. **Mailhe**. At a suitable temperature, chlorine derivatives of benzene are reduced by hydrogen to benzene in the presence of finely divided nickel. Thus at 270° C. chlorobenzene gives a good yield of benzene, with small quantities of diphenyl. Hexachlorobenzene gives a mixture containing trichloro-, dichloro-, and monochlorobenzene, together with benzene. Bromo-compounds undergo a similar reduction, but with greater difficulty, on account of the formation of nickel bromide, which is not readily reduced at the temperature of the experiment. Iodo-compounds behave in a like manner; the reaction stops after a short time on account of the accumulation of nickel iodide, but if a mixture of hydrogen and iodobenzene and pure hydrogen are sent alternately over reduced nickel at 270° C. a good yield of benzene is obtained.—Observations on the preceding note: M. **Berthelot**. The relation between the foregoing experiments and those made by the author in 1868 by means of hydriodic acid is pointed out, and the precautions necessary in the repetition of this work insisted on.—On the scapular and pelvic hands of the holoccephalous fishes and in the Dipneustæ: Armand **Sabatier**.—Observations on the sun made at the Observatory of Lyons with the 16 cm. Brunner equatorial during the third quarter of 1903: J. **Guillaume**. Tables are given showing the number of spots, their distribution in latitude, and the distribution of the faculæ in latitude.—On the diminution in the intensity of the solar radiation during the years 1902 and 1903: Ladislas **Gorczyński**. The variations in the

intensity of the solar radiation, previously noted at Lausanne, Clarens, Heidelberg, and at Washington, are confirmed by the author's observations at Warsaw. The first marked diminution commenced in May, 1902, the lowest point being noted in the spring of 1903. Towards the end of the year the progress of this diminution of intensity, compared with that of 1902, appeared to be arrested, although the absolute values still continue low when compared with the values for 1901. The eruptions of Martinique have been suggested as a possible cause of this diminution, but so far positive proof of this is wanting.—On systems of two surfaces the lines of curvature of which project on a plane following the same curves: M. **Guichard**.—On entire functions: A. **Pellet**.—On monodrome functions and transcendental numbers: Edmond **Maillet**.—On the principle of construction of an optical apparatus for obtaining very high magnifications: C. **Chabrié**. Instead of obtaining a geometrically similar image, as is the case with the usual optical systems, the suggestion is put forward that deformed, magnified images may be used, reducing these images to their proper shape by a geometrical construction. The case of the magnification produced by a transparent cone is worked out.—The action of magnetic fields on feebly luminous sources: C. **Gutton**. Whenever phosphorescent calcium sulphide is placed in a non-uniform magnetic field it becomes more luminous, but there is no action in a uniform field. The bearing of these experiments on work with the Blondlot rays is discussed.—On the physiological action of the *n*-rays and conducted radiations: Augustin **Charpentier**. A piece of tempered steel, moved about the side of the head, the room being in semi-darkness, produces a distinct increase in the clearness with which the surrounding objects are seen, and this effect was proved not to be due to changes of refraction in the eye.—The emission of *n*-rays by plants maintained in the dark: Édouard **Meyer**.—An attempt at an experimental determination of rational clothing: J. **Bergonié**.—On manganese salts acting as oxydases in the presence of a colloid: A. **Trillat**. Colloidal solutions of manganese obtained in the presence of albumen possess the properties of an oxydase, oxidising hydroquinone to quinone, pyrogallol to purpurogallol acid; the oxidising properties are removed by boiling.—On mixtures of antimony and its trisulphide: H. **Pélabon**.—On an isomer of borneol, campholenic alcohol, and some campholenic derivatives: A. **Béhal**.—Some new dinaphthopyranic phenols: R. **Fosse**.—On the alkyl-allyl-ketones: E. E. **Blaise**. The general method for the preparation of ketones by the use of the magnesium alkyl compounds fails with allyl iodide, the reaction being abnormal. The author has now found that the condensation of nitriles with allyl iodide proceeds in a normal manner in the presence of zinc, and has prepared a number of allyl ketones in this way.—Oxyalkyl ethylenic hydrocarbons and acids: Charles **Moureu**. The author has isolated in the pure state a series of oxyalkyl ethylenic acids of the type RC(OR):CH.CO₂H and of the corresponding hydrocarbons, and has studied the modes of decomposition of these compounds.—Researches on azo-compounds; the reduction of acetals and nitrobenzoic acids: P. **Freundler**.—The influence of the carbonic acid emitted by the soil on vegetation: E. **Demoussy**. From earlier work the author had been led to the conclusion that the rapid growth of plants under glass is not only due to the high temperature caused by the fermentation of the manure, but is largely due to the large amount of carbon dioxide given off. In confirmation of this view, further experimental evidence of the effect of an excess of carbon dioxide is now given.—On the culture of divers species of higher plants in the presence of a mixture of algæ and bacteria: MM. **Bouilhac** and **Giustiniani**. Several non-leguminous plants may profit by atmospheric nitrogen fixed by certain lower organisms, algæ and bacteria.—Organisation and morphogeny of the Tridacnæ: M. **Anthony**.—On the selection of polytaxic characters in the case of Mendelian growths: G. **Coutagne**.—Report on the development of the tracheal apparatus and metamorphoses in insects: Jules **Anglas**.—The application of the X-rays to the examination of fine pearls: Raphaël **Dubois**. It is possible by means of the X-rays to examine the living oyster, and, without in any way injuring it, to see whether it contains a pearl or not. If the pearl is too small, the oyster can be returned alive for further growth.—Pollinisation experiments in *Poly-*

gonum Fagopyrum: Pierre Paul Richer.—On the growth in weight of plants: Mlle. M. Stefanowska.—On the culture of black rot: P. Viala and P. Pacottet.—On the role of phosphorus in mineral layers: L. De Launay.—On the presence of the Oligocene in Madagascar: Paul Lemoine.—On the earthquakes felt in Portugal during 1903: Paul Choffat. Slight earthquake shocks are frequent in Portugal, but on August 9 and September 14, 1903, that country was visited with two shocks of unusual force. The first of these affected nearly the whole of Portugal; the second was more limited in range, and it is shown that the seismic centres of both these earthquakes were in deep sea.

NEW SOUTH WALES.

Royal Society, December 2, 1903.—Mr. F. B. Guthrie, president, in the chair.—A comparison of the periods of the electrical vibrations associated with simple circuits: J. A. Pollock, with an appendix by J. C. Close. The periods of the electrical vibrations connected with narrow rectangular closed circuits have been compared with those of the oscillations associated with straight wires, with open and closed circles, and with closed ellipses. Definite numerical results have been obtained for circuits varying in length from 3 to 9 metres.—A contribution to the study of the dielectric constant of water at low temperatures: O. U. Vonwiller. The object of the experiments was to ascertain whether the dielectric constant of water had a maximum value at 4° C. or not. First an air condenser was used, readings being taken as its capacity was given different known values, and then a condenser having water as its dielectric, readings being taken as the temperature rose from 0° C. The capacity of the water condenser invariably decreased as the temperature rose, there being no indication whatever of a critical value at 4° C.

DIARY OF SOCIETIES.

THURSDAY, FEBRUARY 11.

ROYAL SOCIETY, at 4.30.—On the Compressibilities of Oxygen, Hydrogen, Nitrogen, and Carbonic Oxide between One Atmosphere and Half an Atmosphere of Pressure; and on the Atomic Weights of the Elements concerned. Preliminary Notice: Lord Rayleigh, O.M., F.R.S.—A New Method of Detecting Electrical Oscillations: Dr. J. A. Ewing, F.R.S., and L. H. Walter.—On the High-Temperature Standards of the National Physical Laboratory. An Account of a Comparison of Platinum Thermometers and Thermojunctions with the Gas-thermometer: Dr. J. A. Harker.—Constant Standard Silver Trial-Plates: Edward Matthey.—On Certain Properties of the Alloys of Silver and Cadmium: Dr. T. Kirke Rose.—Sun-spot Variation in Latitude, 1861-1902: Dr. W. J. S. Lockyer.

ROYAL INSTITUTION, at 5.—Recent Research in Agriculture: A. D. Hall. SOCIETY OF ARTS, at 4.30.—Our Commercial Relations with Afghanistan: Col. Sir Thomas H. Holdich, K.C.M.G.; K.C.I.E.

MATHEMATICAL SOCIETY, at 5.30.—On the Roots of the Equation $\int \frac{dx}{(x+1)^2} = c$: G. H. Hardy.—On a Certain Double Integral: Prof. A. C. Dixon.—On an Appropriate Form of Conductor for a Moving Point-Singularity: Prof. A. W. Conway.—On Group-Velocity: Prof. H. Lamb.—On Point-Wise Discontinuous Functions of a Real Variable: Dr. E. W. Hobson.—Some Extensions of Abel's Theorem on Power Series on the Circle of Convergence: G. H. Hardy.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Transatlantic Engineering Schools and Engineering: Prof. R. M. Walmsley.

FRIDAY, FEBRUARY 12.

ROYAL INSTITUTION, at 9.—Some Aspects of Modern Weather Forecasting: W. N. Shaw, F.R.S.

PHYSICAL SOCIETY, at 8.—Annual General Meeting. Address by the president, Dr. R. T. Glazebrook, F.R.S., on the Theories of Microscopic Vision.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Anniversary Meeting. INSTITUTION OF CIVIL ENGINEERS, at 8.—The Electricity and Destructor Station at Plumstead: T. S. Nash. MALACOLOGICAL SOCIETY, at 8.—Annual Meeting: President's Address.

SATURDAY, FEBRUARY 13.

ROYAL INSTITUTION, at 3.—Culture and Sculpture: Dr. C. Waldstein. ESSEX FIELD CLUB, at 6.30 (Essex Museum of Natural History, Stratford).—Nature's Protection of Insect Life, with Natural-colour Photographs: Mr. F. Enock.

MONDAY, FEBRUARY 15.

SOCIETY OF ARTS, at 8.—Oils and Fats—their Uses and Applications: Dr. J. Lewkowitsch. (Cantor Lectures, IV).

TUESDAY, FEBRUARY 16.

ROYAL INSTITUTION, at 5.—The Development of Animals: Prof. L. C. Miall, F.R.S.

ZOOLOGICAL SOCIETY, at 8.30.—(1) On the Marine Fauna of Zanzibar and British East Africa—Polychæta, Part iii.; (2) The Polychæta of the Maldivé Archipelago from the Collections made by J. Stanley Gardiner in 1899; Cyril Crossland.—On some Nudibranchs from Zanzibar and East Africa—No. IV. Dorididæ Cryptobranchiata: Sir Charles Eliot, K.C.M.G.

ROYAL STATISTICAL SOCIETY, at 5.—Trade Union Expenditure on Unemployed Benefit: E. L. Hartley. INSTITUTION OF CIVIL ENGINEERS, at 8.—The Forms of Turbines most Suitable for Low Falls: A. Steiger.

WEDNESDAY, FEBRUARY 17.

SOCIETY OF ARTS, at 8.—Garden Cities in their Relation to Industries and Agriculture: A. R. Sennett.

ROYAL MICROSCOPICAL SOCIETY, at 8.—On the Vertical Illuminator; the Influence of the Antipoint on the Microscopic Image shown Graphically: E. M. Nelson.—A Microscope with Geometric Slides: Keith Lucas.—Mr. C. L. Curties will exhibit Specimens of Marine Objects mounted by Mr. H. J. Waddington.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—Report on the Phenological Observations for 1903: E. Mawley.—Observations by Means of Kites at Crinan in the Summer of 1903: W. H. Dines.

CHEMICAL SOCIETY, at 5.30.—Observations on some Continuous Intramolecular and at First Reversible Changes extending over Prolonged Periods of Time: R. J. Friswell.—The Esterification of *r*-Mandelic Acid by Menthol and Borneol: A. McKenzie.

THURSDAY, FEBRUARY 18.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: Further Researches on the Temperature Classification of Stars: Sir J. Norman Lockyer, K.C.B., F.R.S.—Theory of Amphoteric Electrolytes: Prof. James Walker, F.R.S.—Note on the Formation of Solids at Low Temperatures, particularly with regard to Solid Hydrogen: Prof. Morris W. Travers.—Atmospherical Radio-activity in High Latitudes: George C. Simpson.

ROYAL INSTITUTION, at 5.—Recent Research in Agriculture: A. D. Hall. LINNEAN SOCIETY, at 8.—Mendel's Laws as Illustrated by Wheat Hybrids: R. H. Biffen.—Hereditry and Variation as seen in *Prunella sinensis*: W. Bateson, F.R.S.—Formation of Secondary Wood in Psilotum: L. A. Boodle.

FRIDAY, FEBRUARY 19.

ROYAL INSTITUTION, at 9.—Condensation Nuclei: C. T. R. Wilson, F.R.S.

GEOLOGICAL SOCIETY, at 8.—Anniversary Meeting. INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Annual General Meeting; followed by Discussion on Heat Treatment of Steel.—The Motion of Gases in Pipes, and the Use of Gauges to Determine the Delivery: R. Threlfall, F.R.S.

EPIDEMIOLOGICAL SOCIETY, at 8.30.—The Etiology of Scurvy: Dr. Myer Coplans.

SATURDAY, FEBRUARY 20.

ROYAL INSTITUTION, at 5.—The Life and Work of Stokes: Lord Rayleigh.

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