

In a short discussion which followed, Prof. Forsyth said it was desirable that they should not hurry changes. It did not lie with the public schools or the preparatory schools to make changes. There was a vast body of teachers in the small schools, but the great difficulty was to get at such teachers and induce them to adopt new methods. The report was adopted.

AMONG the many interesting papers read at the conference of the Froebel Society and the Child-Study Association on Saturday was one by Dr. W. B. Drummond, of Edinburgh, who dwelt upon the preparation for child-study as a piece of proper scientific investigation carried on according to modern methods. He laid down that a course of training in biology, that is to say, in the practical study of plants and animals, was the first essential to success. His reason was that the observations made on children are in reality part of biology. Next a course of psychology should follow, and then one in methods of education, for many of these have been based upon an intimate acquaintance with the ways and needs of children. He pointed out how advantage was taken of the peculiarities of the child mind in the Bible, and instanced the setting up of the twelve stones from Jordan so that when they had aroused the curiosity of the children, and this had been satisfied, the monument would always be a reminder to them of the crossing of Jordan as on dry land. The educational results of many celebrations, customs and games which we are ourselves familiar with were touched upon, though it was pointed out that these were not always intentional at the beginning. The danger was pointed out of asking children ill-considered questions which might excite their imagination in a way detrimental to them, or which by suggesting an answer or confusing the young persons might defeat the object of the experiment. During the course of the paper, the characteristics of primeval man were touched upon, as indeed they had been previously during the conference, and in the concluding discussion, Mr. Lewis Paton, head-master of University College School, expressed the opinion that much light could be thrown upon the ways of boys by a study of savages. Another and possibly more serious point was that he found by the time his pupils had reached the age of nine and came to him, their characters were formed or more often deformed, and this is a very strong argument for the advancement of child-study.

AN article by Sir William Ramsay, in the January number of *East and West*, deals with the recent Report of the Indian Universities Commission, and contains several suggestions which ought to be read by all who are interested in the aims and character of university education. The commissioners had not the courage of their convictions, for after forming an accurate conception of the function of a university, they refused to act upon it and accepted old ideals as offering the path of least resistance for the universities of India to follow. As regards the government of the universities, Sir William Ramsay shows that the commissioners could have found abundant precedent for a recommendation that a small number of persons, not exceeding ten, should have been given control of the funds of the university, leaving to the teachers—that is, heads of departments—the entire management of academical affairs. The large number of colleges—many of them really secondary schools—in so-called affiliation with Indian universities presents a difficulty, but the suggestion is put forward that it could be overcome by making the B.A. and B.Sc. degrees, or the former only, equivalent to a leaving examination for secondary schools. Students who wished to pursue their studies would do so at the universities. There would thus be a separation of the college from the university, as in the United States, where numerous colleges give the degrees of A.B. and S.B., and the students afterwards proceed to such places of post-graduate study as the Johns Hopkins University or the university side of Harvard. Some American universities have both college and university sides, but the students in the latter are those proceeding to higher degrees. As to the objection that unless external examiners are called in the examination for degrees by colleges could not be contemplated, Sir William Ramsay urges that the teacher ought to be trusted to gauge the capacity of his students, though it would be advisable for him to act in conjunction with an external examiner for all the colleges to secure uniformity of standard. Finally, he remarks:—"The true prosperity and success of colleges and of universities in training men for their later careers, and in creating and disseminating knowledge, depend on the observance of two fundamental maxims:—First,

choose for professors men who have made some reputation and are engaged in active prosecution of research; second, give such men a wide liberty in dealing with their subjects and with their students. Where these maxims have been acted on, university education has been a conspicuous success, and the creation and progress of knowledge have been maintained. May India see fit to adopt and practise these maxims."

SCIENTIFIC SERIALS.

American Journal of Science, January.—The morphogenesis of *Platystrophia*. A study of the evolution of a Palæozoic brachiopod, by E. R. Cumings.—On ruling concave gratings, by W. Rollins. It has been shown that the Rowland concave gratings give false spectral lines so sharp and clear that there is probability and some evidence that they have been mistaken for real lines. The cause of this is examined, and suggestions are made for a new design of ruling machine in which these defects are overcome. The machine has not yet been constructed.—The variations of potential along a wire transmitting electric waves, by C. A. Chant.—Rickardite, a new mineral, by W. E. Ford. The mineral occurs in the Good Hope mine at Vulcan, Colorado, and consists of a nearly pure copper telluride, Cu_4Te_3 .—On the occurrence of free phosphorus in the Saline Township meteorite, by Oliver C. Farrington. The phosphorus was noticed on drilling a hole into the meteorite for the purpose of breaking off a piece, and was proved to exist in the free state by its smell, luminosity, action on silver nitrate and conversion into ammonium phosphomolybdate.

Bulletin of the American Mathematical Society (2), ix., No. 3 (December, 1902).—W. B. Fite, commutator subgroups of groups whose orders are powers of primes.—L. I. Hewes, note on irregular determinants.—G. O. James, on the projections of the absolute accelerations in relative motion.—E. P. Eisenhart, on infinitesimal deformation of the skew helicoid.—S. Epoteen, on integrability by quadratures.—E. B. Wilson, account of the Abel centenary.—Reviews: English and French translations of Hilbert's "Grundlagen der Geometrie" (E. R. Hedrick); Dickson's "Linear Groups" (G. A. Miller); Buckingham's "Thermodynamics" (E. H. Hall).—No. 4 (January, 1903).—F. Cajori, on series whose product is absolutely convergent.—L. E. Dickson, on the abstract simple groups of orders 504 and 660.—C. M. Mason, account of the Carlsbad meeting of the Deutsche Mathematiker-Vereinigung.

SOCIETIES AND ACADEMIES.

LONDON.

Anthropological Institute, January 13.—Dr. A. C. Haddon, F.R.S., in the chair.—Dr. C. S. Myers read a paper on the future of anthropometry. He suggested that the work in which anthropometry had hitherto been concerned, viz. the determination of the average metric differences between the various peoples of the world, must ultimately yield before improved methods and new problems. The frequency-distribution of any one character in a series of individuals must be studied with greater accuracy. The mean of the deviations of individuals from the mean of the whole series and the form of the binomial frequency-curve require to be determined both for relatively pure and mixed peoples. Frequency-curves will almost invariably show more than one point of maximal frequency. But before the usual inference is drawn that these several peaks represent heterogeneous elements in the series, care must be taken that the irregularities of distribution are not the result of examining an insufficient number of individuals. The future will see the precise investigation of the degree of correlation of various characters, the mode of inheritance of characters, the fertility and characters of cross-breeds, and the effect of migration and evolution on mankind. Mr. Francis Galton, Prof. Karl Pearson and others have already made a start. Anthropometry has first to look for aid to the infant science of biometry, which can employ experimental and therefore simpler conditions. The whole study of natural history is passing from the descriptive to the quantitative aspect. In this, physical anthropology must join.

Royal Meteorological Society, January 21.—Mr. W. H. Dines, president, in the chair.—The **President** delivered an address on the method of kite-flying from a steam vessel and meteorological observations obtained thereby off the west coast of Scotland. In the spring of 1901, the Royal Meteorological Society appointed a committee for the purpose of making an investigation as to the temperature and moisture of the upper air, and the British Association, at the Glasgow meeting, also appointed a committee to cooperate in the work. At the request of the joint committee, Mr. Dines undertook to carry on the inquiry during the summer of 1902, and in this address he gave an interesting account of all that he had done. After describing the apparatus, which included kites (of a modified Blue Hill pattern), eight miles of wire in one piece, winding-in apparatus, steam engine and meteorograph, he proceeded to give an account of his work and observations at a fixed station, and also from a steam tug, in the neighbourhood of Crinan off the west coast of Scotland. A considerable amount of information concerning meteorological phenomena was obtained, seventy-one observations of temperature at an average height of 4140 feet and thirty-eight charts from the self-recording instruments with an average of more than 6000 feet having been secured. The greatest height attained was 15,000 feet, by means of four kites on the wire. The temperature gradient over the sea was considerably less than its average value over the land, being about 1° for every 300 feet of height. The upper currents were found to differ in direction from those below much less than was expected. As a general rule, the humidity increased up to a level of about a mile and then decreased. Mr. Dines illustrated his address with a number of interesting lantern slides.—Captain D. Wilson-Barker was elected president for the ensuing year.

Entomological Society, Annual Meeting, January 21.—The Rev. Canon Fowler, president, in the chair.—Canon **Fowler**, the retiring president, in the first part of his address dealt chiefly with the many facts that have been recently brought forward with regard to cryptic coloration and mimicry, more especially as affecting the order Coleoptera; the facts are indisputable, but the hypotheses founded upon them are, perhaps, sometimes pressed too far. In the second part, the question of the origin of the Coleoptera was discussed; there is no satisfactory evidence of the appearance of the order in the Palæozoic period, but the leading families are found in the Lias, as completely differentiated as at the present time; in fact, many of the genera and even the species are almost identical with those now living; the Coleoptera, that is to say, have altered but little from the time at which they existed side by side with the gigantic extinct saurians and the pterodactyles; the whole question of the origin and history of the insects generally is of the first importance in the history of evolution.

PARIS.

Academy of Sciences, January 19.—M. Albert **Gaudry** in the chair.—Notice on the work of the late M. Sirodot, by M. **Bornet**.—Researches on the chinchona alkaloids, by MM. **Berthelot** and **Gaudechon**. A thermochemical paper, giving the heats of combustion and formation of quinine and quinidine, together with the heats of solution of several salts of these alkaloids. Attention was paid to the influence of the physical condition of the quinine, the value obtained with quinine which had been recently precipitated being slightly different from that given by quinine which had been precipitated for some days. The isomer quinidine proved to have the same function, the same heats of formation and of neutralisation.—On some formulæ of kinematics useful in the general theory of elasticity, by M. P. **Duhem**.—The coloured drawings on the walls of the cave of La Mouthe, forming true decorative panels, by M. Emi **Riviere**. The antiquity of the numerous drawings and paintings on the walls of this cave has been verified by the anthropologists of the Congress of the French Association for the Advancement of Science. The drawings have been identified as certainly dating from the Quaternary epoch. They are contemporary with the *Tarandus rangifer*, *Ursus spelæus* and *Hyaena spelæa*. The extreme freshness of some of the drawings threw some doubt on their authenticity, but it has been shown that these are covered with the same clay as the others. A detailed account of the drawings uncovered up to the present is given, and the work is being continued.—On a colouring matter from the figures in the cave of La Mouthe, by M. Henri

Moissan. The black colouring matter, freed from particles of silica and chalk, proved to consist entirely of an oxide of manganese. It is similar to that discovered by MM. Capitan and Breuil in the cave of Font de Gaume.—On the reducibility of differential equations, by M. R. **Liouville**.—On the universal functions of the plane and surfaces of Riemann, by M. A. **Korn**.—On the surfaces which correspond with parallelism of the tangent planes and conservation of areas, by M. C. **Guichard**.—The proof of a rotating electromagnetic field produced by a helicoidal modification of stratifications in a tube of rarefied air, by M. Th. **Tommasina**. The facts described correspond with the view of the anodic origin of these phenomena and the part played by reflection in the anode modification. It is pointed out that if the charges are transmitted along the helicoidal bundle, this should behave as a solenoid carrying a current. In this case, the bundle which would be the deviable bundle should turn under the action of the other part of the current which passes along the non-deviable bundle, precisely like a movable solenoid turning round a fixed linear current.—On the so-called electrolytic reduction of potassium chlorate, by M. André **Brochet**. A criticism of a paper by Bancroft and Burrows. The author is in general agreement with the experimental part of this work, but arrives at quite different conclusions regarding the true explanation of the phenomenon. The reduction he regards as being produced by a secondary and purely chemical reaction, and hence concludes that the reduction is not electrolytic properly so called.—On a mode of formation of phenols, by M. F. **Bodroux**. Phenyl-magnesium bromide and the corresponding derivatives of other aromatic hydrocarbons are slowly acted upon by dry air, and from the product of this reaction, after acidifying with hydrochloric acid, phenols can be extracted. Working in this way, phenol has been obtained from bromobenzene, and ortho- and para-bromotoluene have been transformed into the corresponding cresols. From monobromanisole, the monomethylether and hydroquinone were obtained, parabromophenetol behaving similarly. The yields are small, varying from 5 to 10 per cent. of the theoretical.—On ethyl dinitroacetate, by MM. L. **Bouveault** and A. **Wahl**. This compound has been obtained by the action of ordinary fuming nitric acid upon the acid ethyl ester of malonic acid, carbon dioxide being given off. The physical and chemical properties of the nitro-compound are given, and the preparation of the ammonium salt described.—The influence of the nature of the external medium on the state of hydration of the plant, by MM. Eug. **Charabot** and A. **Hébert**. The effect of the addition of a salt of a mineral acid to the soil is to accelerate the diminution of the proportion of water in the plant. The nitrates have the most powerful effect in causing the loss of water, then follow sulphates, chlorides and finally sodium phosphate.—Observations on the theory of cell division, by M. P. A. **Dangeard**. The primitive laws of cell division are found to be modified by the appearance of a membrane or an inextensible envelope; the laws of Hertwig and Pflueger only give expression to this modification interposed in the cellular structure in the course of development.—The existence of the lower Cretaceous in Argolide, Greece, by M. L. **Cayeux**.—On the presence of a kinase in some Basidiomycetes, by MM. C. **Delezenne** and H. **Mouton**. The powdered fungus is extracted with saline water (0.8 per cent.) in presence of toluol, and the liquid filtered either through paper or a Berkefeld filter, the extract from *Amanita muscaria* giving the best results. This extract, which is inactive towards albumen, when mixed with a pancreatic juice also inactive by itself, is capable of rapidly digesting albumen. The effects are produced by a soluble ferment analogous to enterokinase.—The influence of the stereochemical configuration of glucosides on the activity of the hydrolytic diastases, by M. Henri **Pottevin**. An examination of some apparent exceptions to the law of Fischer.—Acetaldehyde in the ageing and alterations of wine, by M. A. **Trillat**. Acetaldehyde appears to play an important part in the various modifications undergone by wine. The ageing corresponds to a normal oxidation of the alcohol of the wine, resulting in the formation of aldehydes, their transformation into acetals and esters. Under the influence of certain diseases, the proportion of aldehydes increases; according to the conditions, these aldehydes may either form an insoluble compound with the colouring matter or may be resinified by the action of the mineral salts of the wine.—The comparative bactericidal power of the electric arc between poles of ordinary carbon or of carbon containing iron,

by MM. Alfred **Chatin** and S. **Nicolau**. The arc with iron has always a greater bactericidal power than the arc between ordinary carbon poles, the effect being most marked with the staphylococcus aureus and least with the anthrax bacillus, but even in the latter case the ratio of the times required for sterilisation was as 5 : 1 in favour of the poles containing iron.—Researches on the toxic power of *Ksopo* or *Tanghin de Menabe*, by M. Lucien **Camus**.—The origin of pearls in *Mytilus gallo-provincialis*, by M. Raphaël **Dubois**.

NEW SOUTH WALES.

Royal Society, November 5, 1902.—Prof. Warren, president, in the chair.—New South Wales Meteorites, by Prof. **Liversidge**, F.R.S. *Barratta Meteorites*, Nos. 2 and 3. The first meteorite from this locality was examined by the author in 1872; the later ones were received in 1889. No. 2 weighed 3½ lb. and No. 3 48 lb.; they both very closely resemble the first one found in appearance, specific gravity, &c. No. 2 has, on analysis, been found to resemble No. 1 also in chemical composition; it is essentially a mixture of enstatite, olivine, &c., with about 6 per cent. of nickeliferous iron. No. 3 has not yet been analysed. *Gilgoin Meteorites*, Nos. 1 and 2. The weight of No. 1 was 67½ lb. and its sp. gr. 3·857. They are both much fissured and weathered. No 2 weighed 74 lb. and has a sp. gr. of 3·757. No. 1 has been found on analysis to resemble the Barratta meteorites, but to contain more lime and alumina, and less iron and magnesia and about 14 per cent. of nickeliferous iron. No. 2 has not yet been analysed. *Boogaldi (Bugoldi) Meteorite*. An account of this meteorite was given by Mr. R. T. Baker about two years ago; it has since been analysed; the principal constituents are iron 91·135, nickel 8·636, cobalt 0·065 and phosphorus 0·17.—Forests considered in their relation to rainfall and the conservation of moisture, by Mr. J. H. **Maiden**. A descriptive statement of the relation between forests and water supply. Some uses of forests are, (a) to temper floods; (b) to conserve springs and to aid in the more even distribution of terrestrial waters; (c) to prevent evaporation of water; (d) to give shelter to stock, crops, &c.; (e) the leaves of forest trees, &c., afford manure and mulch.

DIARY OF SOCIETIES.

THURSDAY, JANUARY 29.

ROYAL SOCIETY, at 4.30.—The Relation between Solar Prominences and Terrestrial Magnetism: Sir Norman Lockyer, F.R.S., and Dr. W. J. S. Lockyer.—The Bending of Electric Waves round a Conducting Obstacle: H. M. Macdonald, F.R.S.—On Skew Refraction through a Lens; and on the Hollow Pencil given by an Annulus of a very Obliquely Placed Lens: Prof. J. D. Everett, F.R.S.—On the Decline of the Injury Current in Mammalian Nerve, and its Modification by Changes of Temperature: Miss S. C. M. Sowton and J. S. Macdonald.

ROYAL INSTITUTION, at 5.—Pre-Phoenician Writing in Crete and its Bearings on the History of the Alphabet: Dr. A. J. Evans.

FRIDAY, JANUARY 30.

ROYAL INSTITUTION, at 9.—Vibration Problems in Engineering Science: Prof. W. E. Dalby.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Design of the Electrical Equipment of a Light Railway: J. R. Macintosh.

SATURDAY, JANUARY 31.

ESSEX FIELD CLUB (Essex Museum of Natural History, Stratford), at 6.30.—Proposals for a Photographic and Pictorial Survey of Essex: A. E. Briscoe.

MONDAY, FEBRUARY 2.

SOCIETY OF ARTS, at 8.—Paper Manufacture: Julius Hübner. **VICTORIA INSTITUTE**, at 4.30.—On the Unseen Life of our World, and of Living Growth; Design, Human and Divine: Prof. Lionel S. Beale, F.R.S.

SOCIETY OF CHEMICAL INDUSTRY, at 8.—Statistics of British and German Chemical Trades for 1901, with Suggestions for Improving the Official Tables: F. Evershed.—The Standardisation of Analytical Methods: H. Droop Richmond.

TUESDAY, FEBRUARY 3.

ROYAL INSTITUTION, at 5.—The Physiology of Digestion: Prof. Allan Macfadyen.

SOCIETY OF ARTS, at 8.—Technical Education in Connection with the Book-Producing Trades: Douglas Cockerell.

MINERALOGICAL SOCIETY, at 8.—(1) On a Meteoric Stone seen to fall on August 22, 1902, at Caratash, Smyrna; (2) Note on the History of the Mass of Meteoric Iron found in the Neighbourhood of Caperr, Patagonia: L. Fletcher, F.R.S.—On the Crystalline Forms of Carbides and Silicides of Iron and Manganese: L. J. Spencer.—The Refractive Indices of Pyromorphite: H. L. Bowman.—Note on Quartz Crystals from De Aar: T. V. Barker.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Discussion of papers on The Nile Reservoir, Assuan: M. Fitzmaurice, C.M.G.—Sluices and Lock-Gates of the Nile Reservoir, Assuan: F. W. S. Stokes.

ZOOLOGICAL SOCIETY, at 8.30.—On the Hair-slope of four Typical Animals: Dr. W. Kidd.—A Prodomus of the Snakes hitherto recorded from China, Japan and the Loochoo Islands: Capt. F. Wall.—On the Variation of the

Elk: H. J. Elwes, F.R.S.—Note on the Wild Sheep of the Kopet Dagh: R. Lydekker, F.R.S.

WEDNESDAY, FEBRUARY 4.

SOCIETY OF ELECTRO-CHEMISTS AND METALLURGISTS (Faraday Club, St. Ermin's Hotel, Westminster), at 5.—General Meeting to inaugurate the work of the Society and elect a President and Council.

SOCIETY OF ARTS, at 8.—Methods of Mosaic Construction: W. L. H. Hamilton.

SOCIETY OF PUBLIC ANALYSTS, at 8.—Annual General Meeting.—At 8.30.—The Determination of Glycerine in crude Glycerines: Dr. Julius Lewkowsch.—(1) A Plea for the more Extended Consideration of Physics in Analytical Methods; (2) Note on the Determination of Casein precipitated by Rennet: H. Droop Richmond.

ENTOMOLOGICAL SOCIETY, at 8.—An Account of a Collection of Rhopalocera made on the Anambara Creek in Nigeria, West Africa: Percy I. Lathy; On the Hyspid Genus Deilemera, Hübner: Colonel C. Swinhoe.

GEOLOGICAL SOCIETY, at 8.—(1) The Granite and Greisen of Cligga Head (West Cornwall); (2) Notes on the Geology of Patagonia: J. B. Scrivenor.

THURSDAY, FEBRUARY 5.

ROYAL SOCIETY, at 4.30.—*Probable Papers*:—The Brain of the Archæoceti: Prof. Elliot Smith.—On the Negative Variation in the Nerves of Warm-Blooded Animals: Dr. N. H. Alcock.—Primitive Knot and Early Gastrulation Cavity coexisting with Independent Primitive Streak in Ornithorhynchus: Prof. J. T. Wilson and J. P. Hill.

ROYAL INSTITUTION, at 5.—Arctic and Antarctic Exploration: Sir Clements Markham, K.C.B.

CHEMICAL SOCIETY, at 8.—(1) A New Vapour-Density Apparatus; (2) A New Principle for the Construction of a Pyrometer: J. S. Lumsden.

LINEAN SOCIETY, at 8.—Stephanospermum, Bronngiart, a Genus of Fossil Gymnospermous Seeds: Prof. F. W. Oliver

RÖNTGEN SOCIETY, at 8.30.—Discussion on Some Points suggested by the Presidential Address of November, 1902, opened by J. H. Gardiner.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Adjourned Discussion on the Metric System.

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