

to be given, in addition to the existing grants. It is proposed in another part of the Bill to make educational endowments as serviceable as possible for the advancement of education, and to consolidate, simplify, and improve the administrative machinery now in use. No provision is made for the training of teachers. We are not concerned here with the sectarian difficulties which seem to make it hopeless to contemplate a permanent settlement of the question of religious teaching in State schools. The denominationalists regard the provision of religious instruction without creed or catechism, prescribed by the Bill, as opposed to their principles and as an endowment of undenominationalism; therefore they will oppose the measure. The Labour Party, on the other hand, has taken the logical position that State aid should only be given for secular education; and that all religious instruction should be abolished in elementary schools, though moral or ethical teaching could be given based upon the best thoughts and works to be found in the literature and history of the world. Until a common factor of agreement is found in sectarian doctrines, or religious instruction is banished entirely from elementary schools, our educational system promises to continue to be the shuttlecock of opposing parties.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 7, 1905.—"On a Property which holds good for all Groupings of a Normal Distribution of Frequency for Two Variables, with Applications to the Study of Contingency-tables for the Inheritance of Unmeasured Qualities." By G. Udny Yule. Communicated by Prof. O. Henrici, F.R.S.

Suppose a contingency-table to have been formed for two characters which have been assigned in some way (not necessarily quantitatively) into classes. Extract from the general contingency-table the frequencies in any four adjacent compartments, and consider these as forming, by themselves, an elementary contingency-table. If the sign of association in all such elementary tetrads be the same, the general contingency-table may be termed *isotropic*. In an isotropic table the sign of the association is the same, not only for every tetrad of adjacent frequencies, but for every set of four frequencies in the compartments common to two rows and two columns. The table remains isotropic in whatever way it may be condensed by grouping together adjacent rows or columns, and if, as an extreme case, it be reduced to four-fold form, the sign of the association in such four-fold table is the same as in the elementary tetrads of the original table. If the rows and columns of an isotropic table be disarranged, the disarrangement is no longer isotropic, but the rows and columns can easily be rearranged in isotropic order. The normal frequency distribution for two variables is isotropic, and possesses the preceding properties. An examination of a number of tables recently published by Prof. Pearson for inheritance of anthropometric measurements (stature, span, forearm and head measurements) shows that all are at least approximately isotropic. On the other hand, the tables for inheritance of eye-colour published by the same writer on the basis of Mr. Galton's material, are, without exception, anisotropic, the divergence from isotropy being of such a kind as would be produced by an excess of frequency in the diagonal compartments of the table corresponding to identity of eye-colour in the two relatives. This excess, in the case of the tables for inheritance in the first degree, is not, however, so great as would be given by the theory of simple alternative inheritance, which accordingly requires modification. The same type of anisotropy appears to hold for the great majority of the tables for inheritance of coat-colour in horses given by Prof. Pearson, and also for the miscellaneous characters, mental and physical, in man, given by him in the Huxley lecture (1903). The marked prevalence of this type of distribution for such very diverse qualities, as compared—so far as investigation has gone—with its complete absence in the case of measured characters, raises the question whether it may not be, in whole or in part, of subjective origin.

The above abstract should have preceded that printed in last week's NATURE (p. 551).

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January 18.—"The Growth of the Oocyte in *Antedon*: a Morphological Study in Cell-Metabolism." By Dr. Gilbert Chubb. Communicated by Prof. E. H. Starling, F.R.S.

The paper deals with the growth of the oocyte in *Antedon bifida*, Pennant, and is an attempt to utilise the morphological changes accompanying this process to determine the relative physiological significance of the various cell-structures.

The most striking expression of nucleolar activity consists in the intermittent discharge of spherules into the cytoplasm throughout the growth of the egg. Of these spherules, those discharged during the earlier period of the egg's growth constitute the yolk-nucleus, and both the origin and later behaviour of the latter structure are shown to be due to the progressively changing physical consistency of the cytoplasm. Neither the yolk-nucleus nor the nucleolar matter discharged subsequent to its formation take any part in yolk formation.

Evidence is adduced to show that the chromatin is responsible for the formation of the nucleolus, and that it is in this latter structure that the waste products of cytoplasmic activity undergo their final changes.

The irregularity of the germinal vesicle, so often accepted as an indication of the direct participation of this structure in yolk formation, is shown to be due to purely physical causes. The actual process of yolk formation is shown to be unaccompanied by increased nuclear activity, and to consist merely in the automatic conversion into a more stable form of material deposited in solution in the cytoplasm by the chromatin throughout the entire growth of the egg.

Zoological Society, March 20.—Dr. Henry Woodward, F.R.S., vice-president, in the chair.—Descriptions of the species of the coleopterous genus *Sciobius*: Guy A. K. Marshall. The genus comprised forty-one species, of which twenty-two were described as new.—A contribution to the study of evolution based upon the Mexican species of *Cnemidophorus*: Dr. Hans Gadow. The main object of the paper was to trace the correlation of certain variations exhibited by the lizards of this genus, and the environmental, bionomic conditions. To do this a revision of the numerous species of the genus had been necessary, most of the ample material for which had been collected by the author himself. Especial attention had to be paid to an exhaustive study of the surprisingly great variability of certain characters, in particular the changes of the colour-pattern and the scutellation of the collar and of the limbs. The distribution of the many races, into which some of the species seemed to have recently differentiated themselves, was likewise followed up in detail.

Geological Society, March 21.—Mr. Aubrey Sturhan, F.R.S., vice-president, in the chair.—The Chalk and Drift in Møen: Rev. Edwin Hill. The problem of Møen is to account for portions of Drift, isolated, and seemingly included, in cliffs of Chalk. It has been assumed that these portions occupy dislocations, and that the dislocations were either simultaneous with, or subsequent to, the deposition of the Drift. But cases are here described where Drift is seen to occupy cavities in dislocations, which had been water-worn, and consequently had been produced, before the advent of the Drift. A probable assumption that there were pre-Glacial cliffs similar to the present, with clefts and furrows in the cliffs, which were covered in Glacial times with a mantle of Drift now in course of removal by denudation, explains every variety of Drift-inclusion. Slopes of uniform inclination, which rise from the beach to the bases of the vertical cliffs, appear to be talus-slopes. In reality they are everywhere solid Chalk, with only a skin of debris; this suggests post-Glacial changes in sea-level.—The relations of the Chalk and Boulder-clay near Royston (Hertfordshire): Prof. T. G. Bonney. On the uplands south of Royston, Mr. H. B. Woodward has described three sections (Quart. Journ. Geol. Soc., vol. lix., 1903, p. 362), which in his opinion indicate that a great ice-sheet, as it advanced from the north, sheared off large masses of Chalk and mixed them up with its ground- or englacial moraine (the Chalky Boulder-clay). The author points out that this interpretation rests on an hypothesis—namely, that the latter deposit is the direct product of

land-ice—which, as it involves some serious difficulties, cannot yet be taken for granted. That ice is capable of shearing off and thrusting before it large masses of rock is also an hypothesis, for which the author, after doing his best to study ice-work in the field, can find no valid evidence. He maintains that these sections do not suggest the above explanation. At the Pinner's Cross Pit the Boulder-clay is not, strictly speaking, "banked-up" against the Chalk, but occupies a hollow in the Chalk. In the pit south-west of Newsell's Park, a shear-plane can indeed be seen in one face, which, however, is explicable by ordinary faulting. A few yards farther to the south-east, Boulder-clay appears above the floor of the pit, filling an arched cavity. This is, no doubt, a singular position, but there is nothing to show that the Chalk has been thrust over the Clay. The author suggests that, as in Møen, the Clay has been carried down from above into cavities already formed in the Chalk.—Brachiopod homœomorphy: Pygope, Antinomia, Pygites: S. S. **Buckman**. This paper deals with the diphyoid Terebratulæ, of which so many species have borne the name *Terebratula diphya* (Colonna). It is pointed out that this name is pre-Linnean, and can only date from the time when it was revived by L. von Buch in 1834. It appears that *Terebratula diphya* is not the type of the genus Pygope. Reasons are given for taking as the type of Pygope one of the forms of *T. antinomia* which is considered to be the same species as *T. deltoidea*, Val. Then the later generic name Antinomia, Catullo, is discussed. The genus was founded on five species, and one of them is now selected as the type—the genolectotype. This is *A. dilatata*, Catullo, supposed to be equivalent to *Terebratula antinomia*, Catullo, that is, to what is now selected to be the type of that species. In that case the species would bear the name *Antinomia antinomia* (Cat.). But there is yet another series of diphoids, typified by *Terebratula diphoides*, d'Orb. It is pointed out that, although the species covered by the name *diphoides* are very like Pygope as now used, yet they all differ in having particular characters in the preperforate stage—a dorsal ridge and a ventral sulcus.

Royal Microscopical Society, March 21.—Rt. Hon. Sir Ford North, P.C., F.R.S., vice-president, in the chair.—A contribution to our knowledge of the Rotifera of South Africa: C. F. **Rousselet**.—A new form of finder which can be used on any microscope, and by which the object registered on one microscope can be found on any other: J. M. **Coon**.—Some Oribatidæ from Sikkim: N. D. F. **Pearce**. Most of the tropical species were on the average smaller than those found in temperate climes.—The limits of resolving power for the microscope and telescope: E. M. **Nelson**.

Entomological Society, March 21.—Mr. F. Merrifield, president, in the chair.—Six ♂♂ examples of the Pierine genus *Eronia* with corresponding ♀♀s: Dr. F. A. **Dixey**. Attention was directed to the extreme diversity shown by the ♀♀s in these closely allied species. Dr. Dixey considered that this characteristic was due to the fact that in every instance the ♀ had been diverted from the ordinary aspect of the group by the operation of mimicry, either Müllerian or Batesian. The species of entirely different affinities which had acted presumably as models were associated also with the exhibit.—Two specimens of *Emmelesia unifasciata* which emerged in August last from pupæ which had lain over since the autumn of 1900, thus having passed five seasons in the pupal stage: R. **Adkin**.—Progressive melanism in the Riviera of *Hastula hyerana*: Dr. T. A. **Chapman**. A discussion followed on melanism and its causes.

Physical Society, March 23.—P101. J. Peiry, F.R.S., president, in the chair.—Unilateral electric conductivity over damp surfaces: Prof. F. T. **Trouton**. Some time ago the author noticed a rather perplexing difference in electrical resistance depending on the direction in which the measuring current was passed. The resistance under examination was that of the layer of moisture which adheres to glass when exposed to moist atmospheric conditions. The arrangement in which this resistance measurement was effected was one used for determining the temperature of deposition of dew. For this purpose two parallel wires of platinum were melted on to a glass

surface at a small distance apart. The surface could be artificially cooled. A cell and a galvanometer were inserted in series with the two platinum wires. As soon as moisture condensed on the glass the circuit was completed and a current passed, thus permitting the accurate determination of the dew-point. When a delicate galvanometer is used a small current can be detected long before the true dew-point is reached. It is at this stage that the anomalous behaviour in the resistance is found. On passing a current across the glass surface when exposed to ordinary atmospheric conditions, it was found to diminish to a certain minimum value, the amount of which depended on the hygrometric state. On reversal, the current assumed its original value, and then diminished to a minimum as before, and so on for further reversals. In order more conveniently to study the matter with larger currents, tinfoil grids were prepared by pasting strips of tinfoil on to glass plates. The theory put forward to account for the phenomenon depended on the transportation of moisture over the surface by the current. In this way the effective thickness of the layer might be much diminished by a banking up of the moisture along the edge of one of the metallic electrodes.—The construction and use of oscillation valves for rectifying high-frequency electric currents: Prof. J. A. **Fleming**. The author recalled the fact that so far back as 1890, when investigating the Edison effect in glow-lamps, he had shown that the space between the incandescent carbon filament and an insulated metal plate placed in the vacuous bulb possessed a unilateral conductivity, negative electricity being able to pass from the filament to the plate, but not in the opposite direction. This led him to suggest an arrangement of the above kind for separating out or rectifying the oppositely directed currents in an alternating current. This effect was now recognised as due to the copious emission of negative ions or electrons from the incandescent carbon. It was by no means obvious, however, before trial, that any such rectifying arrangement or valve would operate with currents of very high frequency. For example, electrolytic rectifiers such as the aluminium-carbon cell were not available for high-frequency currents because a time element entered into the chemical actions involved. In 1904, however, the author discovered that if the carbon filament in an electric glow-lamp was surrounded with a metal cylinder connected to an insulated terminal by a wire sealed through the bulb, and if the filament was made incandescent by an insulated battery, then between the insulated terminal and the negative pole of the battery a unilateral conductivity existed which was operative with currents of any frequency, and the valve so made might be employed to render electrical oscillations measurable by an ordinary sensitive galvanometer. The author exhibited oscillation valves made on this plan.—The use of the cymometer for the determination of resonance curves: G. B. **Dyke**. The experiments described in the paper were made with a view to the adaptation of the direct-reading cymometer to the delineation of resonance curves and the determination of the logarithmic decrements of wave trains and the resistance of oscillating sparks.

EDINBURGH.

Royal Society, February 19.—Dr R. H. Traquair, vice-president, in the chair.—The elevation of the boiling point of aqueous solutions of electrolytes: Rev. S. M. **Johnston**. The paper contained a detailed account of the method of experiment, and after giving the experimental results in a number of cases, proceeded to examine into reasons for the observed increment in the value of the elevation constant as indicated by theory. When the ratio of the molecular conductivity for a given concentration to the value for infinite dilution was plotted against the elevation constant, the graph for each salt was, up to a certain ionisation, a straight line parallel to the ionisation axis, but changed direction at this point. Arguments were adduced that this increment in the value of the elevation constant was due to hydration; and if this explanation be assumed, the observations gave a means of determining the ionisation, and therefore the concentration, at which hydration commences. Thus for solutions of CdI₂, LiCl, NH₄Br, and NH₄I, with concentrations respectively of 1.8, 0.92, 0.74, and 0.7 gram equivalents per litre,

it was calculated that hydration commenced at ionisations (respectively) of 0.103, 0.57, 0.678, and 0.694.—The formation of certain lakes in the Highlands: Dr. L. W. Collet and Dr. T. N. Johnston; with a note on two small lakes in the Alps. The paper and the appended note dealt with the characters of certain lakes in relation to their origin as rock basins or barrier basins.—The methods of standardising preparations of the suprarenals: Dr. Isabella Cameron.

March 5.—Prof. Crum Brown, vice-president, in the chair.—The igneous geology of the Bathgate and Linlithgow Hills, part ii., petrography: Dr. J. D. Falconer. In this continuation of a former paper the petrography of the igneous rocks was discussed under three heads:—(1) the lavas; (2) the contemporaneous intrusions; (3) the later intrusions, chiefly in the form of dykes and sills, and probably of late Carboniferous age.—Three papers dealing with some of the zoological results of the Scottish National Antarctic Expedition were communicated, namely, the South Orkney Collembola: Prof. G. G. Carpenter; the Tubellaria collected by the expedition: Drs. J. F. Gemmill and R. T. Leiper; and the *Echinorhynchus antarcticus*: Dr. J. Rennie. The last paper was an account of a new species of parasitic worm obtained from the stomach of a Weddell whale.

PARIS.

Academy of Sciences, April 2.—M. H. Poincaré in the chair.—Photography of the solar protuberances with coloured screens during the eclipse of August 30, 1905: H. Deslandres and G. Blum. The object of the work was to use coloured screens in order to cut off, as far as possible, all the permanent gaseous radiations of the protuberances. Three screens were used, a green screen transparent from λ 505 to λ 580, a lighter green screen transparent from λ 500 to λ 580, and a yellow screen transparent for the red, orange, and yellow. Owing to the presence of some clouds the scheme could not be carried out completely, but the general results were satisfactory, and the authors recommend the method for use in future eclipses.—The action of the radium emanation on chromogenic bacteria: Ch. Bouchard and M. Balthazard. There are two groups of chromogenic bacteria; in the first the colouring matter produced remains adhering to the bacterium, in the second the colouring matter becomes diffused throughout the culture medium. The radium emanation is not capable of modifying the chromogenic power of the first group, but exerts a distinct effect on the second group. A detailed study was made of the pyocyanic bacillus, and it was found that, amongst the various biological properties of this organism, the power of secreting pigments was the one most sensible to the action of the radium emanation. The virulence of the organism was also clearly reduced; much larger doses of the emanation were necessary to affect the reproductive power of the organism.—The heart of King Rameses II. (Sesostris): M. Lortet. The microscopic characters of the muscle peculiar to the cardiac muscle of the heart were clearly made out.—A new arrangement of the spectroheliograph: G. Millochou and M. Stefanik. The spectroheliographs at present in use have the disadvantage of registering on the photographic plate all the vibrations produced by the various rolling and rubbing parts used in the construction. In the instrument described an attempt has been made to reduce these effects.—Remark on the preceding note: J. Janssen.—The analytical reduction of any system of forces in E_n : P. H. Schoute.—Hypertranscendental functions: Edmond Maillet.—The most probable numerical value of the ratio e/μ_n of the charge to the mass of the electron in the cathode rays: C. E. Guye. A correction is introduced into the usual formula for deducing the ratio of the charge to the mass of the electron, the effect of which is to reduce the difference between the experimental values of Simon and Kaufmann. This result is favourable to the hypothesis of the identity of the electrons which constitute the cathode rays and the β rays of radium.—The influence of compressibility on the formation of drops: H. Ollivier. It is shown that the formation of small liquid drops is largely influenced by the elasticity of the walls and by the compressibility of the liquid; the experimental measurements can be applied to measure the latter.—The halogen

combinations of thallium: V. Thomas. A thermochemical paper.—The action of some alkaloids with respect to pollen tubes: Henri Coupin. Most alkaloids have a very toxic action on pollen tubes. Certain alkaloids, which for a given dose are toxic to the tubes, at a greater dilution may actually serve as food.—The action of carbonic acid on the latent life of some dried seeds: Paul Becquerel.—A contribution to the physiology of grafting: G. Rivière and G. Bailhache.—Some larval forms from the collections of the Prince of Monaco: H. Coutière.—The isopods of the French Antarctic Expedition: Mlle. Harriet Richardson.—The influence of feeding on the value of the urological coefficients and on the mean weight of the molecule elaborated: A. Desgrez and J. Ayrignac. The experiments were made on twenty-five healthy subjects, and the effects of varying diet studied. The diets included milk alone; milk, eggs, and vegetables; milk and vegetables; mixed diet, with a little meat; mixed diet, with much meat; and an absolutely vegetarian diet. The results are given in tabular form.—Demonstration of the fibrinogenic function of the liver: MM. Doyon, Claude Gautier, and Albert Morel.—The origin and mode of formation of Oolitic iron minerals: Stanislas Meunier.

DIARY OF SOCIETIES.

WEDNESDAY, APRIL 12.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—Some so-called Vagaries of Lightning reproduced Experimentally: A. Hands.—Note on the Value of a Projected Image of the Sun for Meteorological Study: Catherine O. Stevens.

ROYAL MICROSCOPICAL SOCIETY, at 8.—Exhibition: Lantern Slides of Plant Structure prepared by Mr. A. Flatters.

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