

ON July 12, 1908, King Edward VII. and Queen Alexandra visited Sheffield and opened the new University buildings. On the day of the King's visit Mr. Wm. Edgar Allen gave 10,000*l.* to the University on the sole condition that it should be used for the erection of a building for the University library. On Monday, April 26, to the great satisfaction of the University authorities and of the people of Sheffield and district, the Prince and Princess of Wales opened the Edgar Allen Library. At a special Congregation honorary degrees of Litt.D. were conferred on His Royal Highness and on Mr. Wm. Edgar Allen, the donor of the library. During the ceremony the Chancellor, the Duke of Norfolk, announced that Mr. Allen had that morning given donations of 500*l.* to the Royal Infirmary and 500*l.* to the Royal Hospital, on condition that a ward or wing in each should be called after the Prince and Princess respectively, a condition their Royal Highnesses were pleased to accept. The educational value of these fresh gifts was aptly referred to by the Chancellor, who pronounced them "a very thoughtful work in connection with this University, because it is undoubtedly a fact that the medical students of this University derive great advantages from what they can learn and see at the great hospitals of this city." The Prince, in the course of an interesting speech, said:—"The great development of the university movement is a remarkable feature in the march of education during the latter part of the nineteenth century. Our important industrial centres recognise that there are problems to be solved differing widely from those dealt with in the more ancient universities. Sheffield was quick to see the necessity of adapting herself to the industrial needs of the people, and to realise that scientific and technical knowledge is indispensable to success in the strenuous commercial struggle among the nations of the west. Thanks to the liberality of Mr. Mark Firth, the college which bore his name was founded in 1879, and incorporated twenty-six years later with those other institutions which constitute the University of Sheffield, including among them schools of engineering and metallurgy which are famous throughout the land. . . ."

THE Lord Mayor will preside at a meeting, to be held at the Mansion House as we go to press, in support of the National League for Physical Education and Improvement. The speakers will include the Bishop of Ripon, the Duke of Argyll (probably), Lord Halsbury, Lord Ashbourne, Sir Henry Craik, M.P., and others. The following report, prepared by a strong and representative committee organised by the league, will be presented and discussed:—(1) That physical education should be compulsory in all schools, subject to the conditions of sections (2) and (3). (2) That medical inspection and report should be compulsory as a preliminary to pedagogical gymnastics and at intervals thereafter; the report to make special reference to the conditions of eyes, ears, teeth, lungs, and heart, and to be drawn up on an authorised form to be supplied to the medical officer. A special report should also be made on the return of a pupil after severe illness. That a local education authority does not adequately carry out its duties in regard to medical inspection unless provision is made for this. (3) That there should be regular pedagogical gymnastics at the schools, the number of lessons, the duration of each, and the nature of the exercises to be adapted to the age and physical condition of the child, the time so allotted not to curtail the play hours, games being an important part of physical education. The committee consider that, when possible, this instruction should be carried out daily, though they recognise that for the present this may be impossible, and that three days a week should be the minimum. They consider that, as far as possible, exercises not demanding apparatus should be carried out in the open air. (4) That in all secondary and intermediate schools specially trained gymnastic specialists should be appointed; in elementary schools, where the physical education is necessarily carried out by ordinary school teachers, such teachers should possess a qualification in physical training. (5) The studies of gymnastic specialists should be carried out on the general lines of the Swedish system, with such modifications as are necessitated by the different conditions of school life in this country; recognition to be made of

various grades of qualifications, and corresponding differences in the course of study required. (6) The studies of the gymnastic specialist should embrace anatomy, physiology, hygiene, mechanics, and pedagogics. (7) For the present, certificates of efficiency as teachers will have to be granted or approved by a central body, whether or not in the future these powers can be delegated to universities or other local bodies. (8) The committee have considered the question of a central institute, and are of opinion that, although such an institute is highly desirable, they are not in a position at present to give definite recommendations in regard to its formation.

#### SOCIETIES AND ACADEMIES.

##### LONDON.

**Royal Society**, April 22.—Sir Archibald Geikie, K.C.B., president, in the chair.—"Dynamic" osmotic pressures: the **Earl of Berkeley** and E. G. J. Hartley.—(1) The theory of ancestral contributions in heredity; (2) the ancestral gametic correlations of a Mendelian population mating at random: Prof. Karl Pearson. The purpose of these two papers is to place in a somewhat clearer light the relationship of the biometric to the Mendelian standpoint. The law of ancestral heredity, as stated by the present writer in a paper published many years ago in the Proc. Roy. Soc., involved the following three points:—(a) the linearity of the regression of offspring on any ancestor; (b) the diminution of the ancestral correlations in a geometrical progression; and (c) the determination of the probable character of the offspring, when the mating was at random, by the multiple regression formula. It was shown, in a memoir of 1896, that when the ancestral correlations were of the type  $\rho, \rho^2, \rho^3 \dots$  then the character of the offspring depended only on the characters of the two parents, and ancestry need not be considered. In a memoir in vol. cciii. of the Phil. Trans. it was shown later that (a) and (b) held for a generalised Mendelian population, for the somatic characters, but that the somatic correlations were not of the type  $\rho, \rho^2, \rho^3 \dots$  and accordingly that ancestry, in the biometrist's sense, did matter even in a population following the simplest Mendelian formula, providing the mating was at random. A recent paper in the Proc. Roy. Soc. might be interpreted as meaning that the law of ancestral heredity did not apply to a Mendelian population. In the first of the above papers the writer indicates how, in a population originally consisting of  $p$  dominants,  $s$  recessives, and  $q$  hybrids, mating at random, the percentage of the number of dominants in the offspring increases with the number of dominants in the grandparentage, and this is true in the case of any grade of ancestors, whatever be  $p, q$ , and  $s$ . In the second paper the writer turns from the somatic to the gametic correlations, which were not discussed in the earlier memoirs, and shows that the gametic correlations form a series of the character  $\rho, \rho^2, \rho^3 \dots$ ; in other words, a knowledge of the gametic character of the parents makes a knowledge of the gametic character of the ancestry unnecessary. Apart from symbols, this must be a truism, because the offspring arises solely from the gametes of the parents; but a point of some interest is that the Mendelian gametic correlations, whatever be the mixture of protogenetic, allogenic, and heterogenetic elements in the freely mating population, take the same values, i.e. 0.5, 0.25, 0.125, &c., diminishing one-half with each ancestral grade. These gametic correlations are much nearer to the values obtained by biometric investigations for the somatic correlations, the theoretical Mendelian somatic correlations being considerably too small. It would thus appear that the Mendelian gametic correlations accurately obey the fundamental conceptions of the law of ancestral heredity, and the only real outstanding antinomy lies in the principle of absolute dominance. The correlations found biometrically suggest that there is a closer relation between the gametic and somatic constitution—at least for certain characters in the species investigated—than is represented by the first Mendelian principle of absolute dominance.—The intracranial vascular system of Sphenodon: Prof. A. Dendy. This memoir contains a detailed description, with illustrations, of the intracranial

blood vessels of the Tuatara, of which no account has hitherto been published. The description is believed to be more complete than any hitherto given for any reptile, and a considerable number of vessels are described which have not hitherto been noted in Lacertilia. This comparative completeness of detail is largely due to the employment of a special method of investigation. By this method the entire contents of the cranial cavity are fixed and hardened *in situ*, and are then in excellent condition either for dissection or for histological purposes. The brain does not occupy nearly the whole of the cranial cavity, there being a very large subdural space (especially above the brain) across which many of the blood vessels run, together with delicate strands of connective tissue which connect the dura mater with the pia. The eyeballs are removed, and an incision is made on each side in the cartilaginous wall which separates the cranial cavity from the orbit. Acetic bichromate of potash (made up according to the formula given by Bolles Lee) is injected into the cranial cavity through these incisions, and the entire animal, after opening the body cavity, is suspended in a large volume of the same fluid for about five days, and then graded up to 70 per cent. alcohol. When the cranial cavity is now opened up the cerebral vessels are seen with extraordinary distinctness, although they have not been artificially injected. Further details were made out by means of serial sections, both transverse and longitudinal, and both of the adult and of advanced embryos (Stage S). In most respects the arrangement of the intracranial blood vessels agrees with that found in the Lacertilia, so far as these have been investigated but there is an important difference in the fact that the posterior cephalic vein leaves the cranial cavity through the foramen jugulare, and not through the foramen magnum, while a slightly more primitive condition is shown in the less complete union of the right and left halves of the basilar artery. Sphenodon makes some approach to the condition of the Chelonia in this latter respect, but differs conspicuously from this group in the fact that the circle of Willis is not completed anteriorly, as well as in the fact that no branch of the posterior cephalic vein leaves the cranial cavity through the foramen magnum. A very characteristic feature of Sphenodon is the development of large transverse sinuses resembling those of the crocodile, but these communicate with the extracranial vascular system in quite a different manner from that described by Rathke in the latter animal.—The graphical determination of Fresnel's integrals: J. H. Shaxby. Fresnel's integrals  $\int_a^x \cos \frac{1}{2}\pi x^2$  and  $\int_a^x \sin \frac{1}{2}\pi x^2$  can readily be evaluated by applying Simpson's rule to the calculated values of  $\cos \frac{1}{2}\pi x^2$  and  $\sin \frac{1}{2}\pi x^2$  for a sufficient number of values of  $x$ . In the cosine case, the curve  $y = \cos \frac{1}{2}\pi x^2$  gives a series of loops, cutting the  $x$ -axis at  $x=1, \sqrt{3}, \sqrt{5}$ , &c. The areas of these loops, after the first few, are shown to be proportional to the lengths of the bases upon which they stand; a loop extending from  $x_1$  to  $x_2$  has an area  $k(x_2 - x_1)$ , where  $k = \frac{2}{\pi} = 0.6366$ . Thus integration to fairly large values of  $x$  as upper limit may be simply performed by adding together (a) the area for the first few loops (with due attention to + or - sign) obtained by Simpson's rule; (b)  $k \Sigma d$ , where  $\Sigma d$  is the quantity obtained by summing (again paying attention to sign) the base lines of the complete loops of higher order than those in (a); and (c) the area of the part of a loop bounded by the upper limit, viz. from  $x_1 = \sqrt{2n-1}$  to the upper limit of integration  $x_2$ , where  $x_1^2$  is the greatest odd whole number less than  $x_2^2$ . The area (c) is given by the expression  $\frac{2}{\pi(x_1 + x_2)} (\sin \frac{1}{2}\pi x_2^2 \pm 1)$ . Similar methods can be used for the sine integral. Values of the integrals calculated as above are tabulated, and agree with Gilbert's values to within 1 part in 1000.

Linnean Society, April 1.—Dr. D. H. Scott, F.R.S., president, in the chair.—Amphipoda Hyperiidea of the Sealark Expedition to the Indian Ocean: A. O. Walker. The Amphipoda Hyperiidea of the Sealark Expedition consist of thirty-five species in twenty-eight genera, none

new to science. *Scina borealis*, G. O. Sars, has not previously been found in tropical seas. Most of the specimens were taken in open tow-nets, so the actual depth at which they occurred is uncertain, but an ovigerous female of *Platyscelus armatus* (Claus) was taken "off sounding-lead" at 209 fathoms, which shows that this species deposits its ova on the bottom.—Marine Mollusca of the Sealark Expedition: Dr. J. Cosmo Melville. The marine Mollusca obtained during the Stanley Gardiner Expedition of 1905-6 are especially interesting from the standpoint of geographical distribution. Accompanying the catalogue of nearly five hundred species are given tables of comparison with the molluscan faunas of nine or ten selected "areas" of the Great Indo-Pacific region, one curious result of this investigation being that, whereas many are identical with species found in Polynesia or even Japan, the reverse obtains when comparison is made with the more contiguous fauna of the Persian Gulf and North Arabian Sea. This last has been made the subject of special study during the past fourteen years, and a total of nearly seventeen hundred species chronicled, of which something like five hundred proved new to science. Only one of these new forms (*Peristernia corallina*, Melv.) has been found to occur in the Stanley Gardiner collections made in the more southern portions of the same ocean, and comparatively few of the better-known forms are identical. Indeed, the affinities of this collection are, as might be expected, Mauritian.—Land and fresh-water Mollusca of the Seychelles Archipelago: E. R. Sykes. The author gives an account of the land and fresh-water shells collected by Mr. Stanley Gardiner in the Seychelles Islands. Nearly all the known forms are included in the collection, and three species belonging to *Ennea* (2) and *Priodiscus* (1) are described as new. A table showing the inter-insular distribution is given, and a list of all known forms. The origin of the fauna is uncertain, but the islands have evidently been for some considerable period separated from the mainland.—A blind prawn from the Sea of Galilee, constituting a new genus and species, *Typhlocaris galilea*: Dr. W. T. Calman.

#### PARIS.

Academy of Sciences, April 19.—M. Bouchard in the chair.—Examination of the upper layers of calcium and hydrogen in the solar atmosphere, and of the same black filaments in the two layers: H. Deslandres and L. d'Azambuja. The large spectroheliograph at Meudon permits of the examination of the  $K_3$  and  $K_2$  lines, quite pure and free from other light. The black filaments of  $K_3$  have been compared with the image of  $H\alpha$ . It is concluded that in all previous work the lines obtained for hydrogen represent a mixture of different layers. To obtain the upper layer only, it is necessary to isolate the centre of the black line.—The slowness of the spontaneous transformation of the variety unstable at low temperatures of certain dimorphous bodies: D. Gernez. An experimental study of the equilibrium of yellow and red mercuric iodide and the corresponding varieties of thallous iodide.—The "sense of direction" in bees: Gaston Bonnier. The fact that bees, up to a distance of 3 kilometres, fly in a direct line for the hive, has been explained as due either to the sense of sight or of smell. The author's experiments clearly demonstrate that neither sight nor smell serve for this purpose, and that bees possess a "sense of direction." This sense is not located in the antennæ.—The map of south Imerina: the methods of work employed: E. Colin. This map is on the scale of 1/100,000, with contour lines of 50 metres.—Remarks relating to the communication of M. Deslandres: G. E. Hale. In the photographs of  $H\alpha$  it has been found that the relative intensity of the black and brilliant flocculi is determined by the position of the slit relative to the line  $H\alpha$ . If the slit only allows the light from the central portion of the line to fall on the plate, the brilliant flocculi are very intense in the image. If, on the contrary, the image is formed exclusively from the light of the edge of the line, the black flocculi are well seen, but the brilliant flocculi are faint or even invisible. The results are not favourable to the theory of anomalous refraction as the cause of the hydrogen flocculi.—Letter from Dr. J. B. Charcot describing the voyage of the *Pourquoi-pas?*

(Antarctic expedition).—The determination of the solar parallax from observations of the planet Eros made in several observatories in 1900-1: Arthur R. Hinks. The photographic observations lead to  $w = 8.807^{\circ} \pm 0.0027^{\circ}$ ; the principal micrometric observations give  $8.803^{\circ} \pm 0.0039^{\circ}$ . The reduction of the eye observations by the method of passages is not yet completed. The mean value  $8.806^{\circ}$  is not consistent with a greater constant of aberration than  $20.47^{\circ}$ .—The distribution in space of large proper motions: H. H. Turner.—Infinitely small deformation of ruled surfaces: J. Haag.—Differential systems of isomorphs: E. Vessiot.—The analytical function equal to the maximum modulus of an integral function: Arnaud Denjoy.—The electrical properties of copper-aluminium alloys: H. Pecheux. Alloys containing 3, 5, 6, 7.5, 10, and 94 per cent. of aluminium were examined. The electromotive forces of thermocouples consisting of alloy/copper were measured for temperatures up to  $820^{\circ}$  C., and the resistances of the same alloys measured for temperatures up to  $350^{\circ}$  C.—Some consequences of the use of a selective receiver in the measurement of radiant energy: Ch. Féry.—The physico-chemical properties of the colloidal particles known as *micelles*: G. Malitano. The author maintains that the experimental data of J. Duclaux are not in contradiction with his own experiments.—The function of contact electrification in the permeability of membranes to electrolytes: Pierre Girard.—The determination of added water in decomposed milks: André Kling and Paul Roy. The total nitrogen corresponding to the albumenoids of the milk is not affected by the fermentative processes, and hence is suggested as more suitable for the detection of added water than the estimation of the non-fatty solids.—The suspension of life in certain seeds: Paul Bécquerel. Seeds of lucerne, mustard, and wheat were kept at the temperature of liquid air for three weeks, and then further cooled to  $-253^{\circ}$  C. (boiling hydrogen) for seventy-seven hours. All the lucerne and mustard seeds germinated normally, and four out of five of the wheat grains. The seeds had been well dried and placed in a vacuum before cooling.—Remarks on the preceding communication: Armand Gautier.—The lowering of the diaphragm: A. Thooris.—The diastases of milk: F. Bordas and F. Touplain. The oxydase reaction given by unboiled milk in presence of hydrogen peroxide and paraphenylenediamine appear to be due, not to an oxydase, but to the casein, or compound of casein and lime.—The comparative harmlessness of carbonic acid in incubation: M. Lourdel.—The inequalities of electric potential at several points of the organism: J. Audrain and R. Demerliac.—Passive congestion of the liver and arterial hypertension: E. Doumer and G. Lemoine.—The hydroids of the Lamouroux collection: Armand Billard.—A storm at sea: M. Halluitte.

## DIARY OF SOCIETIES.

THURSDAY, APRIL 29.

ROYAL SOCIETY, at 4.30.—Note on the Results of Cooling certain Hydrated Platin-cyanides in Liquid Air: Prof. J. Emerson Reynolds, F.R.S.—A Phenomenon connected with the Discharge of Electricity from Pointed Conductors (with a Note by Prof. J. Zeleny): Prof. H. T. Barnes and A. N. Shaw.—On the Effect of Temperature on Ionisation: J. A. Crowther.—The Wave-making Resistance of Ships; a Theoretical and Practical Analysis: Dr. T. H. Haweck.—The Ionisation in Various Gases by Secondary  $\gamma$  Rays: R. D. Kleeman.

ROYAL SOCIETY OF ARTS, at 4.30.—The Problem of Indian Labour Supply: S. H. Fremantle.

FRIDAY, APRIL 30.

ROYAL INSTITUTION, at 9.—The Pitfalls of Biography: Dr. Edmund Gosse.

SOCIETY OF DYERS AND COLOURISTS, at 8.—Recent Developments of the Theory of the Colloidal State, and their Bearing on the Dyeing and Cleaning of Textile Fibres: Dr. E. Feilman.

SATURDAY, MAY 1.

ROYAL INSTITUTION, at 3.—The Earth Movements of the Italian Coast and their Effects: R. T. Günther.

MONDAY, MAY 3.

SOCIETY OF CHEMICAL INDUSTRY, at 8.—Vulcanisation Tests in Plantation Rubbers: Clayton Beadle and Dr. H. P. Stevens.—The Indian Magnesite Industry: H. H. Dains.—A New Steam Meter: A. Girtler.—A New Refractometer: J. Lewkowitsch.

ROYAL SOCIETY OF ARTS, at 8.—Aërial Flight: F. W. Lanchester.

TUESDAY, MAY 4.

ROYAL INSTITUTION, at 3.—Cosmogonical Questions: Prof. Svante Arrhenius.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—(1) A Note on a Stone on the Rock of Cashel: (2) Some Irish Stone Circles: A. L. Lewis.

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WEDNESDAY, MAY 5.

ENTOMOLOGICAL SOCIETY, at 8.

ROYAL SOCIETY OF PUBLIC ANALYSTS, at 8.—The Analysis of Air: W. J. A. Butterfield.—The Estimation of Iron by Permanganate in Presence of Hydrochloric Acid: G. Cecil Jones and J. H. Jeffery.—The Composition of Butter from a Cheshire Herd of Cows: A Smetham.—A Rapid Method for the Estimation and Separation of Milk Sugar and Cane Sugar in Sweetened Condensed Milk: I. S. Jamieson.

THURSDAY, MAY 6.

ROYAL SOCIETY, at 4.—Election of Fellows.—At 4.30.—*Probable Papers*: Reciprocal Innervation of Antagonistic Muscles. Note XIV. On Double Reciprocal Innervation: Prof. C. S. Sherrington, F.R.S.—Note on a Curious Property of Neon: Prof. J. Norman Collie, F.R.S.—The Properties of Colloidal Systems. I. The Osmotic Pressure of Congo-red and of Some Other Dyes: Dr. W. M. Bayliss, F.R.S.—The Origin and Destiny of Cholesterol in the Animal Organism. Part V. On the Inhibitory Action of the Sera of Rabbits fed on Diets containing Varying Amounts of Cholesterol on the Haemolysis of Blood by Saponin: Miss Mary T. Fraser and J. A. Gardner.

LINNEAN SOCIETY, at 8.—On some Zootheca from Queensland and the New Hebrides: Mrs. Leonora J. Wilsmore.—The Ecological Relations of the Tiger-Beetles: Dr. V. E. Shelford.

RÖNTGEN SOCIETY, at 8.15.—An Illustrated Description of the Historical Collection of Tubes recently deposited at the Albert and Victoria Museum: Dr. G. H. Rodman.—On X-rays Produced at a Magnetically Deflected Cathode Focus: J. H. Gardner.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Theory and Application of Motor Converters: H. S. Hallo.

FRIDAY, MAY 7.

ROYAL INSTITUTION, at 9.—The Campaign against Malaria: Major Ronald Ross, C.B., F.R.S.

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