

Societies and Academies.

LONDON.

Royal Society, Nov. 17.—T. Graham Brown: Absence of a linear relationship between graded simple reflex flexions and the relations thereof evoked by a constant extension producing stimulus. In decerebrate cats, graded flexion magnitudes of simple flexor shortening are obtained in response to flexion-producing stimuli of different intensities. Each of these simple shortenings is then subjected to the 'inhibitory' effect of a constant extension-producing stimulus—thus giving compound flexor shortening. Comparison of the magnitudes of simple flexor shortening and of compound flexor shortening fails to establish a linear relationship between the two.

T. Graham Brown: Absence of a linear relationship between the reflex flexor shortenings evoked by a graded series of flexion-producing stimuli and the 'inhibitory' lengthenings of a constant extension reflex evoked by the same stimuli. In decerebrate cats, graded reflex magnitudes of simple flexor shortenings are obtained in response to flexion-producing stimuli of different intensities. Each of these stimuli is then compounded with a constant extension-producing stimulus, and the resultant lengthening (relaxation) of the extensor muscle is measured. Comparison of the magnitude of simple flexor shortening and of compound extensor lengthening fails to establish a general linear relationship between the two.

T. Graham Brown: The relation of the magnitudes of remaining reflex shortening in two antagonistic muscles during compound stimulation. Where two antagonistic reflex stimuli are applied concurrently, the remaining shortenings of two antagonistic muscles during compound stimulation are related to each other. This relation is such that in many cases where one or both of the reflex stimuli are varied in intensity, the sum of the remaining shortenings in the two antagonistic muscles (each measured as a ratio to maximal reflex shortening) is constant. In other instances this constancy fails, but a series of sums bears an approximate relationship of linearity to the magnitudes of the simple reflex shortenings evoked by the series of graded reflex stimuli which are used in the experiment. The most general statement of this relationship is as follows: The sum of the proportional remaining shortenings in two antagonistic muscles, Y , is linearly related to the simple reflex shortening, X , evoked at each intensity of the series of graded reflex stimuli used in a series of compound reflexes, *i.e.* $Y = AX + B$.

Sybil Cooper and D. Denny-Brown: Responses to stimulation of the motor area of the cerebral cortex. The spinal discharge evoked by cortical stimulation can follow the rate of repetition of break shocks in that stimulus up to about 180 a second, indicating a very simple synaptic relation between the pyramidal tract and the anterior horn cell. Rates of stimulus above and below that rate usually cause a total electro-myographic rhythm of 160 to 180 a second. Varying types of grouping of the spinal discharge occur, among them being that of a 'dominant' rhythm of 35 to 50 a second, with no relationship to the rate of stimulus. The typical motor response to stimulation of the motor area shows signs of concurrent inhibition. Clonic after-discharge, 'epilepsy,' and the form of the motor response are the result of a conflict between inhibition and excitation.

J. Lorrain Smith and T. Rettie: The distribution of lymphatics defined by autolysis of their contents. Autolysis *post mortem* of the liquid contained in the lymph forms doubly refractile globules of 'soap,' often in such quantity that the lumen of the channel is

filled continuously. Lymphatics of the liver are defined because in them the globules form abundantly and at a stage when, as yet, no sign of them is to be found in any other site.

Geological Society, Nov. 2.—J. A. Douglas and W. J. Arkell: The stratigraphical distribution of the Cornbrash: I. The south-western area. The stratigraphical distribution of the Cornbrash in south-western England, from Oxford to the south coast near Weymouth, is described, and the eleven brachiopod zones proposed by Mr. S. S. Buckman are discussed. The new records are added to Mr. Buckman's faunal range-diagram, and in this way it is shown that many of his conclusions regarding penecontemporaneous erosion and non-sequences in the Cornbrash, as expressed in his clinal diagram, have been based on insufficient data. A twofold rather than a threefold subdivision of the Cornbrash is advocated.

Linnean Society, Nov. 3.—R. W. T. Gunther: Exhibition of rotographs of some unpublished letters of John Ray. The letters were written by Ray to the antiquary, John Aubrey, and to the Keeper of the Ashmolean Museum, Edvard Lhwyd, between 1676 and 1703. It is proposed to print them *in extenso* as an extra volume in the Ray Society's series, together with Ray's letters to the secretaries of the Royal Society.—T. A. Sprague: The botany of Brunfels. Brunfels' interest in plants seems to have been chiefly confined to their medicinal properties, on which his classification was largely based, with the result that some of his 'genera' were highly artificial; 'Scrophularia,' for example, included *Scrophularia nodosa*, *Sedum Telephium* and *Ranunculus Ficaria*. His use of the terms 'male' and 'female' sometimes indicated differences in flower-colour between two plants which were otherwise more or less similar, the deeper colour in the following order—red, blue, yellow, white—being 'male,' and the paler colour 'female.' The term 'female' in other cases indicated a spurious kind or an abnormality. His herbal contains the first recognisable illustrations of many of the Linnean species, of which indeed they may often be regarded as the historic types.—S. K. Mukerji: The biological relations of *Mercurialis perennis* L. The known range of *M. perennis* has been considerably extended, and the discontinuity in distribution of the genus is more apparent than real. Seed output is low compared with many other woodland species, and only about 10 per cent. of the seeds formed in England are germinable. The root-system shows branched and unbranched roots, both infected with fungi, particularly the former. Shallow rooting is associated with very high water content of soil, and the lower the acidity the deeper the penetration. Great variation in leaf form and size occurs. The leaf margin bears hydathodes secreting an acid liquid containing potassium chloride and calcium carbonate. An intergradation of sex has been observed. Pollination is partly entomophilous but mainly anemophilous. The fruit explosively ejects the seeds to a distance of about 4 metres. *M. perennis* shows no correlation between dry weight and the total carbonate content of the soil, and it is apparently not a true calcicole but an oxyphobe. It shows decided preference for soils with a high organic content. Light intensity distinctly affects the distribution and growth of individuals of the different sexes separately, and light intensity may determine the sex of a plant under certain conditions.

Optical Society, Nov. 10.—J. R. Hamblin and T. H. Winsor: On the resolution of gratings by the astigmatic eye. An investigation of the resolution of gratings by the human eye, commenced by H. H. Emsley in 1925, is continued. The irregular curves

representing variation of grating acuity from meridian to meridian is of the same general form in all astigmatic eyes. Experiments show that the images of gratings placed in various directions, which are produced by an ordinary astigmatic system, show irregularities of the same form due to the overlapping of the blurred images of the separate lines of the gratings. Thus an eye with regular astigmatism will exhibit irregularities in resolving gratings at various inclinations, and charts consisting of fine parallel lines are not trustworthy for testing ocular astigmatism.

Physical Society, Nov. 11.—G. W. Sutton: The power-factor and capacity of the electrodes and base of triode valves, with special reference to their use in thermionic voltmeters. A discussion of the conditions under which a three-electrode valve-voltmeter should be operated to ensure a minimum power consumption, and at the same time to give indications closely proportional to the square of the input voltage; and a simple method of adjusting the operating voltages to fulfil the necessary conditions.—H. Lowery: (1) The refraction and dispersion of (1) air, (2) oxygen, (3) gaseous chloroform; (2) New determinations of the gaseous refractivities of (1) acetone, (2) methyl ether, (3) ethyl ether. The refractivities of air, oxygen and gaseous chloroform have been found for the green mercury line ($\lambda 5461$), and the dispersion studied over the range $\lambda 4800$ to $\lambda 6700$. The gaseous refractivities of acetone, methyl ether and ethyl ether for $\lambda 5461$ have also been measured.—Panchanon Das: The theory of the elastic pianoforte hammer. By making various approximations, formulæ are obtained from which it is possible to deduce the practical effect of the elasticity and velocity of the hammer, and of the position of its point of impact on the string.

EDINBURGH.

Royal Society, Nov. 7.—A. W. C. Menzies and P. R. C. Macfarlane: Some further notes on the salmon of the River Moisie, Eastern Canada. The Moisie catch is chiefly composed of salmon which have spent either 2 + or 3 winters in the sea, and one of the main features of interest is the high proportion of 'spring' fish which arrive in June and July—83 per cent. in 1923 and 41 per cent. in 1924. Grilse apparently are almost entirely absent from the Gulf of St. Lawrence rivers (only one was found in this Moisie collection), although they are present in large numbers in Newfoundland, and, apart from the two age groups already mentioned, the catch is composed almost entirely of fish on their second or third return to the river: 13 per cent. in 1923, and no less than 29 per cent. in 1924 belong to this last class of fish, which consequently form a proportion far beyond that usually found in European rivers. The average weight of the Moisie large spring fish, 20.5 lb., is much the same as that of similar fish on the eastern side of the Atlantic, but the weight of the 2 + winters group, 10.5 lb., is only comparable with that of the earlier of the migrants of the same history in Great Britain. Recovery after spawning is evidently rapid and growth is good. Only one-third of the smolts were two years old at migration, and the remainder were either three or four years of age.—L. H. Easson and R. W. Armour: Action of 'active' nitrogen on iodine. Experiments on the rate of the reaction between active nitrogen and iodine vapour and on the intensity of the light emitted for different pressures of iodine. The emission of the line $185 \mu\mu$ was observed and the evidence for the energy content of active nitrogen discussed.—J. W. Gregor: The pollination of *Lolium perenne* and *L. italicum*. The prevalence of self-sterility in the agricultural grasses has indicated

methods of breeding, and an investigation of this problem was necessary preparatory to the study of the survival of growth forms within wild populations. It has not been possible, so far, to increase the self-fertility of *L. perenne* and *L. italicum* by changing the environmental conditions, or by artificial methods of pollination. The results obtained from plants under strictly controlled conditions have been confirmed by growing these plants in the field isolated from other plants of the same species.—Dorothy J. Jackson: Wing dimorphism in the genus *Sitona* and its inheritance in *Sitona hispidula* F. (Coleoptera, fam. Curculionidæ). Wing dimorphism is common in the genus *Sitona* and has been specially studied in *S. hispidula*. In the macropterous form of this species the wings are fully developed. In the brachypterous form the wings are small and truncated, and the metathorax is modified in structure. The dimorphism is well-marked in the pupal stage. Some of the macropterous insects are capable of flight, others have the wing muscles greatly reduced and histologically abnormal. The macropterous and brachypterous forms are widely distributed in Europe and occur frequently in the same locality. Breeding experiments conducted to determine the genetical relationship of the two forms indicate that the brachypterous condition is inherited as a simple Mendelian dominant.—B. Kaczkowski: Contribution to the studies of the origin of European sheep. Craniological investigations on the sheep having been found unsatisfactory, the method of serological isoagglutination was applied in an attempt to discover the ancestral types involved in the development of modern European sheep. Two main blood groups are present in sheep; one (*A*), as found in *O. musimon* and in Polish local sheep, being dominant to the other (*O*), as found in the Southdown. The latter group may be divided into two sub-groups, one with, the other without, anti-*A*. It would appear probable that differences in origin exist between the English Southdown and the Polish local sheep.—E. T. Copson: On Fourier constants. By the use of a theorem recently proved by Titchmarsh, certain convergence properties of series of Fourier constants are obtained. The results are connected with the generalised Riesz-Fischer and Parseval theorems, but cannot be obtained by the use of these.

MANCHESTER.

Literary and Philosophical Society, Nov. 1.—J. N. Langdon and Edna M. Yates: Transfer of training in manual dexterity. The doctrine of transfer of training states that training in any specific form of mental activity is capable of having its effects transferred to any other activity of the same form although dealing with different material. A group of 32 subjects was trained intensively for a fortnight, in a laboratory adaptation of a process employed in driving-chain manufacture. Tests of manual dexterity and muscular ability were given before training was commenced and at the ends of the first and second weeks respectively. The same tests were given to a group of 28 subjects who received no training. All the subjects were of roughly the same age and type, and in each case the subject's payment was calculated upon actual performance, hence the predominant incentive to satisfactory performance was a financial one and may be assumed to be constant. Statistical analysis of the results reveals that there is no significant difference between improvement in the test performances of the trained and control groups respectively. In fact, the brief practice afforded by the first giving of the test is more effective than the prolonged intensive training on a similar, but not identical, performance. There is evidence, then, that training in manual dexterity is specific and not general.

SHEFFIELD.

Society of Glass Technology, Oct. 19.—J. F. Hyslop: Crystal growth and impact brittleness. The chief cause of brittleness in opal glass is the tendency of the glass to produce sharp angular crystals, and these may be formed by: (a) the tendency of the matrix to precipitate silica. If the opal is susceptible to this secondary devitrification, a careful choice of working temperature is necessary to avoid brittleness; (b) the tendency of the glass to grow angular instead of globular fluoride particles. This happens in a glass of low viscosity, and such a glass is brittle at low and high working temperatures.—E. J. C. Bowmaker and J. D. Cauwood: The detection of selenium in decolorised bottle glass. The glass is treated with hydrofluoric acid, a little strong nitric acid, and evaporated to dryness at about 90° C. Strong nitric acid is added to the residue, again evaporating to dryness. The residue is then dissolved with 1:1 nitric acid and a little water added. Strong sulphuric acid is added and the whole evaporated until fuming. After cooling, a piece of codeine sulphate is added with stirring, and the solution heated to fuming. A green coloration denotes the presence of selenium. Manganese and copper must be absent.

PARIS.

Academy of Sciences, Oct. 31.—Ch. Depéret: New observations on the Neolithic deposits of Glozel (Allier). The authenticity of the deposits described by the author last year has been disputed. New excavations were made last July, in company with MM. Arcelin and Björn, of the Oslo Museum, under conditions which would render impossible the fraudulent introduction of objects. The author concludes that the date of the Glozel deposits dates from very early Neolithic and maintains the authenticity of the discoveries.—A. Lévêque: The theoretical solution of the problem of the exchange of heat by circulation of a non-viscous fluid in quiet movement, with velocity potential, inside a tube.—A. Schidlof: The interpretation of the masses of the electron and proton in a universe of five dimensions.—Boutaric and Mlle. G. Perreau: Refractometric measurements on colloidal solutions. Results of the application of the interference refractometer to colloidal solutions, especially the phenomena accompanying flocculation.—A. Travers: The ionic equilibrium $\text{Al}(\text{OH})_3 + 6\text{F}^- \rightleftharpoons \text{AlF}_6^{3-} + 3\text{OH}^-$. Cryolite is stable over a wide range of pH.—Joseph Péneau: The age of the iron minerals attributed to the Gothlandian in the synclinal of Saint-Julien-de-Vouvantes.—Maurice Piettre: Remarks on agglutinating immunosera: localisation of the agglutinines.—Henri Jean Frossard: The treatment of deafness by the Laënnec method.—A. Leulier, P. Sedallian, and J. Gaumond: Diphteric toxin, nucleoproteids, and dialysis.

ROME.

Royal Academy of the Lincei, June 19.—L. Palazzo: Results of a magnetic exploration in the Giuba and Uebi Scebeli (Southern Somalia).—P. Vinassa: The 'electronic number' and constituents of the globe. The electronic number, indicating the number of peripheral electrons which can be found in the various elements taking part in terrestrial combinations, seems to be not merely of geochemical interest, as it serves as the basis of a new classification of the elements.—C. Foa: The neurochemical mechanism of vagal inhibition in the heart of mammals. The results of experiments on frogs indicate that stimulation of the cardiac vagus does not determine distance phenomena, and that the presence in the blood of a substance with

vagal action may be assumed.—L. A. Herrera: Plasmogeny. Imitation of amœbæ by means of resin soap.—S. Minetti: The Taylorian development $\Sigma a_n z^n$, where $a_n = g(n)$ with $g(n)$ wholly transcendental.—L. Labocchetta: Equations of geometrical figures comprising a parameter with variation of which the line or surface represented passes continuously from the polygonal or polyhedral form to the circular or spherical form.—P. Nalli and G. Andreoli: The area of a surface, Stieltjes' multiple integrals, and multiple integrals of functions of several complex variables.—G. Krall: Green's functions relating to pluri-connected fields.—F. Robles: Rayleigh's theorems of small oscillations.—G. Thomsen: Dynamics of rigid bodies in general relativity.—A. Masotti: Motions of a perfect liquid by plane strata.—A. Carrelli: The hydrodynamic interpretation of the quantum theory.—G. R. Levi and C. Fontana: Gold purple. The supposedly cubical granules of gold in purple of Cassius have a side with the mean value 36 Å. Addition of stannic acid has no influence on the degree of subdivision of the gold.—G. Malquori: The system, $\text{Fe}(\text{NO}_3)_3 - \text{KNO}_3 - \text{H}_2\text{O}$ at 25°. Nonhydrated ferric nitrate and potassium nitrate form neither additive compounds nor mixed crystals at 25°. The solubility curves of the two salts project beyond the point of intersection, a metastable region being thus exhibited.—G. Natta: Crystalline structure of cesium trichloromercurate. This compound, CsHgCl_3 , obtained by crystallisation of the solution containing excess of cesium chloride, crystallises in the monometric system. The elementary cell is cubic, the side being 5.44 Å. The positions of the ions in the cell are defined by the following co-ordinates: Hg ($\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$); Cs (0 0 0); Cl ($\frac{1}{2}$ $\frac{1}{2}$ 0), ($0 \frac{1}{2} \frac{1}{2}$), ($\frac{1}{2}$ 0 $\frac{1}{2}$). The calculated density is 4.53.—A. Rejna: Crystalline structure of calcium hydroxide. For this compound the values given by Levi, namely, $a = 3.52$, $c = 4.93$, $c : a = 1.40$, are confirmed, the value $u = \frac{1}{4}$ being assumed and the co-ordinates for Ca and O being Ca (0 0 0); O ($\frac{2}{3}$ $\frac{1}{3}$ u): ($\frac{2}{3}$ $\frac{1}{3}$ u).—L. Scremin: Variations in the ionic equilibrium as factors of pharmacological action. (i) Potassium and convulsant drugs. When the equilibrium $\frac{\text{Na}^+\text{K}^+}{\text{Ca}^{++}\text{Mg}^{++}}$ is modified in the sense of an increase in K^+ , the cells of the posterior cornu react far more readily towards drugs which have the specific effect of increasing the reflex excitability. The cause of this action of the potassium ion is not known, but it may be due to the fact, observed by various investigators, that this ion renders the cell walls more permeable and thus facilitates the entry of the drug.—P. Aloisi: Study of the manganese ferropyxones. Examination of two samples of Italian rhodonite reveals a variation in the sign of the double refraction with change of the relation between the manganese oxide and the oxides of other bivalent metals. This variation in sign appears to be accompanied by profound modifications in the whole orientation of the indicatrix.—A. Desio: Miocene echinoderms of Porto Bardia and of the oasis of Giarabub.—B. de Finetti: Conservation and diffusion of Mendelian characters. (ii) General case.—E. Benedetti: Modifications in the course of alcoholic fermentation arising from the effect of the oscillating electromagnetic field on the yeast. When either 5 per cent. glucose solution or beer wort containing yeast is subjected to the action of an oscillating electromagnetic field for a short time, the velocity of the subsequent fermentation is diminished. As the action of the field is prolonged more and more, this effect increases to a maximum and afterwards changes to an acceleration of the fermentation, this again changing to a retardation for still longer exposures to the field.