Societies and Academies.

LONDON.

Royal Society, November 1.—E. G. T. **Liddell** and Sir Charles **Sherrington**: A comparison between certain features of the spinal flexor reflex and of the decerebrate extensor reflex respectively. Comparison of the tetani of the knee flexor, evolved by motor nerve stimulation and by reflex excitation, shows somewhat close resemblance between them. A constant difference is the presence of after-discharge in the latter. A further difference frequently found is, the myograph records being isometric for both, a steeper ascent and sharper ascent-plateau turn for the reflex. The reflex tetanus, like the "motor-nerve" tetanus, appears to engage from its very beginning the full quota of the motoneurones that it will at any time under its further continuance engage. The steeper ascent in the reflex is due to after-discharge setting in early, so that some of the motoneurones activated by the reflex cannot respond to the immediately succeeding series of stimuli. Intensity and not duration in the external stimulus is therefore the sole arbiter of the intensity of the reflex tetanus. Similar comparison of the crossed reflex of the knee extensor with the "motor-nerve" tetani of that muscle shows that the reflex tetanus develops much the more slowly, and that the ratio between the tension developed by the reflex contraction to a single shock and that to a serial stimulus is much less than under "motor-nerve" stimulation. The reflex at its outset appears to activate only a small fraction of the quota of motoneurones that it will gradually bring into activity.—J. **Barcroft** and H. **Barcroft**: The blood pigment of Arenicola. The blood pigment of *Arenicola Marina* differs from the hæmoglobin of human blood in certain respects. The α band of the oxy-hæmoglobin is situated 18 Å.U. nearer the violet and the α band of the carbon monoxide hæmoglobin is situated 11 Å.U. nearer the violet than the corresponding human band. The dissociation curves show a greater affinity for both oxygen and carbon monoxide than those of human blood. The affinity for carbon monoxide is about 70 times that for oxygen, as compared with 250 in man and 140 in the mouse. The possibility of a relationship between the position of the bands and the affinity of the pigment for gas is discussed. The main unloading of oxygen from the pigment of Arenicola would appear to be between 1 and 3 mm. pressure. The mean oxygen capacity of the hæmoglobin per gram of Arenicola is about 0·01-0·013 c.c. A comparison between the oxygen capacity of the pigment and the total oxygen consumption of the worm shows that the pigment holds sufficient oxygen to supply the animal for 1-2 hours, and probably acts as a reserve to tide it over the period at low-water when its hole is closed.—T. **Deighton**: The basal metabolism of a growing pig. The basal metabolism of a pig has been measured at various ages from seventy-five days upwards, and it has been shown that in the pig, as in human beings, the metabolism per unit area is greatest in mid-youth. This increase of metabolism in youth seems to be directly ascribable to growth. Metabolism after the ingestion of food reaches a maximum after five hours and then declines. The rationing of pigs for maintenance and growth is discussed, and it is concluded that the curve of rationing for growth and maintenance, without fattening, cannot possibly be a two-thirds power curve.

Physical Society, June 22.—Dr. Alexander Russell in the chair.—F. **Horton**: The excitation and ionisation potentials of gases and vapours. The study of ionisation potentials dates back to the discovery of the phenomenon of the ionisation of gases by collision, but the theoretical importance of a knowledge of the least difference of potential through which an electron must fall in order to acquire sufficient energy to ionise a gaseous atom or molecule on collision with it has greatly increased since the propounding by Bohr of his theory of atomic structure. Bohr's theory predicted the possibility of an atom being excited to emit radiation by the impact of an electron having energy in excess of a definite minimum amount—an amount corresponding to an "excitation" potential less than that required for ionisation. The experimental methods of investigation may be divided into two classes: (1) Those depending on the detection of the loss of energy by the colliding electron; (2) those depending on the detection of the radiation or ionisation resulting from the collisions.

Royal Meteorological Society, October 17.—Dr. C. Chree, president, in the chair.—Sir Napier **Shaw** and D. **Brunt**: Towards a basis of meteorological theory: thirty-nine articles of condition for the middle atmosphere. The propositions refer to the "middle layers" of the atmosphere, or those from 4 to 8 kilometres above mean sea-level; that is, the region lying above the effects of the friction of the earth's surface and below the stratosphere. Owing to the normal increase of potential temperature with height, the middle atmosphere is possessed of resilience and may be regarded as made up of separate aerospheres or horizontal layers which are thermally and therefore dynamically distinct. Air will not pass from one aerosphere to another without some internal source of energy, but there is no resilience for horizontal motion within an aerosphere. That a wide field for discussion is opened is evident from quotation of No. 6 as an example: "The chief effective cause of the general circulation between the equator and the poles and the correlated circulation round the poles is the cooling of the slopes and plateaux of high land in the polar regions."

Royal Microscopical Society, October 17.—Prof. F. J. Cheshire, president, in the chair.—W. F. **Charles**: Peculiarities in the development of the ant's foot. On the inside of the lower palate of the snapdragon, and surrounding the base of the stamens, there is a series of glandular hairs containing a viscous fluid; but these capitate hairs cannot be ruptured by the ordinary claws of the insect. Within the pulvillus of each foot of ants found on snapdragon there appears to be a minute pair of forcep-like claws, developed expressly to enable the insect to grasp and pull itself along hairy surfaces. These claws were sufficiently sharp to puncture certain minute depressions upon the surface of the glandular hairs, releasing the viscous fluid and entangling the ant. The depressions on the hairs, which are covered with one epidermis only, appear to facilitate the rupture.—M. T. **Denne**: A new variable light screen for use with the microscope. The instrument consists of a cylindrical cell provided with an end plate of glass, and a piston sliding within it bearing a second glass plate arranged so that adjustment with respect to the fixed plate may be effected by a high-pitch screw and nut combined with worm gearing. A coloured or neutral-tinted fluid can be introduced between the plates. With stained preparations, the screen permits the gradual intensification of the image of certain elements at the expense of others; with unstained preparations, it gives increased visibility, while dark ground effects are distinctly improved. The range given is from total transmission to nearly extinction of the incident beam.

Industrial Applications Section, October 24.—Prof. F. J. Cheshire, president, in the chair.—Marie C. **Stopes**: The microscopy of recent coal research. Early workers like Dawson and Huxley tended to treat "coal" as if it were a uniform substance. Hence arose disputes, and apparent contradictions, one demonstrating that "coal" was made of spores, others saying that "coal" was made of wood, others of bark. Recent work has shown differences between the finer bands even in the same lump of coal, where only a few millimetres apart one zone may show a preponderance of spores, another a preponderance of leaf or stem tissue, and another a uniform glue-like texture. The four main types composing bituminous coal are fusain, durain, clarain, and vitrain. Prof. Seyler has shown similar zones in anthracite by an opaque method of examination by reflected light.

Zoological Society, October 23.—Dr. A. Smith Woodward, vice-president, in the chair.—E. A. **Spaul**: Experiments on acceleration of metamorphoses of frog-tadpoles by injection of anterior-lobe pituitary-gland extract and iodine.—A. **Subba Rau** and P. H. **Johnson**: Observations on the development of the sympathetic nervous system and suprarenal bodies in the sparrow.—H. C. **Abraham**: A new spider of the genus Liphistius from the Malay Peninsula, and some observations on its habits.—Mr. A. **Smith**: A review of the lizards of the genus Tropidophorus on the Asiatic mainland.—J. G. H. **Frew**: On the larval anatomy of the gout-fly (*Chlorops taeniopus* Meig.) and two related acalyptrate muscids, with notes on their winter host-plants.—A. **Loveridge**: (1) Notes on mammals collected in Tanganyika Territory, 1920–1923. (2) A list of the lizards of British East Africa (Uganda, Kenya Colony, Tanganyika Territory, and Zanzibar), with keys for the diagnosis of the species.

EDINBURGH.

Royal Society, October 22.—F. O. **Bower**: Remarks on the present outlook on descent. At the moment we seem to have arrived at a phase of negation in respect of the achievements of phyletic morphology. So far from presenting a tree with a single trunk, the results of comparison offer us what appears little better than a bundle of sticks. The prospects appear depressing to young aspirants, and it is said that phyletic morphology leaves them cold. But this depends very largely upon the mode of presentment. How, then, are we to proceed in inquiry as to the origin of living things? Surely by a continued study of morphology in its broadest sense. Mr. Tansley, in his address to the British Association at Liverpool, advocated the study of "process of development," that is, physiological inquiry: but he rightly recognises how "process and structure continually act and interact." Structure may be held as the record of process. Any school based primarily on "process" and with "record" relegated to the background might turn out good statisticians, but it would probably fail in converting them into historians. Provided, however, that the study of "process" and "record," that is, of physiology and morphology, be co-ordinated, all may be well with the future of phyletic morphology.

MANCHESTER.

Literary and Philosophical Society, October 23.—H. **Clay**: The economic aspect of the Ruhr problem. The Ruhr is the richest coalfield in Western and Central Europe. Before the War, its output was 60 per cent. of the coal and 80 per cent. of the coke output of Germany; it was the chief centre of the steel industry and the chief source of the coal-tar used by the dye industry and of sulphate of ammonia used in agriculture. Territorial changes under the Treaty have enhanced the relative importance of the Ruhr in Germany's national economy. The occupation by the French, coupled with passive resistance, rapidly reduced the economic activity of the Ruhr. Reparations deliveries of coal almost ceased, and 46 French blast-furnaces out of 116 were damped down between January and April. The Ruhr population was maintained by subsidies from Berlin. The dislocation of industry caused by the separation of the Ruhr and the demoralisation caused by the depreciation of the currency have steadily reduced the efficiency of German industry, until it can no longer produce at world-prices. Unemployment is growing; it is certain to increase if the Berlin (or any other) Government succeeds in floating a new, stable currency and checking inflation. It is unlikely that any German Government will be in a position to pay any reparations, so far ahead as it is practicable to look. The French are unlikely to gain any economic benefit from their occupation of the Ruhr. The policy, so far as its objects were economic, has paid insufficient regard to two fundamental truths; first, that the wealth of a country is not a stock of goods that can be seized, but the output of an organisation that continues only so long as the organisation functions; and, second, that the direction and activity of the industrial organisation responds only very slowly and incompletely to political dictation.

SHEFFIELD.

Society of Glass Technology, October 17.—A. R. **Sheen** and W. E. S. **Turner**: The effect of titania on the properties of glass. Batches were calculated on the basis of the formula, $6SiO_2$, $x Na_2O$, $y TiO_2$, where $x+y=2$. The first six members of this series gave glasses readily; *i.e.* where the value of y varied from 0·1 to 0·6. Above 0·8 (*i.e.* 13 per cent. TiO_2) it was found difficult to melt the glass at 1400° C. When compared with the corresponding lime and magnesia glasses, the titania-containing glasses had somewhat lower annealing temperatures, durability similar to that of magnesia glasses, and thermal expansion slightly less than that of lime glasses. Heat-resisting properties were also indicated.—A. **Cousen**: The estimation of selenium in glass. Twenty grams of finely powdered glass were dissolved slowly in hydrofluoric acid and, after standing in the cold, the products of decomposition, with the exception of selenium, were dissolved by pouring into excess of boiling water. The selenium itself was filtered off on a filter pulp pad in a Gooch crucible. From the pad the selenium was removed by treating with a dilute chlorine solution (about 1/300 N). To the filtered solution was added 1 c.c. of 5 per cent. gum arabic and 5 c.c. of ½ per cent. phenyl hydrazine hydrochloride, the whole being made up to 50 c.c. Colloidal selenium was obtained, a yellow colour slowly developing. After half an hour this colour was matched against a standard solution of sodium selenite similarly treated.

PARIS.

Academy of Sciences, October 15.—M. Albin Haller in the chair.—A. **Lacroix**: The notion of doliomorph type in lithology. The term "doliomorph" is applied to lithologic types, which, from the chemical point of view, do not correspond with their mineralogical composition. According to the usual mode of expression, quartziferous rocks, rocks with free silica,

acid rocks are regarded as synonymous. It is shown that this equivalence is not always legitimate. In the new classification, doliomorph types are not classed with rocks of the same qualitative mineralogical composition, but with those of the same chemical composition, with some of which they are heteromorphs.—Jean **Perrin**: Radiochemistry and fluorescence. Results of measurements on the disappearance of "new methylene blue" under the action of light, completing the theory proposed in an earlier communication (*C.r.*, 1923, p. 612).—L. **Joubin**: The meeting of the International Council for the Exploration of the Sea, held at Paris. An account of the work done by the committees.—V. **Grignard**, J. **Dœuvre**, and R. **Escourrou**: The constitution of natural methylheptenone. The ketone exists in two isomeric forms, and this has given rise to some uncertainty regarding its constitution. The authors have applied the method of oxidation by ozone and have estimated the oxidation products, formaldehyde (with formic acid and carbon dioxide) characterising the α-form, acetone the β-form. Methylheptenones from four different sources were examined by this method, and it was shown that the natural ketone is a mixture of both forms; the α-form is in the smaller proportion, about 25 per cent.—Ervand **Kogbetliantz**: The unicity of trigonometrical series.—F. H. **van den Dungen**: Integral equations, with several parameters and their technical applications.—N. Vasilesco **Karpen**: The mechanism of hovering flight.—J. **Guillaume**: Observations of the sun made at the Observatory of Lyons during the third quarter of 1923. Owing to bad weather, observations were possible on only sixty-two days during the quarter. The usual tabular summary is given.—Mlle. **St. Maracineanu**: A method of measurement suitable for a strong radiation. The method described is applied to the cases of polonium and actinium.—Claude **Bonnier**: Aqueous solutions of ammonium bicarbonate. When ammonium bicarbonate is dissolved in water in a closed vessel, there is evolution of gas, and pressure is set up. In the present note the influence of concentration of the solution and of the ratio of the volumes of the liquid and gas phases on the pressure is studied, and the experimental results expressed in the form of curves.—M. **Bourguel**: The preparation of true acetylene hydrocarbons by sodium amide, starting with 2-3-dibrompropylene. Hexine and cyclohexylpropine. The dibrompropylene, $CH_2Br.CBr:CH_2$ (prepared from allyl bromide), is treated with a magnesium alkyl bromide, RMgBr, under conditions exactly defined, giving the bromide, $R.CH_2.CBr:CH_2$, and hydrogen bromide is removed from this by treatment with sodium amide. The hydrocarbons obtained are true acetylenes, and the method is a general one.—Raymond **Delaby**: The catalytic dehydration of ethylglycerol.—J. F. **Durand**: Double decompositions, in aqueous solutions, between metallic acetylides and salts.—Jean **Bordas**: A cause of error in the Iodlbauer method for the estimation of total nitrogen. The presence of tannins in substances analysed by this method causes errors due to loss of nitrous fumes.—P. **Gaubert**: The planes of Grandjean.—Emile **Belot**: A form of latent vulcanism in connexion with earthquakes and tidal waves. The experimental reproduction of a tidal wave.—E. **Rothé**: The earthquakes observed in France in the course of the year 1922. Fourteen shocks were felt during the year, a number much higher than the average. Details are given of each.—René **Souèges**: The embryogeny of the Joncaceæ. The development of the embryo in *Luzula Forsteri*.—V. **Lubimenko**: The influence of leaf wounds on the production of dry substance in green plants.—E. **Lesné** and M. **Vagliano**: The differentiation of vitamin A and the factor preventing rickets.—F. **Vincens**: A disease of the bee (muscardine) due to *Beauveria Bassiana* produced experimentally in bees. This fungus, when present in the food, is readily communicated to bees, causing death within six days.—E. **Roubaud** and J. **Descazeaux**: A bacterial agent pathogenic to the common fly, *Bacterium delendæ-muscæ*. This new coccobacillus was isolated from a spontaneous infection which occurred during the study of *Stomoxys calcitrans*. Details are given of its morphology and culture. The domestic fly is very resistant to bacterial infection, and the fact that it is attacked and killed by the new type is of great interest.—A. T. **Salimbeni** and Y. **Kermorgant**: A new spirochæte met with in the blood of patients suffering from measles.—Fernand **Wyss**: Variation in the morphology and acido-resistance of the human tubercle bacillus under the influence of a saponine.

Official Publications Received.

Memoirs of the Department of Agriculture in India. Botanical Series Vol. 12, No. 2. 1: History of the Operations against Bud-rot of Palms in South India; 2: Inoculation Experiments with *Phytophthora palmivora* Butl., on *Borassus flabellifer* Linn., and *Cocos nucifera* Linn. By W. McRae. Pp. iv+21-70. Botanical Series, Vol. 12, No. 3: Studies in Inheritance in Cotton, I. History of a Cross between *Gossypium herbaceum* and *Gossypium neglectum*. By G. L. Kottur. Pp. iv+71-133. (Calcutta: Thacker, Spink and Co.; London: W. Thacker and Co.) 1.4 rupees; 2s., each.

Bulletin of the Imperial Institute. Vol. 21, No. 1: Report on the Operations of the Imperial Institute. Pp. 290+iv. (London: John Murray.) 3s. 6d. net.

Report of the Council of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne, intended to be presented at the Annual Meeting of the Society, October 30th, 1923. Pp. 33. (Newcastle-upon-Tyne.)

Canada. Department of Mines: Geological Survey. Summary Report, 1922, Part A. Pp. 145A. Summary Report, 1922, Part D. Pp. 98D. (Ottawa: F. A. Acland.)

Canada. Department of Mines: Geological Survey. Memoir 133, No. 114 Geological Series: The Southern Part of the Sydney Coal Field, Nova Scotia. By A. O. Hayes and W. A. Bell. Pp. 108. Memoir 134, No. 115 Geological Series: Brockville-Mallorytown Map-area, Ontario. By J. F. Wright. Pp. 63+4 plates. (Ottawa: F. A. Acland.)

Canada. Department of Mines: Victoria Memorial Museum. Bulletin No. 37, Anthropological Series, No. 8: An Album of Prehistoric Canadian Art. By Harlan I. Smith. Pp. iii+195. (Ottawa: F. A. Acland.) 50 cents.

Departement van Landbouw, Nijverheid en Handel: "'S Lands Plantentuin" (Jardin Botanique de Buitenzorg). Treubia: Recueil de travaux zoologiques, hydrobiologiques et océanographiques. Vol. 3, Livraison 1. Pp. 126. Vol. 3, Livraison 2. Pp. 127-242. Vol. 3, Livraison 3-4. Pp. 243-432. (Buitenzorg: Archipel Drukkerij.)

University College of the South-West of England: Session, 1922-23. List of Members of the Court of Governors, Annual Report of the Council, Annual Report of the Senate, Accounts. Pp. 57. (Exeter.)

County Council of the West Riding of Yorkshire. Nineteenth Annual Report of the Education Committee, presented at a Meeting of the West Riding County Council on 10th October 1923. Pp. 54. (Wakefield.)

Lawes Agricultural Trust: Rothamsted Experimental Station, Harpenden. Report 1921-22, with the Supplement to the "Guide to the Experimental Plots" containing the Yields per Acre, etc. Pp. 105. (Harpenden.) 2s. 6d.

The National Institute of Agricultural Botany. Fourth Report and Accounts, 1922-23. Pp. 16. (Cambridge.)

Statens Meteorologisk-Hydrografiska Anstalt. Arsbok, 3, 1921. IV: Meteorologiska iakttagelser i Sverige, Band 63 (IV: Observations météorologiques suédoises, Vol. 63). Pp. xi+181. (Uppsala: Almquist & Wiksells Boktryckeri A.-B.) 10 kronor.

Meddelanden från Statens Meteorologisk-Hydrografiska Anstalt. Band 2, No. 1: Vegetationens årliga utvecklingsgång i Svealand. By H. Wilh. Arnell. Pp. 80. (Stockholm.) 4 kronor.

The Indian Forest Records. Vol. 10, Part 1: The Constituents of some Indian Essential Oils. By John Lionel Simonsen. Part 11: The Essential Oil from the Leaves of *Cupressus torulosa*, Don. Pp. 10. (Delhi: Government Central Press.) 3 annas.

Tide Tables for the Eastern Coasts of Canada for the Year 1924: including the River and Gulf of St. Lawrence, the Atlantic Coast, the Bay of Fundy, Northumberland and Cabot Straits; and Information on Currents. (Issued by the Tidal and Current Survey in the Department of Marine and Fisheries of the Dominion of Canada.) Twenty-eighth Year of Issue. Pp. 75. (Ottawa: F. A. Acland.)

Tide Tables for the Pacific Coasts of Canada for the Year 1924: including Fuca Strait, the Strait of Georgia, and the Northern Coast; with Data for Slack Water in the Navigable Passes and Narrows, and Information on Currents. (Issued by the Tidal and Current Survey in the Department of Marine and Fisheries of the Dominion of Canada.) Twenty-fourth Year of Issue. Pp. 75. (Ottawa: F. A. Acland.)

Smithsonian Institution: Bureau of American Ethnology. Bulletin 79: