

Societies and Academies.

LONDON.

Royal Society, January 15.—Sir Charles Sherrington and E. G. T. Liddell: Further observations on myotatic reflexes. The myotatic reflex of the knee-extensor obtains after pre-collicular as well as after inter-collicular transection. The reflex retains tonic character after exclusion of the otic labyrinths. Stretch of the knee-flexors also yields a myotatic reflex, a main action of which is the depression by inhibition of the myotatic reflex of their antagonist, the knee-extensor. The reflex relaxation of the knee-extensor thus obtained is not changed into contraction by administration of strychnine.—A. V. Hill, C. N. H. Long, and H. Lupton: Muscular exercise, lactic acid, and the supply and utilisation of oxygen. An attempt is made to apply to the case of muscular exercise in man the principles discovered in the last seventeen years by the physical and chemical investigation of activity in the isolated frog's muscle. Part I. summarises the investigations, especially such as refer to the recovery process by which lactic acid, liberated during exercise, is removed in the presence of oxygen afterwards. In Part II. is described the method of estimating lactic acid in human blood. Part III. is a description of the lactic acid changes which occur in human blood, during and after exercise, with an account of their effect on the respiratory quotient. Part IV. describes methods of studying the respiratory exchanges in man, under the rapidly altering conditions which obtain at the beginning and end of exercise. Part V. is an account of the recovery process, in which oxygen is used and the lactic acid produced during activity is restored as the glycogen from which it arose. In Part VI. a discussion is given of the "oxygen debt" existing at the end of exercise, and of the muscle as an "accumulator of energy." Part VII. describes the relation between the rate of oxygen intake and the intensity of exercise. Considerably increased amounts of oxygen can be taken in when breathing gas mixtures rich in oxygen. In Part VIII. curves are given relating the "oxygen requirement" to the severity of various types of exertion.—A. P. Chattock: The physics of incubation. Daily cooling appears to be unnecessary, but an improvement in the hatching of more than 11 per cent. is indicated if the usual twice-a-day turning is increased to four times at equal intervals. By means of specially designed hygrometers, values of the humidity under hens have been obtained; very little improvement resulted from raising the humidity in incubators to the hen's nest value (20 mm. water-vapour pressure at the centre). On the principle that the water vapour and carbon dioxide which escape from the eggs during incubation must both leave the nest by the same paths, the ventilation in a hen's nest may be estimated. The value obtained is equivalent to the passage through the nest of 3.2 cubic feet of air per hour per 50 eggs; and is several times smaller than the ventilating air flow in typical "hot air" and "tank" incubators.—J. F. Fulton: (1) The influence of tension upon the electrical responses of muscle to repetitive stimuli. Simultaneous mechanical and electrical records of short, maximal, tetanic responses of intact skeletal muscle (gastrocnemius and sartorius; frog) have shown that the size of the successive electrical responses varies in isometric contraction with the tension developed, and in isotonic records with the work done. Tension *per se* rather than length of fibre controls the size of the action current. The mechanism which determines the size of the action current probably also controls the

energy liberation within the fibre. (2) The relation between the durations of the isometric twitch and of the after-action of tetanus. The end of the plateau of short tetanic responses is characterised by an "angle" similar to that of the twitch. The duration of the after-action as measured from the beginning of the last electrical response of the tetanus to the "angle" is, in short tetani, invariably less than the duration of the twitch. The ratio of these two durations is approximately the same as that of the size of the corresponding action currents. The terminal "angle" of long tetani is less precise than in short, and is also less precise at high initial tensions than at low tensions. These modifications of the "angle" may be taken as evidence of slight fatigue—a less prompt "neutralisation" of the activating ions. (3) Some observations upon the electrical responses and shape of the isometric twitch of skeletal muscle. Isometric twitches of the intact gastrocnemius of frogs, when recorded with a myograph of high natural frequency, have a flat top which terminates with sufficient abruptness to form on the linear record a clearly defined "angle." Any factor tending to produce fatigue, obscures the "angle." From the shape of the isometric twitch it has been inferred that the "fundamental" process of contraction is rectangular in shape, the "angle" representing the point at which it ends, and the curve of relaxation representing the viscous return of the muscle to its resting shape.

PARIS.

Academy of Sciences, December 15.—M. Guillaume Bigourdan in the chair.—P. Villard: The construction of electro-magnets. Comparison of results obtained with differently shaped pole pieces, one cylindrical the other conical.—Ch. Depéret: The classification of the older Palæolithic from the historical and geological points of view. The palæolithic strata known as the Chellean consists of deposits of two different ages. One of these is older than the Chelles gravels, and for this the term pre-Chellean is proposed. The difference of age is shown both by the fauna and by the worked implements.—Ch. Depéret, Fabien Arcelin, and Lucien Mayet. New discoveries in the prehistoric deposit of Solutré (Saône-et-Loire). Following up the discoveries of human remains made in 1923, excavations near the same spot have revealed two more complete skeletons of Cro-Magnon type. The excavations of 1924 at Solutré have proved the existence, in regular superposition, of a series of levels containing graves, ranging from the Aurignacian epoch up to historic times.—Maurice Lugeon: River erosion. Example of the Rio Uruguay.—C. Sauvageau: The curious development of *Castagnea Zosteræ*.—Paul Montel: Some special complex families.—J. Haag: The combination of the results of observation.—René Thiry: Parallel displacement in Weyl's geometry.—B. Galerkin: The stability of a plate uniformly compressed parallel to its surface, limited by two arcs of concentric circles and by two radii.—P. Laffitte: The propagation of the explosive wave. C. Campbell has shown that if the diameter of the tube containing an explosive gas mixture increases suddenly, the explosive wave ceases to propagate itself, starting from the point of discontinuity. Experiments described by the author made with two gas mixtures ($CS_2 + 3O_2$ and $2H_2 + O_2$) show that although the explosive wave ceases to be propagated, starting from the point where the diameter changes suddenly, it reforms in the second tube after a period of combustion.—Léon and Eugène Bloch: The spark spectrum of iron in the Schumann region. The wave-lengths and intensities of 253 lines in the

region 1855 Å and 1505 Å are given: about half of these are new.—Alb. Colson: The displacement of the maximum of solubility and the existence of constant solubilities.—E. Carrière and E. Vilon: Experimental study of the action of sulphuric acid on calcium oxalate. After proof of the existence of an equilibrium, the influence of each of the variables, temperature, concentration of calcium oxalate and sulphuric acid, and excess of sulphuric acid was separately determined, the results being shown in the form of curves.—Claude Fromageot: Adsorption and cataphoresis.—P. Lebeau and P. Marmasse: The thermal fractionation of the gaseous products from the carbonisation of the structural constituents of bituminous coals. Fusain, durain, clairain, and vitrain from an English coal, and vitrain and durain from a French coal have been submitted to the method of fractional carbonisation described in an earlier paper (*Comptes rendus*, 177, p. 319). The results are shown graphically and analyses of the total gas obtained given. The composition of the gases obtained are very similar and they do not differ much from the gas obtained by the carbonisation of the original coal. The two vitrains, however, show a higher percentage of methane.—G. Saurat: The quaternary formation of Syrté minor.—Pierre Lamare: The presence of granites in the valleys of Baztan and Bertizarana (Haute-Bidassoa) and their tectonic significance.—G. Mouret: The geology of the Plateau of Aigurande and the dislocations of the neighbourhood of Neris (Allier).—Sabba Stefanescu: The presence of *Elephas planifrons* and of three mutations of *Elephas antiquus* in the geological layers of Roumania.—H. Hérissé: The presence of a glucoside in *Baillonia spicata* capable of being hydrolysed by emulsin, and the products of hydrolysis of this glucoside. The glucoside was not isolated, but from its hydrolysis by emulsin, *d*-glucose and a lactone, named baillonigenol, were isolated in a pure and crystallised condition.—P. Freundler: The conditions of the stabilisation of iodine in *L. flexicaulis*. The initial amount of iodine in these algae may be preserved in three ways: increasing the saline concentration, heating in closed vessels at 110° C., or by complete desiccation at 105° C.—L. Grigoraki: Contribution to the study of Dermatophytes.—A. Maige: The evolution of amylogen excitability of the plastids in cells with starch reserves.—Maurice Nicloux and A. Yovanovitch: The fixation of chloroform by the central nervous system and the peripheral nerves. The method previously worked out for the determination of minute quantities (0.5 mgm. to 1 mgm.) of chloroform in blood and the tissues has been applied to the study of the amounts of chloroform fixed by the nerves after anaesthesia. The peripheral nerves, such as the central nervous system, fix the largest quantities of chloroform.—R. Herpin: The swarming and development of Eunice and Syllis.—Armand Dehorne: The histo-physiology of the intestinal cells of *Ascaris* of the horse and of the turtle.—Ch. Pérad: Researches on the destruction of the oocysts of Coccidia. The oocysts of *E. perforans* and *E. stiedæ* have been submitted to the actions of solution of various disinfectants, including formol, phenol, corrosive sublimate, and hypochlorites, and are not destroyed after 24 hours' exposure to these media, and in fact appear to develop better after such treatment. On the other hand, these organisms are very sensitive to drying or to heat and this is recommended for their destruction.—Henri Stassano: The mode of action of heat on the lactic ferments in the pasteurisation of milk. Three methods were tested: maintenance at 95° C. for two minutes, at 63° C. for 25 minutes, and in thin layers at 75° C. for 8 seconds.

Some lactic ferments survive all three methods of pasteurisation, but the third method proved relatively the most efficient.—P. Lemay and L. Jaloustre: The comparative action of bismuth on staphylococcus, streptococcus, and the Coli bacillus. The staphylococcus is most sensitive to the action of bismuth salts.—H. Labbé and Lavagna: The action of acetoacetic acid on the nitrogen nutrition.—W. Kpaczewski: Surface tension and the cancer problem. It is proved by experiment that the development of cancer is accompanied by a diminution of the surface tension of the serum and blood plasma.—Jean Saidman: The absorption of ultraviolet rays by the skin and its therapeutical applications.—Kohn-Abrest: The index of toxicity and the utilisation of petrol in motor-cars. The ratio CO/CO₂ in the exhaust gases of a petrol motor is defined as the index of toxicity. Some determinations of this index are given, based on analyses of the exhaust gases of a motor-car working under different conditions.

CALCUTTA.

Asiatic Society of Bengal, December 3.—C. Dover: Further notes on the Indian diplopterous wasps. The subject is discussed from the faunistic point of view, and is based on a study of the Vespidae in the British Museum; it is an attempt to settle the systematic position of various Indian forms.—Satya Churn Law: Kālidāsa and the migration of birds, No. 2. The migratory Hansas and Raj-hansas in Kālidāsa's works.—H. Beveridge: On Tamerlane. A review of the information in our possession about "the terrible Vulcan of Samarcand."—Maulavi 'Abdu'l Wali: Notes on the archaeological remains in Bengal. The antiquities dealt with are situated in Burdwan, Murshidabad, Midnapur, Narayanganj, Birbhum, Aurangabad and other places.—Hirendra Lal Sen Gupta: A short history of the Madhyamika philosophy.—Harit Krishna Deb: "Ant-gold" and the Kautīliya Arthasāstra. The story of the so-called gold-digging "ants," in the sandy regions of Dardistan, related by Herodotus and later writers, is referred to in a passage in the Kautīliya. Cunningham's conjecture that these "ants" were some kind of marmots is confirmed. Incidentally, it is suggested that the "griffins" alleged to guard the gold dug up by "ants" may have been some variety of ant-eaters.—Harit Krishna Deb: (1) The Kautīliya Arthasāstra on the three classes of invaders. Invaders are classified in the Kautīliya as *dharmavijayinah*, *lobhavijayinah* and *asuravijayinah*. The pre-Asoken date of this classification being shown, the inference is that India was already familiar with the Assyrian (*asura*) mode of invasion.—(2) The Kautīliya Arthasāstra on forms of government. The Kautīliya presents us with a threefold classification of forms of government, here analysed, namely, *vājya*, *dvairājya* and *vairājya*, corresponding respectively to government by one, by two or by the multitude. The Kautīliya's discussions contain helpful hints for a reconstruction of pre-Mauryan political and constitutional history.—Chhote Lal Jain: A bibliography of literature relating to Jainism, mainly from 1907 to 1924.

ROME.

Reale Accademia dei Lincei: Communications received during the vacation, 1924.—T. Levi-Civita: Exact determination of periodic irrotational waves in deep water.—E. Carano: Observations on the mechanism of division of the mother-cell of the embryo sac in apogamous plants.—Bonaparte Colombo: Study of the equations

$$\frac{\partial^2 z}{\partial x^2 \partial y} + \frac{\partial^2 z}{\partial x \partial y^2} = f(x, y, z, p, q, r, s, t)$$

and

$$\left(\frac{\partial}{\partial x} + \lambda_n \frac{\partial}{\partial y}\right) \left(\frac{\partial}{\partial x} + \lambda_{n-1} \frac{\partial}{\partial y}\right) \dots \left(\frac{\partial}{\partial x} + \lambda_2 \frac{\partial}{\partial y}\right) \left(\frac{\partial z}{\partial x} + \lambda_1 \frac{\partial z}{\partial y}\right) = F(x, y).$$

—Francesco **Sbrana**: Certain integral equations.—Washington **Del Regno**: Photo-electric emission of selenium. No difference is detectable between the emission from selenium in the dark and in the light, the free electrons thus appearing to play no part in the phenomenon. The purely electronic character of the conductivity of selenium under the influence of light is upheld.—Bernardo **Oddo**: Di-indylmethane.—Gaetano **Charrier** and Alessandro **Beretta**: Action of nitrosobenzene on *o*-nitroaniline. The product of this action is *o*-nitro-*p*'-nitrosodiphenylamine.—Gustavo **Cumin**: Geological notes on the Istrian mountain region. I.: Soils.—Enrico **Fossa-Mancini**: Tertiary strata in the neighbourhood of Orosei (Eastern Sardinia).—Ugo **Panichi**: The specific gravity of minerals and crystallised chemical compounds.—G. **Micatovich**: Experiments confirming the statolytic theory.—A. **Spartà**: Contribution to the knowledge of larval development in *Uraleptus Maraldii* Risso.—Livia **Garofolini**: Development of the chromaffine system and appearance of the chromo-reaction in *Triton cristatus*.—Luisa **Volterra**: Variability of pelagic Dafnias in Lakes Albano and Nemi: *Daphnia longispina*.—Ugo **Banderati**: Action of alcohols on the sensory-motor cortical centres of the dog.—Mario **Ercole**: Contribution to the knowledge of the rhythm of renal secretion.—Carlo **Mannella**: Action of strychnine on the survival of the central preparation.—Carlo **Petacci**: Action of ethyl alcohol on the survival of the central preparation.—Palmira **Tavolaro**: Direct action of strychnine and various alcohols on the central preparation.—Oliviero **Olivo**: Commencement of the functional capacity of the contractile tissues in the embryo of the hen, in relation to their structural and morphological differentiation. I.: Functional and morphological differentiation of the cardiac embryo.—Gabriella **Armellini-Conti** and Giuseppe **Armellini**: Investigations on the variation of the luminous intensity of the moon during the total eclipse of August 14, 1924. From the moment at which the moon entered the earth's shadow until the eclipse became total, the total luminous intensity of the moon varied approximately according to a parabolic law. When the moon, entirely in the penumbra, began to enter the umbra, the intensity was nine-tenths of that exhibited by the full moon, whilst the intensity of the totally-eclipsed moon was about one-fortieth of that of the full moon.—F. **Zambonini** and G. **Carobbi**: Contribution to the study of the isomorphous relationships between compounds of beryllium and those of magnesium. In compounds of simple structure, beryllium and magnesium are probably not isomorphogenic except in very special cases, but mixed crystals of the double nitrate of magnesium and lanthanum with that of beryllium and lanthanum containing so much as 18 per cent. of the latter are obtainable.—L. **Sabbatani**: Pharmacological investigations on iron. VI.: Colloidal ferrous sulphide prepared in the presence of sugar. A preparation has been obtained which is much less toxic than that made in the presence of gelatin and is fixed more exactly and immediately, and almost exclusively in the liver and spleen. Such preparations produce pharmacological effects only as the result of chemical changes, which are rapid and profound with colloids of high degrees of dispersivity and stability, but slow and slight if the degrees of dispersivity and

stability are low.—B. **Longo**: Further results on the sowing of the wild fig.—A. **Russo**: Different constitutions of the two pure gametes in *Cryptochilum echini* Maupas, resulting from the analysis of the nuclear successions, and the prevalence of the globuliform micro-nucleus.—Francesco **Sbrana**: Levi-Civita's parallelism for a surface of ordinary space.—Umberto **Crudeli**: Stationary motions in electronic dynamics.—Enrico **Fermi**: Theory of collisions between atoms and electric corpuscles.—G. **Carobbi**: Double nitrates of metals of the cerium group with copper and with cadmium.—G. **Sani** and V. **Grilli**: Practical notes on the conservation and transformation of nitrogen in stable manure.—Angelo **Bianchi**: Bismuthinite from Crodo, Val d'Ossola, and the crystallographic constants of bismuthinite.—E. **Onorato**: Celestine from Caramanico.—Emanuele **Quercigh**: Celestite from Pietraperzia and from Trabonella (Caltanissetta).—Carmela **Ruiz**: Celestite from Racalmuto (Girgenti).—Roberto **Savelli**: Genetic theory on the "electric mutations" obtained by Alberto Piròvano.—Cesare **Artom**: The species of *Gambusia* acclimatised in Italy (*Gambusia holbrooki* Grd.) in relation to the stability of the character of the gonopodium.—Giulio **Cotronei**: Dimensions reached by *Petromyzon fluviatilis* and the phenomenon of contraction. With this animal, the percentages of the two sexes may be considered identical. The female is larger than the male, and the form living in Southern Europe attains smaller dimensions than that of the north.—Boldrino **Boldrini**: Certain biological reactions encountered in the blood serum of women during and after the lacteal decline. I.: Demonstration of a precipitin of human milk serum.—Gaetano **Viale**: Variations of catalysis in the blood on high mountains.—Marcello **Boldrini**: Internal and external measures of certain long bones in man and in woman. I.: Volume of the medullary cavity and the phenomena of circulation and respiration.—Oliviero **Olivo**: Commencement of the functional capacity of contractile tissues in the embryo of the chicken in relation to their structural and morphological differentiation. II.: Functional and morphological differentiation of the myotome.

Official Publications Received.

- Annual Report on the Working of the Museum Department during 1923-24. Pp. xi. (Malta: Government Printing Office.)
- Memoirs of the Asiatic Society of Bengal. Vol. 8, No. 4: Plant and Animal Designs in the Mural Decoration of an Uriya Village, by Dr. N. Anandale; A Working Model of the Origin of the Ganges in a Temple in Ganjam, by Dr. N. Anandale, with Notes by Mahamahopadhyaya Haraprashad Shastri and Percy Brown. Pp. 230-256 + 6 plates. (Calcutta.) 4.8 rupees.
- Union of South Africa. Journal of the Department of Agriculture, Vol. 9, No. 6, December: The Annual Report of the Department of Agriculture for the Year ended 30th June 1924. Pp. xviii + 409-618. (Pretoria: Government Printing and Stationery Office.) 6d.
- Department of Agriculture, Trinidad and Tobago. Administration Report of the Director of Agriculture for the Year 1923. Pp. 19. (Port-of-Spain: Government Printing Office.) 8d.
- The Science Reports of the Tôhoku Imperial University, Sendai, Japan. Second Series (Geology), Vol. 8, No. 1: On the Fauna of the Anthracolithic Limestone of the Ômi-mura in the Western Part of Echigo. By Ichirô Hayasaka. Pp. 83 + 7 plates. (Tokyo and Sendai: Maruzen Co., Ltd.)
- Empire Textile Conference. Official Report of Proceedings of Conference held at the British Empire Exhibition, Wembley Park, W. 7-week 1924. Pp. v + 267 + 109. (Manchester: The Textile Institute.) 5s.
- United States Department of Agriculture. Department Bulletin No. 1217: Mixing Emulsified Mineral Lubricating Oils with Deep-well Waters and Lime-sulphur Solutions. By W. W. Yothers and J. R. Winston. Pp. 6. (Washington: Government Printing Office.) 5 cents.
- Annual Report of the Meteorological Committee to the Air Council for the Year ended 31st March 1924. (M.O. 267.) Pp. 61. (London: H.M. Stationery Office.) 1s. 6d. net.
- Union of South Africa. Department of Mines and Industries: Geological Survey. Memoir No. 21 on Magmatic Nickel Deposits of the Bushveld Complex in the Rustenburg District, Transvaal. By Percy A. Wagner. Pp. 181 + 22 plates. (Pretoria: Government Printing and Stationery Office.) 7s. 6d.
- Meddelanden från Statens Skogsörsöksanstalt. Hälften 21, Nr. 7: Grankottmätarna (*Eupithecia abietaria* och *Strobilata*) och deras Skadegörelse. Av Paul Spessivtseff. Pp. 295-310. Hälften 21, Nr. 8: Tragnarestudier (Anobiden-studien). Av Ivar Trägårdh. Pp. 311-338. Hälften 21, Nr. 9 (Slutnummer): Redorgörelse för Verksamheten vid Statens Skogsörsöksanstalt under år 1924. Pp. 339-357. (Stockholm.)