

Societies and Academies.

LONDON.

Royal Society, May 28.—R. J. Ludford: (1) Cell organs during secretion in the epididymis. The Golgi apparatus hypertrophies and assumes different forms, according to the degree of secretory activity. There occur nucleolar extrusions, nuclear budding, and a differential staining of the nucleolus, while the mitochondria increase in number at the onset of secretory activity, and decrease during the course of secretion. Variations observed in the secreting cells in different tubules of the epididymis are probably indicative of variations in the degree of intensity of the secretory process. Secretory activity is maintained by the elimination of waste products, which is effected by nucleolar extrusions from the nucleus, and by amitosis followed by the discharge of a nucleus and part of the cytoplasm into the lumen of the tubule. Reconstruction of exhausted cells also occurs during a resting phase, while cells completely worn out are replaced, principally by the basal cells. (2) Nuclear activity in tissue cultures. The nucleoli of fibroblasts of the rat's kidney perform during life slow amoeboid movements. Occasionally a nucleolus approaches the inner surface of the nuclear membrane, and part of it is discharged into the cytoplasm, where it disintegrates. Also, a portion of the nucleus itself may be budded off, persist for a time, and then diffuse into the ground cytoplasm. These processes probably represent phases in the normal metabolic activity of the cell.—J. Needham and Dorothy Needham: The hydrogen-ion concentration and the oxidation reduction potential of the cell interior: a micro-injection study. Subject to certain assumptions, the cell-interior of *Amoeba proteus* has a hydrogen-ion concentration of approximately P^H 7.6, and an oxidation reduction potential of between μH 17 and 19.—F. W. R. Brambell: The oogenesis of the fowl (*Gallus Bankiva*). The Golgi apparatus, type 1, of the oocyte is demonstrated for the first time. It is shown to surround the centrosphere. An intrusion into the oocyte of Golgi apparatus, type 2, from the follicle cells takes place. The former, and possibly the latter, break up into fine granules and become dispersed throughout the cell during oogenesis. These granules probably persist as such, and produce the Golgi apparatus of each embryonic cell by a process of condensation. The mitochondria increase in number in the oocyte and form the *mitochondrial cloud*. The transitory *mitochondrial yolk-body* differentiates in the middle of this cloud. At a certain stage between the third and sixth week after hatching, a number of oocytes in the ovary of the chick enter upon a period of precocious growth, exhibiting remarkable abnormality in behaviour of their cytoplasmic inclusions and finally becoming atretic. This may represent the final degeneration of the primordial germ-cells.

The Optical Society, April 16.—J. Guild: The geometrical solution of colour mixture problems. Starting from the experimental fact that any colour can be uniquely expressed by a trichromatic equation, provided negative coefficients may enter, all problems of colour mixture are amenable to an exact system of geometrical calculation. The methods used obviate the introduction of stereographic projection and other geometrical complications. This simplification is effected by conducting the actual colour mixture part of any calculation in the quantity units of one trichromatic system, leaving the relative magnitudes of the various systems of units, where more than one

system is involved, to be accounted for by the introduction of suitable coefficients in the purely arithmetical part of the work.—J. W. Gordon: "The double square"—a new optical appliance based upon the "optical square." The optical square is a well-known arrangement of two mirrors for deflecting an optical axis through a right angle and obtaining an erect image. The double square is formed by the addition of a third mirror, which gives an inverted image and is so disposed with regard to the first two as to enable the image to be seen in adjacent but concentric fields, the one image simply reversed and in juxtaposition to the other. Such a combination may be used as an artificial horizon in the taking of altitudes or as a gun sight and is applicable to the sextant and the range-finder.—F. Van Neck: (1) The Hahn Goerz workshop microscope. This instrument is a shortened prism microscope giving an erect image of the object. A magnification of between 35 and 55 diameters is obtainable, the variation being effected by extending the ocular tube. An open sight is provided, by means of which the microscope can easily be directed to any particular spot. The microscope is carried on a horizontal bar which can move up and down on a vertical pillar, and movement in any direction is possible. The instrument can be used for examining objects of any kind which cannot be brought on to the stage of an ordinary microscope.—(2) The "Artisol" mirror arc lamp. This lamp is specially intended for the projection of cinema films. The carbons are at right angles to one another, the crater being directly exposed to the parabolic glass mirror. The light reflected from the mirror is collected by a large plano-convex lens. The arrangement of the carbons and the combination of glass mirror and large condenser ensures a much higher illumination per unit of current than in the ordinary pattern lamp.

Linnean Society, April 23.—R. J. Chittenden: *Primula* hybrids. The F_1 between *P. acaulis* and *P. juliae* has a pink corolla, while those between *P. juliae* and *P. elatior* and between *P. juliae* and *P. officinalis* have the corolla yellow. A dominant colour inhibitor seems to be present in *P. elatior* and *P. officinalis* and absent from *P. acaulis*. These facts suggest that the garden Polyanthus may have risen from *P. acaulis* and *P. officinalis* or *P. elatior* hybrids by recombinations of their various factors.—M. A. C. Hinton: A vole from Montenegro, discovered in December 1921 by Dr. V. Martino. Martino's vole is a large species (head and body 130 mm.; tail 101; hind-foot 25.4; ear 18.5), long tail. In colour it is brownish-grey above when adult, bluish-grey when young, whitish below. Its feet are white and its tail conspicuously bicoloured, dark brown above, white below. It is referred to the genus *Dolomys*, described and hitherto only known from the Upper Pliocene of Hungary; Martino's vole is named *Dolomys bogdanovi*. The remarkable external characters and the extreme brachyodonty are generalised features of an archaic form which has managed to linger in Balkan seclusion.—John Parkin: A unique feature in the petal of *Ranunculus*, and its bearing on the phylogeny and taxonomy of the genus. Möbius, forty years ago, explained the cause of the high polish exhibited by the petals of yellow buttercups as follows: The upper epidermis of the petal has a perfectly smooth external surface, and its cells hold the yellow pigment in solution as a kind of oil. Below the epidermis is a layer of cells densely packed with minute starch grains. The whole structure is like a mirror. The epidermis with its clear yellow liquid acts as the gloss, and the starch layer as the reflector. This is substantially correct. Species with

glossy petals form a natural group, and most seem to have yellow flowers. The presence of starch in a few of the non-glossy species presents a difficulty in phylogeny. Perhaps starch in the mature plant is, as a primitive feature, retained and used as an adaptation in the species which have developed glossiness. The high polish of the petal of the yellow buttercup has been of advantage in attracting insect visitors to the flower, and thus been partly responsible in making this section of the genus, in contrast to the white group, cosmopolitan.—Kenneth Rees: Previous investigations into the distribution and ecology of marine algae in Wales.

Faraday Society, April 27.—E. A. Ollard: Adhesion of deposited nickel to the base metal. This work was undertaken to endeavour to measure the adhesion of deposited nickel to mild steel. A special method was evolved, the result of which shows an adhesion probably greater than 19 tons to the square inch.—H. Sutton: The brittleness of zinc-plated steel. Stream-line wires are embrittled by zinc plating. A deposit of zinc of not more than 0.0005 in. affords good protection against corrosion and permits the easy removal of the brittleness. Both cyanide and sulphate baths may be used, but the former is preferred on account of the superior protective qualities of the deposit. In either case the wires should be heated to 100° C. for thirty minutes. A rough surface before plating leads to severe embrittling and impairs the recovery.—W. A. Naish: The partition of silver between lead and zinc. Melting was carried out in clay cylinders in a metal bath, heated electrically and with adequate stirring and temperature measuring arrangements, the cylinders being quenched in mercury. In dilute solution there is a distribution ratio $\left(\frac{\text{Per cent. Ag in Zn}}{\text{Per cent. Ag in Pb}}\right)$ of approximately 302 at 550° C.; this is independent of the concentration of silver or the relative proportions of lead and zinc, but is dependent on the temperature, the deviation at higher concentrations than about 5 per cent. silver being probably due to the formation of compounds.—H. J. Poole: The elasticity of gelatin jellies and its bearing on their physical structure and chemical equilibria. The strain produced in gelatin jellies by the application of a steady stress is not a function of that stress alone but is governed by a time factor. The study of this time factor or "creep" suggests that the jellies are two-phase (solid-liquid) bodies. The creep is mainly due to a reversible flow of the liquid phase in the interstices of the solid phase and, to a lesser extent, to an irreversible plastic deformation of the solid phase. The solid phase is thought to have the form of a mesh of cylindrical fibrils or threads, and the material of these threads is in dynamic equilibrium with the water of the liquid phase, as a result of either a reversible hydrolysis or hydration, whereby the ratio of gelatin in the solid phase to that in the liquid phase becomes progressively less with rising temperature.—D. B. Macleod: (1) On some physical properties of water. The gain in volume, assumed to be due to association of the molecules in water, and the loss of free space, bear a simple relation to the change of association, and these two facts are used to explain all the anomalies of water connected with volume, compressibility, and viscosity. (2) On the relation between the viscosities of liquids and their molecular weights. Previously the author has shown that the viscosity of a liquid is inversely proportional to the free space within the liquid. The viscosities of liquids at a condition of equal amounts of free space relative to the total volume are now compared and

show that viscosity can be interpreted as a simple function of the molecular weight. Divergence from normality is ascribed to different degrees of molecular complexity.—E. K. Rideal: A note on the reduction potential of dicyanquinhydrone. The quinhydrone was prepared from equimolecular proportions of the quinhydrone and hydroquinone and the e.m.f. of the cell determined. The reduction potential was found to be 0.9712 volt at 25° C.

DUBLIN.

Royal Irish Academy, April 27.—E. L. Hirst, A. K. Macbeth and D. Traill: The action of hydrazine on the halogen derivatives of malonamides and of acetoacetic esters. Monochloro-, monobromo-, and dibromo-malonamides are reduced by hydrazine hydrate at laboratory temperature, and the halogen derivatives of substituted malonamides react on warming. The case of dibromomalonamide is of interest as the final reaction product is the hydrazine of mesoxalamide. The α -chloro- and α -bromo-derivatives of ethyl ethyl-, propyl-, and benzyl-acetoacetates give as final products 3-methyl-4-ethyl-5-pyrazolone, 3-methyl-4-propyl-5-pyrazolone, and 3-methyl-4-benzyl-5-pyrazolone respectively, but halogen derivatives of ethyl acetoacetate give mixed products; the low percentage of evolved nitrogen in the last case is traced to this cause. The preparation of ethyl α -chlorobenzoylacetate and its conversion into ethyl aminothiazolecarboxylate were described.

PARIS.

Academy of Sciences, April 27.—Jean Tilho: The order of magnitude of the variations of depth and extent of Lake Chad.—A. Bigot: The presence of Trilobites and Archæocyathidæ in the Cambrian layers in the neighbourhood of Carteret (Channel).—Gaston Julia: Quasi-analytical functions and integral functions of zero order.—M. T. Huber: The bending of a flanged plate.—P. Chofardet: Observations of Orkisz's comet (1925 c) made at the Observatory of Besançon with the *coudé* equatorial. Positions given for April 19, 22, and 23. On April 22 the comet was estimated to be of the 8th magnitude, showing as a circular nebulous cluster, about 8' diameter, with a strong central condensation.—H. Eyraud: The theory of the electromagnetic field and atomic radiation.—Léon Brillouin: Surface tension: the interpretation of the Eötvös relation.—C. E. Guye, P. Mercier, and J. J. Weiglé: The explosive potential in carbon dioxide at high pressures. The experimental results of several years' work are given, showing the explosive potential in volts for pressures between 1 and 20 atmospheres and for distances between the electrodes varying between 0.5 and 5 mm.—R. Forrer: An artificial magnetic anisotropy of nickel. The phenomena of discontinuity.—É. Estanave: Contribution to the realisation of integral photography.—H. Ikeuti: The beta rays produced in air by homogeneous X-rays of short wave-length. Measurements of the lengths of the trajectories of the two types of beta rays, photo-electrons, and fish tracks (C. T. R. Wilson). The results are in general agreement with those of Wilson and Compton.—Albert Arnulf: The ionisation of potassium vapour under the influence of visible light. Experiments showing that under the influence of ordinary (not ultra-violet) light a small number of electrons and positive ions are set free.—Roger Grandgérard. The "Bertillonage" of modern pictures by radiography. A radiograph of a picture furnishes an exact proof of identity. It is suggested that a radiograph of a picture, taken under certain prescribed conditions, should be deposited officially, a duplicate being

retained by the artist. This would suffice to decide any question of authenticity in the future.—H. Forestier and G. Chaudron: The transformation points of solid solutions of alumina or chromic oxide in ferric oxide.—W. Mestrezat and Mlle. Y. Garreau: Experimental contribution to the study of the transport of electrolytes. The mobilisation of the ions by intermolecular exchanges.—Georges A. Le Roy: A medieval weapon damascened with tin. Ancient weapons, inlaid with gold or silver, are well known, but inlaid with tin during medieval times in Europe has not hitherto been noted. The épée examined by the author was found to be inlaid with tin.—Raymond Charonnat: The potassium chlororuthenates. The brown chlororuthenate of Claus and Rutbier and the red salt obtained by Lewis Howe have been accepted as a case of isomerism not in agreement with Werner's theory. It is shown that these two salts are not isomers, since ruthenium is tetravalent in the brown salt and trivalent in the red salts. This removes a supposed case of isomerism incompatible with the theory of Werner.—Max and Michel Polonovski: The oxyserenic derivatives.—Const. Dosios and Theod. Tsatsas: The nitro products of diphenylglycollic ether.—Raymond Delaby and Jean Marc Dumoulin. The isomerisation of the vinylalkylcarbinols $\text{CH}=\text{CH}(\text{OH})\cdot\text{R}$ into ethyl-alkylketones $\text{C}_2\text{H}_5\cdot\text{CO}\cdot\text{R}$. Vinyl-ethylcarbinol is converted by copper at 296°C . into the isomeric diethylketone. The next two higher homologues are similarly converted into the corresponding ketones.—F. Kerforne: The contact of the Vilaine sheet with its substratum.—C. E. Wegmann: A delayed phase of the Scandinavian Caledonian chain.—A. Goris and M. Metin: The chemical composition of a hybrid of *Aconitum Anthora* and *Aconitum Napellus*. The alkaloids peculiar to each species (anthorine and aconitine) are found together in the hybrid.—Paul Gillot: The characteristics of some oils from Euphorbiaceæ. *Mercurialis* and *Euphorbia* are not only characterised by their botanical affinities, but also by the similar physical and chemical characters of the oils extracted from their seeds. These oils are very similar to linseed oil.—E. and G. Nicolas: Observations on the influence of urea, thiourea, and allylthiourea on the higher plants.—Edouard Fischer: The constitution of the green gland of the crayfish.—Lucien Semichon: The action of alcohol on the selective faculty of yeasts in the fermentation of grape musts.—Léon Blum and Maurice Delaville: Researches on the mechanism of acidosis.—L. Panisset and J. Verge: The presence of spirochætes in dogs attacked with hæmorrhagic gastro-enteritis.—Yves Kermorgant: The etiology of mumps.

ROME.

Royal Academy of the Lincei, March 15.—T. Levi-Civita and U. Amaldi: Conditions for the ensurance of the independence of the arguments in the Hamiltonian expression for varying action.—Leonida Tonelli: Singularity of the solution of an ordinary differential equation.—F. Zambonini and G. Carobbi: Lanthanum thalious sulphates. The three compounds, $\text{La}_2(\text{SO}_4)_3$, $4\cdot5\text{Ti}_2\text{SO}_4$; $\text{La}_2(\text{SO}_4)_3$, $3\text{Ti}_2\text{SO}_4$; and $\text{La}_2(\text{SO}_4)_3$, Ti_2SO_4 , $2\text{H}_2\text{O}$, are found to exist.—Secondo Franchi: Fundamental stratigraphical and palæontological data for the secondary age of the calc-schists and the hypothesis of a great overthrust of the mass of these rocks in the Franco-Italian Alps.—Achille Russo: Impure gametogens, impure gametes, and accessory conjugations in *Cryptochilum echini* Maupas.—Enrico Bompiano: A theorem of comparison and a theorem of singularity for the differential equation $y' = f(x, y)$.—Letizia Onali: A theorem on the surface of the minimum

order passing through an oblique curve.—D. J. Struik: Mathematical work of Paul of Middelburg.—Emilio Oddone: The resistance offered by the earth's surface to movements of the air.—G. Carobbi: Synthetic praseodymiferous chlorovanadinite: Reference to Prandtl and Grimm's recent work on element No. 61. The author's failure to justify the assumption that praseodymium exists in a quinquevalent form isomorphous with quinquevalent vanadium furnishes no support for the arrangement of the rare earths given in Prandtl and Grimm's periodic system.—U. Sborgi: An electronic theory of the anodic behaviour of metals, especially of those exhibiting phenomena of passivity.—U. Pratonlongo: Alkaline chlorosis of the vine. The results of preliminary experiments indicate no causal connexion between the high alkalinity of the soil or its tendency to produce chlorosis and the presence, abundance, or fineness of the calcium carbonate it contains.—Antonio Cavinato: Studies on quartz: Quartz crystals from Val Maggia and their interesting pseudo-hemimorphic habit.—Enrico Clerici: Fusion mixture for isopyknomeric analysis. Mixtures of thallium formate and fluoride give liquids of specific gravity $4\cdot20$ at 20°C ., $5\cdot38$ at 100°C ., and $5\cdot40$ at 110°C .; such mixtures exhibit marked fluidity and pass rapidly through filter-paper.—Renato Santucci: Contribution to the study of the post-embryonic development of the Scyllaridea of the Mediterranean.—P. Pasquini: First formation of the pectin in the development of the eye of *Gallus domesticus*.

WASHINGTON, D.C.

National Academy of Sciences (Proc. Vol. 11, No. 3, March).—G. L. Clark and W. Duane: The relative intensities of fluorescent and scattered X-rays. The scattered and tertiary radiations due to tungsten X-rays, for secondary radiators of atomic weight near that of molybdenum, are extremely weak compared with the fluorescent radiation. The source of the powerful radiation found in earlier experiments is unknown.—W. Duane: Note on the quantum theory of the reflection of X-rays. The assumption that only the total fluorescent radiation from an atom quantises its momentum with the crystal leads to results not justified by experiment.—G. N. Lewis: A new principle of equilibrium. Corresponding to every individual process there is a reverse process, and in a state of equilibrium the average rate of every process is equal to its reverse process. This is termed the Law of Entire Equilibrium. In a state of equilibrium, there is no essential difference between backward and forward direction in time; time thus loses its unidirectional character.—J. C. Walker: Studies on disease resistance in the onion. So far as smudge and neck-rot are concerned, immunity appears to be related to the presence of flavone or anthocyan colouring matter in the outer scales. Black mould attacks both coloured and uncoloured varieties.—W. J. Luyten: Notes on stellar statistics; (iv) on the relation between the mean values of the ν and τ components of proper motion.—Cecilia H. Payne: Astrophysical data bearing on the relative abundance of the elements. The temperature of disappearance of a line in stellar spectra is a function of the relative abundance of the element in question (Fowler and Milne). Assuming among other things that stellar atmospheres are uniform and that the effects of nuclear fields are negligible at stellar pressures and temperatures, computations from a homogeneous collection of spectra indicate that the relative abundance of atomic species in the stars and in the earth's crust is of the same order. Zinc is an exception, and the stellar figures for hydrogen and helium are improbably high.