Thomas Graham at University College, London

ON July 15, 1837, the *Mechanics' Magazine* said: "The Chemical Chair of the London University College, vacant through the lamented demise of Professor Turner, has been conferred on Mr. Graham, the Andersonian Professor of Chemistry at Glasgow. A better selection could scarcely have been made. Mr. Graham was first made favourably known to chemical philosophers by his discovery of the laws of gaseous diffusion. He established by well-devised experiments, the conformity of gases flowing through minute orifices, to the universal physical law that determines the issuing velocities of non-elastic fluids. During the last five years he has been diligently engaged in elaborate inquiries into the constitution of salts, with special reference to the functions of their watery element, and has already published some results that are considered by good judges to affect materially the higher doctrines of chemical philosophy."

Medical Schools in Russia

THE issue of the *London Medical Gazette* of July 15, 1837, contains the following account of the contemporary medical schools in Russia: "There are three principal universities in Russia proper, those of Moscow, Harkoff and St. Petersburg; and each of these universities has a large school of medicine. Those of Moscow and St. Petersburg are the most considerable, but there is still a good school at Harkoff, situated in the southern part of the empire, and destined for the convenience of the nations of the conquered provinces on the Asiatic borders. Each university which has a faculty of medicine has also an institute of medicine of the same kind; the students who attend the latter are educated at the expense of the Government, and are subsequently obliged to serve six years, at least, in the civil or military service. Although the first rudiments of a medical school at St. Petersburg are to be found in the establishment of the naval school by Peter the Great in the year 1715, yet the merit of organizing a medical faculty is due to Catherine the Second. In 1764 the Empress founded a medical college which with but few alterations from its first instalment is still recognized in the Medico-Chirurgical Academy of St. Petersburg. To the jurisdiction of this institution were subjected then, as at present, all the medical institutes and all medical practitioners, with the exception of court physicians, in the Empire."

Ploughing by Steam

THE issue of the *Gentleman's Mazagine* of July 1837 contains the following announcement: "A very successful and interesting exhibition of ploughing by steam, invented by Mr. Parkes, took place at Red Moss, near Horwich, Lancashire. The engine is not locomotive, but remains stationary while the plough is at work. The plough is set in motion by means of two long, flexible belts of iron, revolving round two wheels attached to the engine, and round another wheel in a frame firmly fixed on the moss, at such a distance from the engine as may be proposed to make the furrow. The ends of these belts are fixed to the two ends of the plough, and pull it to and fro, for it does not turn in working, but cuts a furrow both when it recedes from and returns to the engine. This operation is most satisfactory, the plough turning a furrow eighteen inches broad, nine inches thick, and more than 300 yards long in less than four minutes.

Societies and Academies

Dublin

Royal Irish Academy, April 12.

P. G. GORMLEY: The zeros of Legendre functions. The number of zeros of the function $Qn^m(z)$, n and m being real, is determined by considering the change in phase due to a complete circuit round the plane, the number which are situated on each axis being given. Those zeros of the function $Pn^m(z)$ which lie to the right of the imaginary axis are considered.

A. C. FORBES: Some climatic theories in connexion with tree remains in and under peat. The stump layers in lowland bogs, which various observers from Geikie onwards have attributed to secular changes in rainfall, merely represent vegetative features in the development of marsh peat. They are the remains of trees which originated, matured and died on a saturated or water-logged substratum induced by topographic features, and neither normal nor periodic fluctuations in rainfall could have affected them to any material extent as is shown by their characteristic root development. The stump remains under mountain (soligenous) peat represent the final generations of pine and birch which gradually disappeared at high elevations, resulting in forest being replaced by peat, which, in its turn, is disappearing above 2,000 feet or so. These changes must be correlated with lower temperatures during the growing season, and the general tendency during the last 2,000 or 3,000 years in the British Isles has apparently been in the direction of cooler and moister summers and milder winters, and the altitudinal tree limit during that period has been lowered to about 1,000 feet. The rainfall and temperature conditions for peat formation are still in operation at the lower levels, and these do not differ in any important respect from those necessary for forest growth.

Paris

Academy of Sciences, May 19 (*C.R.*, **204**, 1449–1516)

JULES DRACH: The logical integration of linear differential equations.

NICOLAS KRYLOFF and NICOLAS BOGOLIOUBOFF: The ergodic properties of series of probabilities *en chaine*.

SZOLEM MANDELBROJT: A general theorem furnishing the argument of singular points situated on the circle of convergence of a Taylor's series.

JACQUES HADAMARD: Remarks on the preceding note.

RAOUL GOUDEY: Measurements of the intensity of gravity in France during the year 1936. Results for the values of g at fifty stations in France carried out with the Holweck-Lejay instrument.

VICTOR VOLKOVISKI: Vortices in bands in liquids.

ANDRÉ GUILBERT: The elementary expression of the energy affecting a magnetic particle of very small dimensions in a magnetizing field.

RAYMOND HOCART and MAURICE FALLOT: The identification of various phases by magnetic study and by the X-rays in alloys of iron and palladium. The magnetic study showed two phases the approximate composition of which are FePd and $FePd_3$, and these were confirmed by the X-rays. The phases only appear after prolonged annealing.

BORIS VODAR: The absorption spectrum of nitric oxide (NO) in the liquid state.

MLLE. MILKA RADOÏTCHITCH: The influence of the solvent on the absorption spectra of neodymium acetylacetonate. Summary of results obtained with

39 organic solvents. Neither the dielectric constant nor the electric moment afford an explanation of the results. These intervene, but there are other factors which complicate the comparisons.

MME. NIUTA WINTER-KLEIN: The relation which exists between the temperature of transformation and the variation of the (refractive) index for several kinds of glass.

W. BRONIEWSKI and I. ST. GLOTZ: The physical and mechanical properties of pure iron as a function of the cold hardening.

LOUIS HACKSPILL and ANDRÉ BOROCCO: Compounds of the isotope 2 of hydrogen with the alkali metals (alkaline deuterides). The alkaline deuterides can be obtained by synthesis under the same conditions as the hydrides, their formulæ are analogous with the latter, and their appearance is the same.

MARTIN BATTEGAY and PIERRE BOEHLER: The anthrylisothiocyanates, anthrothiazols and mercaptoanthrothiazols.

MARCEL FRÈREJACQUE: Acetylglucosides of amines and rotary power.

RAYMOND PAUL and HENRI NORMANT: The action of furfuryl bromide on sodium phenate, *o*-furfurylphenol and furfuryloxybenzene.

R. TRUHAUT: Study of the compounds of glycocol and of alanine with mercuric oxide.

LOUIS LONGCHAMBON: The pyrogenation of coal. Studies of the coefficient of expansion of coal at temperatures below the coking temperature.

ANDRÉ DEMAY: The age of the metamorphism in the Central Massif.

MAURICE BREISTROFFER: The fossiliferous levels of the Albian in the Vocontian abyss (Drôme, Hautes-Alpes and Basse-Alpes).

CHARLES BOIS: The determination of the focal depth of very distant earthquakes.

A. DEMOLON and E. BASTISSE: Observations in lysimetric boxes on the mobilization of the nitrogen and mineral reserves of the soil.

STÉPHANE HÉNIN: Asymmetry and the orientation of clay particles.

WILLIAM HENRI SCHOPFER and ALBERT JUNG: The action of the products of disintegration of aneurine on Phycomyces. The second growth-factor of the Mucorineæ.

MME. ANDRÉE DRILHON: Study of the mineral exchanges in the homeiosmotic fishes.

MLLE. M. HAMON: The mechanisms producing dehiscence of the spermatophores of *Eupagurus Brideauxi*.

BASILE LUYET: The mechanism of cellular death produced by high pressures: the cytological modifications accompanying death in yeast.

ROBERT PAULAIS: Copper, zinc and cobalt in the organs of Lamellibranch molluscs.

ANDRÉ LWOFF and MME. MARGUERITE LWOFF: The function of hæmin, growth factor for *Hemiphilus influenzæ*.

LÉON BINET, GEORGES WELLER and CHARLES JAULMES: The antitoxic power of glutathion. Researches on cobra poison.

Moscow

Academy of Sciences (*C.R.*, 14, No. 6; 1937).

S. BERNSTEIN: The Cotes and the Tchebycheff formulæ of quadrature.

ERVIN FELDHEIM: Mode of convergence in the interpolation of Lagrange.

N. A. SLIOSKIN: Oscillations in rotation of a sphere filled by a viscous liquid.

V. V. ČELINCEV: Structure of organo-magnesium complexes.

N. A. ORLOV and A. T. SHALYGIN: Preparation of carbohydrates by auto-oxidation of some hydrocarbons.

A. G. BERGMAN: Discovery of boron in Central Asia.

S. A. BOROVIK: (1) Finds of tin in micas. (2) Spectroscopic determination of rare earth elements in some minerals found in the U.S.S.R.

V. SMIRNOV and N. AIDINJAN: Determination of ferrous oxide in rocks and minerals.

A. P. VINOGRADOV: Manganese in insects (Formicidæ). The problem of the chemical composition of organisms as a specific character.

A. P. VINOGRADOV, V. V. DANILOVA and L. S. SELIVANOV: Fluorine content of the rivers of the Union (in connexion with the occurrence of mottled enamel tooth disease).

I. A. SMORODINCEV and A. M. FELDT: Critical survey of methods of the separation of thyroglobulin.

I. A. SMORODINCEV and S. P. BYSTROV: Influence of freezing on the swelling of meat.

E. V. PAVLOVSKIJ: New data on the stratigraphy of Cambrian deposits in the Lake Baikal region.

ŠAFRANOVSKIJ: Distribution of angular values in crystals.

M. S. LOICJANSKAJA: The first stages of the decomposition of cellulose by *Spirochaeta cytophaga*.

D. NOVOGRUDSKIJ, E. BEREZOVA, M. NACHIMOVSKAJA and M. PERVIAKOVA: Influence of bacterization of flax seed on the susceptibility of seedlings to infection with parasitic fungi.

E. D. BUSLOVA: A contribution to a method of cultivating embryos of higher plants, deprived of the nutritive reserves of the seed.

K. T. SUCHORUKOV and K. E. OVČAROV: The nature of immunity to rust.

A. A. ISAKOVA and A. SMIRNOVA: Influence of various microbe c mplexes of bacteriorhizas on the development of higher plants.

A. G. TOMILIN: Observations on Far Eastern whales.

A. A. VOITKEVIČ: The anterior lobes of the hypophysis and growth and differentiation phenomena in amphibians (1) and (2).

G. STREICH and E. SVETOZAROV: The morphogenetic role of the thyroid in the process of feather formation.

Moscow

Academy of Sciences (*C.R.*, 14, No. 7; 1937).

N. ACHYESER and B. LEWITAN: Application of the inequality of H. Bohr and I. Favard.

V. FABRIKANT, F. BUTAJEVA and I. CIRG: The absolute concentration of excited atoms in a low-pressure mercury discharge.

M. VEINGEROV: A radiometer of low inertia based on the principle of gas thermometer.

L. KIBEL: Mathematical theory of front shifting in the atmosphere.

S. J. TURLYGIN: Biological effect of centimetre waves.

N. N. MALOV: The law of nervous excitation by alternating currents.

I. LEONTJEV and K. MARKOVA: The curve of the 'racemization' of proteins from the muscles of certain invertebrates.

J. V. RAKITIN : Absorber for acetic aldehyde determination.

G. D. PRATASENJA : Production of polyploid plants after regeneration (2). Autotetraploid of *Nicotiana glauca*.

D. KOSTOFF : Studies on polyploid plants (16). *Nicotiana rustica* and *Nicotiana tabacum* amphidiploid.

E. S. SAPRYGINA : Vernalization of wheat hybrids of the first generation.

A. A. ISAKOVA : The true influence of bacteriorhizal micro-organisms on the germination of seeds (2).

A. V. IVANOV : A new ectoparasitic mollusc of the genus *Megadenus* Rosen.

T. A. BEDNJAKOVA : Induction of the infundibulum by the anterior end of the chorda.

Washington, D.C.

National Academy of Sciences (*Proc.*, **23**, 189–250, April).

C. E. NURNBERGER : Ionization theory and radiobiological phenomena. Assuming that hydrogen is the chief absorber in biological materials of neutrons, the ejected protons are the cause of the major part of the ionization. The concentration of ions produced by protons, and also by α-particles, is more than a hundred times that produced by electrons, and irradiation of aqueous solutions of tyrosine with X-rays (Stenstrom and Lohmann) and with α-particles gives results supporting the view that the chemical changes produced depend on ionic concentration. The relation of this work to recent investigations of the 'selective effect' of neutron irradiation of tissues is discussed.

A. A. BLESS : Effects of the length of X-ray waves on seeds. For moderate dosage, two minutes' exposure gives optimum growth at one stage, while at a later stage, optimum growth is produced by a different exposure. Over the range 0·6–0·12 A., the effects seem to be independent of wave-length.

M. MUSKAT and E. HUTCHISSON : Symmetry of the transmission coefficients for the passage of particles through potential barriers. A general wave-mechanical proof.

P. W. BRIDGMAN : Polymorphic transitions of inorganic compounds to 50,000 kgm./cm.^{2}. Thirty-five, out of eighty-five, such substances show polymorphism, and the transition parameters (pressure, temperature, change of volume and latent heat) have been determined. The temperature range of the experiments was − 79° C. to 200° C. The ice-type of transition (stable phase at higher temperature has the smaller volume) tends to become more common at high pressures. Latent heat shows no statistical trend with increasing pressure, but the energy change tends to increase proportionally with pressure, leading to the view that the atoms *increase* in size on passing to the high-pressure form. This suggests that an important fraction of the electrons of the high-pressure form are in an essentially different state from that in the free atoms.

G. H. PARKER : Colour changes due to erythrophores in the squirrel fish, *Holocentrus*. This fish changes from red to white in about 6 sec., and from white back to red in about 19 sec., on transfer from a black-walled illuminated vessel to a white-walled one or the reverse, due to expansion or contraction of red pigment in the erythrophores. Cutting through nerves supplying the skin suggests the existence of dispersing and concentrating nerves ; the latter, at least, are activated by a neurohumor soluble in lipoids.

F. B. SUMNER and P. DOUDOROFF : Some quantitative relations between visual stimuli and the production or destruction of melanin in fishes. Colour adjustment of fishes and amphibians to background depends on (1) dispersion or concentration of pigment in chromatophores (rapid), (2) changes in amount of pigment (slow). This paper deals with the latter. Fish were placed in two series of four tanks painted white, grey, dark grey and black respectively, one set being illuminated by two 200-watt lamps, the other by two 10-watt lamps. After 87 days, the melanin contents of fish from each tank was estimated photometrically.

R. GOLDSCHMIDT : A remarkable parallelism. In investigating the mutant 'vestigial' in *Drosophila* and its series of multiple alleles, it has been found possible to arrange them in a series with increasing degeneration of wing tissue. It is thought that the genes control the production of a growth-promoting substance, and that the different alleles produce an insufficiency which, below a certain threshold, causes degeneration. Representing the data graphically, the curves produced are identical with those of Krueger on the relationship of bacteria and phage, indicating that the kinetics of the two processes are the same.

E. W. SINNOTT : The relation of gene to character in quantitative inheritance. If the distribution as to a given quantitative trait in an F_2 population is symmetrical, it is concluded that each gene makes a constant absolute contribution and that the contributions are cumulative ; if, on the other hand, the distribution is skewed, this is considered as evidence that the genes are interacting and producing a geometric or multiplicative effect. Experimental work on fruit size in *Cucurbita Pepo* favours the latter view.

S. HECHT : The instantaneous visual threshold after light adaptation. In 1918, J. Blanchard published data on these thresholds. The eye was adapted to a given intensity by looking at a large illuminated area. At a given moment the adapting light was cut off and the minimum illumination required to make visible a central area at the same moment was determined. These data can be explained on the duplicity theory (cones functioning at high intensity and rods at low intensity), and numerical details of the data conform to the mathematical predictions of a photoreceptor process consisting of (*a*) a primary photochemical reaction whereby a photosensitive material is converted into active products, (*b*) a primary dark reaction maintaining the supply of photosensitive material, (*c*) a secondary dark reaction in which products of (*a*) undergo a change providing an impulse to the attached nerve.

G. A. MILLER : The groups of order p^m which have $m - 1$ independent generators.

R. BRAUER and C. NESBITT : Regular representations of algebras.

N. JACOBSON : Simple Lie algebras of type *A*.

D. V. WIDDER : The iterated Stieltjes transform.

K. MENGER : Metric methods in calculus of variations.

S. PASTERNACK : The mean value of r^s for Keplerian systems : a correction.