

University and Educational Intelligence

CAMBRIDGE.—The E. G. Fearnside's scholarship, for the encouragement of clinical research among the organic diseases of the nervous system, valued at £100, has been awarded to J. B. Harman, of St. John's College.

MR. V. K. RANGA V. RAO, of Gonville and Caius College, Cambridge, has been awarded the Garton Foundation studentship in social sciences for 1934. The studentship was founded by the late Sir Richard Garton to help students in the universities of the British Empire to devote themselves to the study of social or economic problems.

THE following scholarships, valued at £100 or more, have been awarded by the Institution of Electrical Engineers for 1934: Ferranti scholarship, F. C. Williams; Duddell scholarship, S. I. Hollingworth; Silvanus Thompson scholarship, S. G. Bittles; Swan Memorial scholarship, E. Bradshaw; David Hughes scholarship, W. B. Hutchison.

ROBERT BLAIR fellowships, tenable during the session 1934-35, have been awarded to Mr. P. D. Holder, of Cranford Nailsea, near Bristol, who proposes to carry out an investigation in the United States of America of the design and erection of steel-frame buildings; and to Mr. David M. Tombs, of London, who proposes to carry out a study and research with Prof. Zenneck, at the Munich Technical High School, into methods of short-wave propagation and reception.

THE University of Leeds' annual report for 1932-33 sounds a note of optimism. Towards the second half of the session, signs of a revival of industry gave ground for the assurance that the worst of the financial anxieties of the Council were over. The student enrolment was approximately the same as in the preceding year, notwithstanding the important restrictions imposed by the Board of Education on the number of students in the training departments of universities—restrictions which are expected to result in a reduction in the number of such students at Leeds from 425 in 1931 to 325 in 1935. Substantial progress was made towards the completion of the great building scheme. It is anticipated that the Brotherton library may be finished by 1935. Other important developments were: the institution of new faculties of law and economics and commerce; the incorporation in the University of the work of the Leeds School of Pharmacy, providing courses leading to the qualifications of pharmaceutical chemist and chemist and druggist; modification of the ordinance for general honours in science so as to require candidates to offer two instead of three principal subjects; the launching, in co-operation with the Royal Bath Hospital, Harrogate, of a scheme for the investigation of chronic rheumatism and allied conditions; and a project for a part-time course in biology leading to a diploma, designed to meet the needs of teachers in schools. In answer to an appeal from the Academic Assistance Council on behalf of expatriated German men of science and scholars (mainly of Jewish origin) the University agreed to accept not more than three for a period of two years as 'special research students'.

Science News a Century Ago

Measuring Electricity

It is important to remember that no method of measuring electricity existed in 1831, when Faraday entered upon the great period of his electrical researches. The galvanometer, the outcome of Schweigger's invention of the 'multiplier' in 1820, was not yet the indispensable instrument it afterwards became; it was not until 1833, in a footnote to his Third Series of Experimental Researches, that Faraday referred to "the great and general value of the galvanometer as an actual measure of the electricity passing through it". The relation between the three quantities we now call current, electromotive force and resistance, upon which modern methods of measuring the electricity in a circuit depend, had been established by G. S. Ohm in 1827; but his work was neglected at first. His paper, "Die Galvanische Kette", was mathematical, and written in German, circumstances which explain why Faraday apparently had no knowledge of it.

Faraday's conceptions involved the distinction between 'quantity' and 'intensity' which was common at the time, depending largely on the observed differences in the behaviour of electricity from the voltaic battery and from the frictional machine. He wrote in his Diary on August 5, 1834: "Quantity in Electricity appears to be analagous to the pitch in sound or the colour in light, and intensity in electricity to the loudness of the sound or the vividness of the light, i.e. to associate with increased energy of vibration but not with more numerous vibrations".

His own measuring instrument was the 'volta-electrometer' or voltameter. It was based, characteristically, on an experimental principle, that of the chemical action of the electric current, and was described by him in 1834 as "the only actual measurer of voltaic electricity which we at present possess".

Death of J. M. Jacquard (1752-1834)

On August 7, 1834, Joseph Marie Jacquard, the French inventor, died at the village of Oullins, near Lyons, at the age of eighty-two years. Though he made several inventions, the one he will always be remembered by is the Jacquard loom for weaving figured fabrics, an invention which for the first time enabled a weaver working single-handed to produce patterned materials according to a given design. This was a step forward of immense importance to Jacquard's native city of Lyons, where, a few years after his death, a monument to him was erected. The Jacquard loom, brought to a successful issue in 1804-5, was the result of a combination of several devices rather than a single invention, and is an example of the cumulative effect of mechanical progress.

Jacquard was born at Lyons on July 7, 1752. The son of a weaver, he received no schooling and at twelve years of age began work in a bookbinder's. From the bookbinder's, he went to a typefounder's, then to a cutler's and on the death of his mother joined his father as a weaver. Evidently gifted with mechanical skill far above the average, he was always endeavouring to improve on the tools of his trade. During the Revolution he was an ardent soldier, and at the opening of the nineteenth century a new chapter of his life began. A medal from the Industrial Exhibition of 1801 was followed by

the grant of a patent. In 1802 he invented a machine for making fishing nets and about the same time was given a post at the Conservatoire des Arts et Métiers, where among the models he found the loom of Vaucanson. Back again in Lyons, and encouraged by some of the manufacturers, he was able to develop his loom, and in 1806 Napoleon authorised the municipality of Lyons to purchase the invention. Jacquard was given a pension of 3,000 francs and the latter part of his life was passed in comparative ease. A man of simple habits, modest and dignified, he retired to the village of Oullins and it is there he is buried. His original loom is preserved in the Conservatoire des Arts et Métiers beside that of Vaucanson.

Zinc Sheathing for Ships

Several times, zinc has been tried for the sheathing of ships with the object of preventing fouling, and on August 9, 1834, under the heading "Mosselmans Zinc", the *Mechanics Magazine* said: "Mills for the rolling of this valuable metal have been erected at Dartford and commenced working on Saturday last. The event was celebrated by a *fête champêtre* which was attended by a number of the most distinguished merchants and shipowners of the city of London, several eminent engineers, men of science, etc. Mr. Ward, late member for London, in proposing the health of Mr. C. P. Chapman, the manager of the establishment, spoke in high terms of the service Mr. C. had rendered to the country by the introduction of so cheap and efficient a substitute for copper in the sheathing of ships, at a time when economy of expenditure is an object of such vital importance to the shipping interest. The demand for zinc for this purpose is, we understand, increasing with astonishing rapidity, and hence the importance of having rolling mills so near the metropolis, where sheets of any thickness or size can be turned out as fast as wanted. The machinery of the mills has been constructed by Messrs. Hall, the eminent engineers of Dartford, and is of a very complete, though necessarily simple, description."

Howard's Quicksilver Boiler

Among the inventions experimented with in the early days of steam navigation was the mercury boiler of Thomas Howard in which the heat of the furnace was communicated to a shallow closed pan containing mercury, on the upper surface of which a small stream of water was sprayed through a nozzle. The apparatus was fitted directly underneath the engine cylinder, and the steam evaporated by contact with the upper surface of the mercury vessel was passed into a casing around the cylinder, and then through ports into the cylinder. A fan was used for the draught for the furnace, and the steam leaving the cylinder was condensed in a copper vessel immersed in a cistern of water continually supplied from the sea. This arrangement was tried in H.M.S. *Comet*, 232 tons, in 1834, and on August 10 a correspondent described the apparatus in a letter to the Editor of the *Mechanics Magazine*. It was said that whereas the *Comet* used with the ordinary low-pressure flue boiler $6\frac{1}{2}$ cwt. of coal per hour, with Howard's boiler the consumption would only be $3\frac{1}{2}$ cwt. The quicksilver boiler was afterwards fitted in the paddle vessel *Columbus*, of 325 tons, but an explosion led to its abandonment.

Societies and Academies

DUBLIN

Royal Irish Academy, June 11. W. B. MORTON: The stability and oscillations of certain permanent arrangements of parallel vortices. The arrangements in question are those which formed the subject of an earlier paper, namely, any three vortices at the corners of an equilateral triangle and four, with a definite ratio of strengths, at the corners of a rhombus. The slightly disturbed motions are discussed, and the frequencies and modes of oscillation about the steady motions are determined. It is found that the triangular arrangement is stable when the centre of the vortices lies within the circle circumscribing the triangle and the rhombus when its acute angle exceeds a critical value, arc $\cos(1/\sqrt{3})$.

PARIS

Academy of Sciences, June 11 (*C.R.*, 198, 2033-2128). ELIE CARTAN: The tensorial calculus in projective geometry. H. DESLANDRES: A simple and general relation of the molecular spectrum with the electrons and rings of electrons of the constituent atoms. A discussion of a new formula with special reference to the infra-red frequencies of sodium chloride, nitric oxide and methane. L. CAYEUX: The difficulties of classification of the old limestone sediments. L. BLARINGHEM: Heredity in mosaic of *Geranium pratense*. JEAN LOUIS FAURE was elected a member of the Section of Medicine and Surgery in the place of the late P. Bazy. NIKOLA OBRECHKOFF: Univalent polynomials. I. POPA: Centro-affine geometry of skew curves. MAURICE FRÉCHET: The importance, in applications, of the nuclei to which the theory of Fredholm does not apply. G. VRANCEANU: The geometrisation of the systems of Pfaff. MIROSLAW KRZYZANSKI: Generalised absolutely continuous functions of two variables. STEFAN KEMPISTY: The totalisation of functions of two variables. E. REMES: On a convergent method of successive approximations for determining polynomials of approximation. GEORGES VALIRON: The singularities of holomorphic functions in a circle. O. YADOFF: The regulation of the power of hydraulic turbines having to work under variable heads. JEAN VILLEY: The permanent flow, in two dimensions, of a very rapid current of air round a cylindrical obstacle. P. SWINGS and B. EDLÉN: The presence of the forbidden lines of argon IV in the spectrum of nebulae. HENRI MARCELET: The capillary index of some vegetable oils. RENÉ LUCAS: A new type of powerful electromagnet for the study of double refraction and of atomic jets. The electromagnet described gives a field of 20,000 Gauss with an ordinary laboratory battery (120 volts, 4.4 amperes, or 530 watts). J. L. DELSAL: The polarimetric study of beryllium tartrates. There exists in solution only one beryllium tartaric complex, $H_2C_4O_6(OH)_2Be_3$, which is formed whatever may be the proportions of the reagents. ANDRÉ CHARRIOU and Mlle. S. VALETTE: The influence of antioxygen bodies on the sensibility of photographic emulsions. The lowering of the sensibility of a photographic emulsion by the incorporation of an antioxygen body confirms the view that these substances are, in a general manner, de-activating substances for molecules excited by radiations. V. DOLEJŠEK and A. NĚMEJCOVÁ: The photographic inversion due to the simultaneous action of two different radiations. MME. ROY-POCHON: Photoelectric cells of the