

reputations before he began, and this late start was a serious impediment in the way of his recognition. This was also delayed by a certain conservative hostility to the subjects which he represented, and which scarcely anyone in England understood.

'Complex' function-theory had been introduced to Cambridge a little before (in a rather ill-digested form) by Forsyth, but the 'real' theory was still practically unknown. Hobson and Young were the first true English 'analysts', and "The Theory of Sets of Points", published by the Youngs in 1906, the first real English book on analysis. This is a first-rate book both in substance and in presentation, and it is most regrettable that it should never have been rewritten, in the light of later advances, and reprinted. But all Young's books were comparatively unsuccessful in England. His Cambridge Tract, "The Fundamental Theorems of the Differential Calculus" (1910), though much of its content is now 'classical' and is reproduced in the standard French courses of analysis, never went into a second edition; and the joint "First Book of Geometry", a most interesting and original 'book for children', written in 1905, was 'a complete flop' at home, though it has been translated into four foreign languages.

The theory of functions of a real variable has been completely rewritten since 1900. The remaking began with Borel's famous monograph "Leçons sur la théorie des fonctions", published in 1898. Among those who have remade it Lebesgue, by general consent, stands first; but there is no one else who has contributed more than Young. Young's first work was independent of Lebesgue; he had found definitions of measure and integration different in form from, and in some ways more natural than, Lebesgue's, but equivalent in essentials. He was anticipated by some two years, and the disappointment was a blow; but he recognized the anticipation magnanimously—"the Lebesgue integral" is his own phrase—and set himself whole-heartedly to work at the fuller development of the theory: he was the first, for example, to find a really satisfactory synthesis of the work of Stieltjes and Lebesgue. But his interests were not at all confined to the theory of integration; there is scarcely a chapter of real function-theory on which he has not left his mark. Thus he rewrote a large chapter of the differential calculus, and the theory of Fourier series, and other orthogonal developments, are full of striking theorems discovered by Young.

G. H. HARDY.

Sir Alfred William Flux, C.B.

ALFRED WILLIAM FLUX, who died recently in Denmark, aged seventy-five, was successively mathematician, economist and statistician. Successively, because after being classed as one of the Jubilee Senior Wranglers in 1887, he came under the influence of Alfred Marshall (who had succeeded to the chair of political economy at Cambridge in 1885), was one of the foundation members of the Economic Society (1890), and from 1893 until 1908 was a teacher of economics, first at Manchester and then at McGill University, Montreal.

Flux's main interest was not in the development of the mathematical theory of economics, but in its practical applications to commerce from the statistical point of view. He had been elected a fellow of the Statistical Society in 1893. Though he joined the Econometric Society in 1934, he appears never to

have used mathematics in his writings, except in his "Economic Principles" (1904), where, following Marshall, he gave them a subsidiary position. Indeed, he publicly deprecated mathematical tools except as a personal background to verbal analysis. In 1908 he returned to England and was attached to the Board of Trade until his retirement in 1932. During this period he was a very active participant in the work of the Royal Statistical Society, as member of council from 1908, honorary foreign secretary from 1925, and president during 1928-30. Soon after 1932 he made his home in Denmark, Lady Flux's native country, and during part of each year worked at the League of Nations in Geneva. The outbreak of war found him in Denmark.

Flux is best known because of his work on the British Censuses of Production. The first Census (1907) was already organized when he joined the Board of Trade, but he became director in 1911 and wrote the Final Report. He was responsible for the Censuses of 1911 and 1924 and for the initiation of that of 1930. Apart from the normal reports on production, he made three important developments. First he built up estimates of the total national income from the side of production, and contrasted and compared the results with earlier estimates based on the aggregate of individual incomes (Giffen's method); this analysis is of far-reaching importance (*J. Roy. Stat. Soc.*, 1913 and 1929). Secondly, he initiated an index of production, for which the Census provided the weights attached to the different quantity series (*J. Roy. Stat. Soc.*, 1927). Thirdly, he reconstituted Giffen's index of wholesale prices, again using the Census for weighting (*J. Roy. Stat. Soc.*, 1921). These results are now well known as the Board of Trade's Index-numbers of Production and of Wholesale Prices, though from time to time details have been modified.

The Board of Trade and its offshoot the Ministry of Labour have frequently been recruited from the ranks of trained economists who have brought wider views than are commonly taken by those without outside experience. This procedure has been abundantly justified by the importance and originality of the work which has here been too briefly summarized.

A. L. BOWLEY.

Dr. F. Dawtrey Drewitt

DR. FREDERIC GEORGE DAWTREY DREWITT, the biographer of Jenner and historian of the Chelsea Physic Garden, died at his home in Kensington after a long illness on July 29 at the age of ninety-four. He was educated at Winchester and Christ Church, Oxford, where he gained a second class in the School of Natural Science and received his medical training at St. George's Hospital. He qualified in 1876, and after being physician to the Victoria Hospital for Children during 1881-97 and at the West London Hospital during 1882-1902 he gave up medical practice for more congenial pursuits.

In 1903 Drewitt became a member of the British Ornithologists' Union, and afterwards served on the councils of the Zoological Society, the National Trust for Places of Interest or Beauty and the Society for the Promotion of Nature Reserves. He was best known, however, for his connexion with the Chelsea Physic Garden, on the board of management of which he had represented the Royal College of Physicians since 1921, and he was vice-chairman from 1929 until a few months before his death.

Drewitt's work entitled "The Romance of the Apothecaries Garden at Chelsea", which first appeared in 1922 and reached its third edition in 1928, contains a delightful account of the history of the Garden, including mention of the distinguished men connected with it, such as Sir Hans Sloane, Linnæus and Sir Joseph Banks, its most remarkable trees and other plants, and the present botanical research which is being carried out there. His further interest in botany is shown by a little book on the Latin names of common flowers, published in 1927. His "Life of Edward Jenner, Naturalist and Discoverer of Vaccination", of which the second edition was published in 1933, contains besides the description of the introduction of, and opposition to, vaccination, a lively account of Jenner's early life as a country practitioner and his observations on natural history. In 1931 Drewitt published for the first time "The Note-Book of Edward Jenner in the Possession of the Royal College of Physicians of London, with an Introduction on Jenner's Work as a Naturalist", in which he dealt with Jenner's friendship with John Hunter, Dean Buckland and Sir Humphry Davy. In addition to these works on natural history, Drewitt was the author of "Bombay in the Days of George IV: a Memoir of Chief Justice Sir Edward West", published in 1907.

There is no better example of the truth of Buffon's well-known aphorism than that given by Drewitt, whose polished and kindly nature was reflected in

his style. His versatility was shown by his being an accomplished artist and twice exhibiting at the Royal Academy. He had many friends not only in the medical profession but also among laymen, the most notable of whom was Ruskin. He married in 1887 but left no issue. J. D. ROLLESTON.

WE regret to announce the following deaths:

Dr. Arnold Berliner, founder and formerly editor of *Die Naturwissenschaften*.

Mr. D. B. Mair, formerly assistant Civil Service Commissioner and a distinguished mathematician, on July 21, aged seventy-four.

Sir Allen Mawer, F.B.A., provost of University College, London, an authority on English place-names, on July 22, aged sixty-three.

Prof. John H. Salter, formerly professor of botany in the University College of Wales, Aberystwyth, known also for his work in ornithology, on August 5, aged eighty-one.

Prof. A. L. Selby, emeritus professor of physics in University College, Cardiff, on July 22, aged eighty-one.

Prof. R. Willstätter, For. Mem. R.S., formerly professor of chemistry in the University of Munich, on August 3, aged sixty-nine.

Sir Francis Younghusband, K.C.S.I., K.C.I.E., distinguished for his explorations in south-eastern Asia, on July 31, aged seventy-nine.

NEWS and VIEWS

Astronomy on Postage Stamps

THE dedication of the Mexican National Astrophysical Observatory at Tonanzintla in February last has been marked by the issue by the Mexican Government of a series of six postage stamps devoted entirely to astronomical subjects. The 2c., 5c., 10c., 20c. and 40c. stamps depict respectively the dark nebula in Orion, the solar corona as seen at a total eclipse, the open spiral nebula in Canes Venatici, the edge-on spiral nebula NGC 4594, showing absorption in the central plane, and the ring nebula in Lyra. The 1 peso stamp, departing from the principle of showing spectacular objects such as these, is an experiment which must surely be unique in philately; it depicts the Hertzsprung-Russell diagram connecting stellar luminosity with spectral type, with the main sequence, the giants, the supergiants and the white dwarfs all duly labelled. The significance of this diagram will certainly escape all but those fairly well grounded in astronomy, but the ordinary user of the stamps of lower denominations cannot fail to be impressed by the grandeur of the objects shown.

Functions of Works Managers

IN his speech in the House of Commons on July 22 on the work of the Factory Department of the Ministry of Labour and National Service, Mr. Ernest Bevin paid a well-deserved tribute to works managers. The works manager, he asserted, deserves more recognition than he had yet received, and the country owes much to him in this War, as well as to the mines manager, for overcoming problems which no Government department, scientific worker or technician could have foreseen. There is a very close under-

standing between the Factory Department and the works managers, who have much in common, being trained, to a very large extent from the same personnel and thus understanding not only each others' problems but each others' approach to the problems. He drew a distinction, which he thinks industry will have to face in the future, between what he called the working directorates who understand the actual operations of the job and he put these working directorates in the same category as works managers. He also emphasized the value of the newly established Factory and Welfare Board as a safeguard against rigid bureaucratic methods. It gives industry and public service a proper place in this branch of administration, and Mr. Bevin thinks that a board of this character will remain a permanent feature to enable us to surmount the changes and difficulties which will arise in our industrial system in the vexed and difficult times ahead. Referring to the Department's policy in encouraging the establishment of personnel managers in the larger factories, he believes that too much is often imposed on the works manager in receiving deputations and like matters and being expected to run the works as well. Much specialization is essential in handling such problems, and the personnel manager as part of the executive is a great asset in large works. Referring to hours of work, Mr. Bevin said that production and mobilization of manpower have now reached a point when matters can be tightened up in respect of hours of work, and the trend of his speech indicated a welcome determination to deal firmly with the question of excessive hours, which are so important a factor in absenteeism and in low production.