

peroxides lies in their ability to liberate alkyl rather than hydroxyl radicals.

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OBITUARIES

Prof. Harald Bohr

No doubt the reason why the death of Prof. Harald Bohr, of Copenhagen, was reported in English newspapers was that he was the brother of Niels Bohr, the famous atomic physicist. Actually he was a great man in his own right, one of the leading figures in the generation of mathematicians which also contained Hardy, Landau and Littlewood. His fame will rest chiefly on his invention of the theory of almost periodic functions. Incidentally, he was perhaps the only front-rank mathematician who was also an international footballer, as he had played football for Denmark.

Harald Bohr's early work was mainly on the theory of the Riemann zeta-function,

$$\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s} = \sum_{n=1}^{\infty} \frac{1}{n^{\sigma+i\tau}}$$

The sort of problem which he considered was this. Suppose that we take a fixed value of σ , greater than 1, and consider the behaviour of the function as $t \rightarrow \infty$. The n th term of the series is periodic, with period $2\pi/\log n$, but the function as a whole is not periodic. Nevertheless, Bohr showed that it imitates to a certain extent the behaviour of a periodic function. It has oscillations which never die out as $t \rightarrow \infty$, and these oscillations are very large when σ is very near to 1. Thus $\zeta(s)$ is unbounded, as $t \rightarrow \infty$, in the neighbourhood of the line $\sigma = 1$. Bohr constructed many beautiful proofs of this and other theorems in the same order of ideas.

It was no doubt his work on the quasi-periodic properties of the Riemann zeta-function that led Bohr to the idea of an almost periodic function. The function $f(x) = \cos x$ is periodic, with the period 2π , that is, $f(x + 2\pi) = f(x)$ for all values of x ; so is $f(x) = \cos \frac{1}{2}x + \cos \frac{1}{3}x$, its period being 12π . It is known from the theory of Fourier series that any periodic function can be expressed as a sum of such trigonometrical functions. But the sum of two periodic functions is not necessarily periodic, as is shown by the example $f(x) = \cos x + \cos(x\sqrt{2})$. The problem which Bohr set himself was to find a property analogous to periodicity which characterizes all such functions. His result is as follows. A number y is called a translation number of a function $f(x)$, belonging to a number ϵ , if $|f(x+y) - f(x)|$ never exceeds ϵ , for any x ; and $f(x)$ is said to be almost periodic if the translation numbers corresponding to any ϵ , however small, are relatively dense, that is, if there exists a number l such that any interval of length l contains at least one such number. Bohr showed that any almost periodic function can, in some sense, be expressed as a trigonometrical series of the form $\sum A_n \exp i\lambda_n x$. His theory thus amounts to a wide generalization of the theory of Fourier series.

E. C. TITCHMARSH

Prof. G. T. R. Evans

GWILYM THOMAS RICHARD EVANS, professor of physics in the University of the Witwatersrand, Johannesburg, died on December 20, 1950, after a short illness. He was sixty years of age. He was a native of Cardiganshire, Wales, born at Talybont near Aberystwyth. He became a student of the University College of Wales, Aberystwyth, taking his B.Sc. degree with honours in physics in 1913. He was immediately appointed to the physics staff of that College. But for a break of several years spent at a munitions factory in South Wales during the First World War, he remained at Aberystwyth until 1920, when he left to take up an appointment in South Africa as lecturer in physics at what was then the Johannesburg University College. He soon became a senior lecturer in the newly constituted University of the Witwatersrand. He was appointed to the chair of physics in 1947 and became dean of the Faculty of Science in 1950. He was a Fellow of the Institute of Physics.

Prof. Evans carried out research on electrolytic conduction and on the preparation and coagulation of colloids both in Aberystwyth and in Johannesburg, and published several papers on these topics. He was an excellent teacher and administrator. During

the course of his service at the University of the Witwatersrand, he came in contact with some thousands of students, mainly in science and in engineering, and left a lasting impression on them by his sympathy and encouragement as well as by his enthusiasm as a teacher. During the last three years, he organized overseas study leave for the members of his staff to enable them to obtain training in metal physics, so that they might return and form a team of workers in that subject.

He is remembered with great affection by his colleagues in the University and by a wide circle of

friends outside. He leaves a widow, a son and a daughter.

H. H. PAINE

WE regret to announce the following deaths:

H. J. Hodsmen, M.B.E., senior lecturer in the Department of Coal Gas and Fuel Industries, University of Leeds, on January 31.

Dr. C. Ramalinga Reddy, vice-chancellor of Andhra University, and a member (1941) of the All-India Board of Scientific and Industrial Research, on February 25, aged seventy.

NEWS and VIEWS

Educational Psychology at Durham:

Prof. F. V. Smith

PROF. F. V. Smith has been appointed to the chair of educational psychology in the University of Durham, with responsibilities for the subject at both Durham and King's College, Newcastle, in succession to Prof. E. A. Peel, who has taken the chair of education in the University of Birmingham. Prof. Smith is an Australian who graduated at the University of Sydney with high honours in psychology. He had experience in administration and lecturing in education in Sydney, being responsible particularly for the diagnosis and remedial treatment of children's educational disabilities. He went to London in 1946 as a lecturer at Birkbeck College, obtaining the degree of Ph.D. of the University of London, and then he became lecturer in experimental psychology in the University of Aberdeen in 1948. Prof. Smith's main contributions have been in the field of Gestalt and Hormic psychology. He believes that a real understanding of pure psychology is essential for furthering progress in its educational and industrial applications. He is a keen traveller and photographer, and is particularly fond of mountain sports both in summer and winter.

Honorary Citizenship of the University of Hamburg: Dr. J. N. Carruthers

ON February 9, the rector of the University of Hamburg, Prof. Jores, conferred the Diploma and Gold Medal of the Citizenship of Honour of the University on Dr. J. N. Carruthers, of the Admiralty Hydrographic Department. Among others, representatives of the German Geophysical Society were present at the ceremony, which took place in the Geographical Institute of the University. In his address Prof. Jores paid tribute to Dr. Carruthers's achievements in the field of oceanography and the exploitation of its results for fishery biology, from which, he said, all nations bordering on the north-west European seas have benefited. Prof. Jores, furthermore, expressed his particular gratitude for the way in which Dr. Carruthers had resumed co-operation with Germany after the Second World War, rendering very valuable assistance to German oceanographical institutions. At the end of the ceremony, Dr. Carruthers gave a lecture on present-day problems of oceanography in Great Britain, presenting a clear view of the valuable results achieved by oceanography proper and showing how physical oceanographers can, to a considerable extent, help fishery biologists. In honour of

the occasion the German Geophysical Society held a symposium, at which the senior chairman of the Society echoed the thanks paid to Dr. Carruthers for his services to German oceanography, especially in establishing the German Hydrographic Institute. On the previous day, Dr. Carruthers gave a lecture in the Institute of Oceanography, University of Kiel.

National Institute of Sciences of India: New Fellows

AT a meeting of the Council of the National Institute of Sciences of India held at Bangalore on January 1, the following fellows were elected: *Ordinary Fellows*: Prof. R. K. Asundi, professor of physics, Benares Hindu University; Dr. K. P. Basu, head of the Dairy Chemistry Section, Indian Dairy Research Institute, Bangalore; Prof. K. P. Chattopadhyaya, professor and head of the Department of Anthropology, University of Calcutta; Dr. C. R. Das Gupta, head of the Department of Haematology, School of Tropical Medicine, Calcutta; Dr. S. Ghosh, lecturer in applied mathematics, University of Calcutta; Lieut.-Colonel S. D. S. Greval, imperial serologist and chemical examiner to the Government of India and professor of serology and immunology, School of Tropical Medicine, Calcutta; S. Gupta, reader in physics, Muslim University, Aligarh; Dr. P. V. K. Iyer, professor of statistics, Indian Council of Agricultural Research, New Delhi; A. N. Khosla, chairman, Central Water-power, Irrigation and Navigation Commission, New Delhi; Dr. K. B. Lal, entomologist and officer-in-charge, Plant Protection Service, Government of U.P., Kanpur; Prof. Shri Ranjan, professor of botany and dean of the Faculty of Science, University of Allahabad; Prof. S. R. Narayan Rao, professor and head of the Department of Geology, University of Lucknow; K. Sawhney, secretary, Indian Central Cotton Committee, Bombay; Prof. N. K. Sen, professor and head of the Department of Chemistry, Presidency College, Calcutta, and University lecturer in chemistry, Calcutta; Sir M. Visweswaraiya, chairman, All-India Manufacturers Organization, Bangalore. *Honorary Fellows*: Sir Alexander Fleming, professor emeritus of bacteriology, University of London; Prof. R. Kuhn, director, Kaiser Wilhelm Institut für medizinische Chemie, Heidelberg; Prof. H. J. Muller, Department of Zoology, Indiana University; Prof. S. A. Waksman, professor of microbiology, New Jersey Agricultural Experiment Station, Rutgers University, New Brunswick.