contamination is primarily dependent on the cumulative deposition.

It is of interest to compare the relationships between the cumulative deposition and the strontium-90 content in milk for Somerset and New York in the past four years (Table 4). In the United Kingdom the levels in milk have risen to only a small extent, although the cumulative deposition has been more than doubled; in New York, however, the cumulative deposition and the levels in milk have both risen similarly. Moreover, the ratio of the level in milk to the cumulative deposition on Somerset (Table 4, col. 3) is considerably above the relatively constant United States value; the over-all rate of transfer of strontium-90 to milk is, therefore, considerably greater. This is perhaps attributable in part, at any rate, to the conditions of United Kingdom pastures being more favourable for stem-base absorption. These differences indicate the danger of extrapolating from one region to another. This danger is likely to be particularly great when the manner of growth of crops contrasts markedly. It might be expected that the component of plant content which is dependent on the rate of fall-out will be particularly great in plants growing in soil submerged in water, particularly if ions can be absorbed largely from the water as opposed to the soil; this could be regarded as an extreme case of stem-base absorption. A report that the total radioactivity of the bog moss *Sphagnum* in the United Kingdom has increased to a considerably greater extent than that of land plants¹⁹ is compatible with this view. Rice grown in flooded paddy fields would seem to provide the opportunity for an analogous large component dependent on the rate of contamination. Relatively high levels of contamination in rice have been reported, but the evidence does not enable the mechanism of contamination to be assessed.

Hitherto it has usually been considered that variations in the rate of transfer of strontium-90

from the ground surface into human diet will be influenced mainly by the importance of milk produce in the diet and by the calcium content of soil. It now appears that this analysis is inadequate; variations in the growth forms of both roots and shoots may cause considerable differences in the relationship between plant content and both the rate of fall-out and the cumulative total. The results of field surveys, conducted for at most a few years, appear wholly inadequate for elucidating these complex relationships. If long term predictions are to deserve credence, careful experimental work is necessary.

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OBITUARIES

Prof. S. R. Milner, F.R.S.

PROF. SAMUEL ROSLINGTON MILNER died at the home of his son in Sydney, New South Wales, on August 12, at the age of eighty-three. For some time his health had not been good, but he continued working to the end. An understanding friend has written of him: "In the entirely selfless absorption in science for truth's sake there cannot have been at any time many equals of S. R. Milner".

He attended King Edward VI School, Retford, and the Universities of Bristol and Göttingen, under Chattock and Nernst. After one year on Schuster's staff in Manchester he worked in Sheffield as a lecturer with Hicks from 1900 until 1917, as acting professor until 1921 and as professor until his retirement in 1940. During the First World War he enlisted in the R.A.M.C. as radiographer to the Third Northern General Hospital, designing and building the necessary apparatus and training men for other hospitals.

In spite of a heavy burden of teaching in an understaffed Department, Milner fulfilled his early promise by a fruitful output of both theoretical and experi-

mental research. At the early age of twenty-five he was awarded the London D.Sc. and later received honorary doctorates from both Bristol and Sheffield. A beautiful and ingenious experimenter, it was a delight to watch his careful construction and manipulation of apparatus. Students will always remember his lectures, which were models of lucidity and copiously illustrated by demonstrations, many of his own devising.

His colleagues and others had a tremendous admiration for his encyclopædic knowledge of physics; but it was his theoretical work on solutions, and later on electromagnetism, which brought him his greatest distinction. Considering first the effect of the departure from the ideal gas laws of the ions in solutions (1900), he developed his ideas in further papers and laid the foundations of the modern theory of electrolytes (1912-1918) in papers on "The Virial of a Mixture of Ions" and "The Effect of Interionic Forces in Electrolytes". For this work he was elected to fellowship of the Royal Society in 1922. Though these papers were necessarily mathematical, he kept the physical basis in the foreground, and this was true also of his later approach to electromagnetic

theory. He examined first the motion of, and stresses in, tubes of force and built up an analysis of the field into moving elements before his thought matured into more mathematical expression of the 'action' of an electromagnetic field, on which his later work was based. He found tools for the development of his ideas in Eddington's '*E*-number' calculus, which he reduced to order, obtaining thereby a new insight into the roots of relativity. Thus he was enabled to formulate for the first time a self-consistent classical theory of electromagnetism. At the time of his death he was engaged in the preparation for publication of further papers in which this theory is expounded.

Milner was the most lovable of men. His outstanding characteristic was his capacity for inspiring affection. He was the friend of all because he was so willing to be friendly and helpful in a rather shy and retiring way. His genuine interest in the welfare and careers of his students was recognized and appreciated by them. Together with his colleagues and many others, they had for him a very deep affection. He is survived by his wife, also a physicist from the University of Bristol, and son, who is professor of physics in the New South Wales University of Technology, Sydney.

J. R. CLARKE

Mr. S. E. Fox

Mr. SEATON E. FOX, who was sixty-five, died in a London hospital on August 27 after a short illness. He was a graduate of the University of Cambridge and in 1932, after working for several years in the explosive and petroleum industries, he became assistant secretary and technical editor to the Technical Section of the Paper Makers' Association, and in 1944 he was appointed librarian, information officer and editor to the British Leather Manufacturers' Research Association, a post he occupied until his death.

During his fifteen years work for the Association, Mr. Fox organized its publications on a sound basis and brought them to a high technical and editorial standard. He began the abstracting system which has proved so useful to members of the British Leather Manufacturers' Research Association: his index of publications on collagen is valued not only by his colleagues and others in the leather industry but also by scientists engaged elsewhere in pure research on that subject. His work was highly respected by librarians and editors in other research associations, and his death is greatly regretted by them and by his many friends and acquaintances in the leather industry.

NEWS and VIEWS

The Danish Atomic Energy Commission

THE main task of the Danish Atomic Energy Commission, which was constituted on December 21, 1955, and which meets regularly once a month under the chairmanship of Prof. Niels Bohr, is the planning and construction of Risø, its research establishment, situated on a 650-acre site four miles north of Roskilde, a town of 30,000 inhabitants, and twenty miles west of Copenhagen. Through the co-operation of the United States of America and the United Kingdom the establishment will eventually have the facilities of three research reactors. DR1 (Danish reactor No. 1) is a low-energy, homogeneous reactor, particularly suitable for educational purposes and physical experiments. It was purchased in the United States in July 1956, together with DR2, which is a light-water-moderated heterogeneous tank-type research reactor with facilities for neutron exposure experiments and isotope production. DR3, purchased in the United Kingdom in June 1957, is a heavy-water-moderated high-flux reactor of the PLUTO-type as constructed for Harwell and Dounreay. Work on DR1 was completed on August 15, 1957, and DR2 and DR3 are expected to become operational during 1958 and 1959, respectively. Details of the layout of the establishment and of the components of the reactors, together with illustrations of the various ancillary buildings, are given in an attractive brochure which has recently been issued by the Commission (Risø: The Research Establishment of the Danish Atomic Energy Commission. Pp. 20. Copenhagen K: Danish Atomic Energy Commission, 1958). The staff of the Scientific and Technical Department on April 1, 1958, totalled 143, distributed among the six groups of the Department—reactor engineering, physics, chemistry, electronics, health physics and agricultural research. In addition, fifty-one people

were employed in the administrative office and the various service departments at Risø and thirty in the secretariat of the Commission at its headquarters in Copenhagen.

Seventy-fifth Anniversary of L'École Supérieure, Paris

To commemorate the seventy-fifth anniversary of the foundation of L'École Supérieure de Physique et Chimie Industrielle in Paris in 1882 the student association has recently issued a most attractive and interesting illustrated volume containing twenty-four articles dealing with chemical and physical topics (*Association des Élèves de l'École Supérieure de Physique et Chimie Industrielles de la Ville de Paris. Physique et Chimie. Ouvrage édité à l'Occasion du 75^e Anniversaire de leur École. Pp. 272. Paris, 1959*). In the first two articles, Prof. R. Lucas, the director of L'École Supérieure, and Prof. L. de Broglie pay tribute, respectively, to the founders and to the many famous past pupils of the institution, and one of these pupils, Paul Langevin, is also the subject of a separate article by Prof. M. Tournier. The articles by the late Prof. F. Joliot on energy and its utilization, Prof. G. Destriau on the phenomena of luminescence, and Prof. J. J. Trillat on electron diffraction, will perhaps be of greatest interest to the physicist; and to the chemist, the articles describing the French chemical industry, polyamide textiles, quantum chemistry, and plastics. There are in addition articles dealing with optical methods for the study of the flow of liquids; the optics of high-frequency aerials; and the visibility of submerged objects. In the final article in the volume Prof. D. Gabor gives a detailed and clear description of his flat colour-television tube which has aroused so much interest both in Britain and overseas.