Table 1. Positive Measurements of Barium-140 in New Zealand Rainwater, Lower Hutt, 41° S.: November 1958–June 1961

| Sample No. | Dates when collected from to | Rain (in.) | Strontium-90 μc./square mile | Barium-140 μc./square mile at mid-collection | Barium-140 / Strontium-90 | Probable source of barium-140 | Per cent strontium-90 due to French test |
|---|---|---|---|---|---|---|---|
| | 1958 (2 samples) November 7–December 4 | | | | | | |
| | 1959 (58 samples) January 15–December 1 | | | | | | |
| | 1960 (24 samples) February 13–May 31 | | | | | 1960 | |
| *B* 044 | February 13–February 19 | 0·2 | 28 ± 1 | 2·5 ± 1·2 | 0·1 ± 0·05 | February 13 | 0·005 |
| *B* 069 | March 9–March 12 | 1·53 | 57 ± 1 | 5 ± 3 | 0·1 ± 0·06 | February 13 | 0·02 |
| *B* 072 | March 12–March 16 | 0·23 | 17 ± 1 | 5 ± 1·5 | 0·3 ± 0·1 | February 13 | 0·07 |
| *B* 085 | March 25–March 26 | 0·25 | 20 ± 1 | 3 ± 1·5 | 0·15 ± 0·1 | February 13 | 0·06 |
| *B* 122 | May 1–May 3 | 0·13 | 19 ± 2 | 11 ± 4 | 0·6 ± 0·2 | April 1 | 0·12 |
| | 1961 (13 samples) January 7–June 1 | | | | | | |
| *C* 024 | January 24–January 31 | 0·08 | 21 ± 1 | 2·4 ± 1·3 | 0·12 ± 0·06 | December 23 | 0·03 |

probably yttrium-90 not lanthanum-140. The other four apparent activities in September/October 1959 were due to the use of an incorrect reagent blank.

During early 1959 the accuracy of our barium-140 determinations was about ± 100 μc./square mile, but this was reduced to about 1–2 μc./square mile by 1961. From the limits of detection of barium-140, the measured values of strontium-90 deposited, and a value of 1480/1 for the barium-140/strontium-90 ratio[3] for the fast neutron fission of uranium-238, the maximum percentage deposition of strontium-90 due to the October 1958 test programme of the Soviet Union can be calculated. These values are compared in Table 2 with the maximum percentage strontium-90 deposited due to this series calculated from measurements of total beta activity which will be published shortly. The percentage contributions quoted here are maximum values; it has not been demonstrated that any strontium-90 is in fact due to this series. Table 2 shows that the percentage contribution of strontium-90 from the October 1958 series of the Soviet Union detectable by our methods increases as the barium-140 decays until after about March 1959 it was no longer possible to detect an influx of debris from this source. The limits of detection for this debris based on total beta activity measurements assumed all the activity came from the series of tests in the Soviet Union. However, age estimates based on rates of decay of the total beta activity of monthly rain samples suggest an influx of fresh debris from about March 1959 at least until our measurements ceased in June 1959. Although this fresher debris could originate in the Soviet Union, it is not possible to rule out entirely the last tests in the Pacific area. Results for total beta activity suggest that the October series of tests in the Soviet Union did not contribute more than 4 per cent of the total strontium-90 deposited at Lower Hutt from November 1958 until June 1959, assuming fast neutron fission of uranium-238.

Table 2. Maximum Percentage Contribution to Fall-out in New Zealand of the October 1958 Series of Tests in the Soviet Union

| Sample collection | Calculated from | |
|---|---|---|
| | Barium-140/strontium-90 | Total β/strontium-90 |
| 1958 | | |
| November | 0·2 | 0·3 |
| December | 3 | 13 |
| 1959 | | |
| January | 8 | 3 |
| February | 32 | 8 |
| March | 80 | 1·6 |
| April | | 10 |
| May | | 3 |
| June | | 12 |

During 1960–61 six positive barium-140 results were found which we believe to be reliable. These results were obtained in the six-week period after the French test on February 13, 1960, and also approximately four weeks after each of the French tests on April 1 and December 23, 1960. If we assume that the fission/yield activity ratio of barium-140/strontium-90 for the fast fission of plutonium-239 is 1820/1 (calculated from ref. 3) then the French contribution to the measured strontium-90 deposited can be found. This is shown in Table 1 for individual rains and has never been found greater than 0·12 per cent. It seems reasonable that this amount of strontium-90 could have arrived at Lower Hutt through the troposphere from the Sahara tests.

[1] *U.S. Atomic Energy Commission HASL Reports*: **77**, 34 (1960); **84**, 62 (1960); **88**, 80 (1960); **95**, 86 (1960); **105**, 90 (1961).
[2] McNaughton, G. S., and Woodward, R. N., *New Zealand J. Sci.* (in the press).
[3] Katcoff, S., *Nucleonics*, **16** (4), 78 (1958).

# OBITUARY

## Prof. E. H. Neville

Eric Harold Neville, who died on August 21 aged seventy-two, was educated at William Ellis School where he came under the influence of Percy Nunn, who clearly stimulated in him an innate feeling for mathematics. In 1907 he went up as a senior scholar to Trinity College, Cambridge. It had then been announced that publication of the Mathematical Tripos lists in order of merit would cease with the lists for 1909; this challenged Neville to sit the examination a year earlier than normal, and he was placed second wrangler in 1909. Two years later he won the Smith's Prize and was elected into a fellowship at Trinity, which he held until 1917.

In 1919 he was appointed to the chair of mathematics in University College (now the University) of Reading, which he occupied until his retirement in 1954. He married Alice Farnfield in 1913, who pre-

deceased him in 1956 ; they had one son who died in infancy.

At the beginning of 1914, while giving a course of lectures in India, he was charged by G. H. Hardy with the task of persuading the Indian mathematician Ramanujan to come to Cambridge. The account of this mission which he gave nearly thirty years later (*Nature*, 149, 292; 1942) is witness to the satisfaction he derived from the successful completion of this task.

His earliest work was in geometry. In *Prolegomena to Analytical Geometry* and *Multilinear Functions of Direction* he was clearing the ground for a treatment of the whole field of differential geometry based on secure logical foundations. Unfortunately, the breadth of his interests led him to undertake other tasks and the work was never completed.

The need to organize the teaching of undergraduates drew his attention to the unsatisfactory foundations of much basic mathematical instruction and he threw himself enthusiastically into the work of the Mathematical Association. With Percy Nunn he was largely responsible for the Association's first *Report on the Teaching of Geometry*. He became librarian of the Association in 1923 and in the course of thirty years he transformed the library from a small collection which could be accommodated in his own house to the valuable reference library for teachers now housed with the University of Leicester. He was president of the Mathematical Association in 1934. He was interested in the work of the British Association, principally in connexion with the Tables Committee, of which he was chairman during 1931–47. He compiled the *Table of the Farey Series of Order 1025* and the *Rectangular to Polar Conversion Tables*. His prefaces to these works contain much that is of interest to anyone contemplating the compilation or printing of mathematical tables. He was a member of the Council of the British Association and, in 1950, president of Section A. He also served on the Council and as vice-president of the London Mathematical Society.

Out of his concern for the improvement of the teaching of pure mathematics arose a number of notes on a wide variety of topics, characterized by freshness of point of view, elegance and economy of presentation. A more ambitious work directed towards the same end was his book on *Jacobian Elliptic Functions*, designed to restore the original beauty and symmetry to a field that had tended to become somewhat unwieldy.

Neville was a man of considerable moral and physical courage—he once rescued a child from the flooded Cam in midwinter. He was essentially a liberal humanist. His love and knowledge of literature matched his interest in the history of mathematics. He was a devoted bibliophile, and it is characteristic that his private library contained not only early editions of all the works of Lewis Carroll and H. G. Wells, but also what is believed to be the most complete set of works on elliptic functions.

R. Rado

# NEWS and VIEWS

## Textile Engineering at Leeds : Prof. P. Grosberg

Although the wool-textile industry is so highly mechanized, graduates in engineering have so far taken little interest in the construction and use of textile machinery, and have largely neglected the opportunities that all sections of the industry provide. There is here a serious threat to the future of the wool-textile industry of the United Kingdom, and the machinery-users showed commendable foresight in endowing a research chair of textile engineering at Leeds some twelve years ago. The first occupant of the chair, Prof. A. H. Nissan, left to take up an appointment in the United States, and he is now to be succeeded by Dr. P. Grosberg, who brings to the post qualifications in pure science, engineering and textile technology. Dr. Grosberg was born in Cape Town in 1925. After graduation in physics and mathematics, and in chemical engineering at the University of the Witwatersrand, he carried out research on thin film lubrication for the degrees of M.Sc.(Mech.Eng.) and Ph.D.(Eng.). On being appointed to the staff of the newly formed South African Wool Textile Research Institute in 1950, he was seconded to the Department of Textile Industries of the University of Leeds for a two-year course of advanced training in textile technology. After a period of some four years research on worsted drawing and spinning processes in South Africa, Dr. Grosberg returned to Leeds as an Imperial Chemical Industries Fellow in textile engineering, and he was appointed lecturer in textile engineering in 1956. His subsequent investigations, in which he has had the assistance of a number of Wool Textile Research Council Fellows, have already secured for him a reputation in such widely different fields as worsted drawing and spinning, warp-knitting, and drying processes. He is now to have the stimulating task of placing the subject of textile engineering on a sound foundation in the University, and of providing the textile industry with the engineers of which it stands in such great need.

## The National Bureau of Standards : Dr. H. C. Allen

Dr. Harry C. Allen, jun., has been appointed chief of the Analytical and Inorganic Chemistry Division at the National Bureau of Standards, U.S. Department of Commerce, Washington, D.C. He will direct a broad programme aimed at developing methods for measuring the chemical properties, composition, and behaviour of substances; preparing standard reference materials; and making accurate measurements and data collections on chemical systems. Since 1954, Dr. Allen has been working at the Bureau on the analysis of high-resolution infrared spectra of gases, and the theory of molecular spectra. He spent the year 1959–60 in the Department of Theoretical Chemistry, University of Cambridge. Before becoming a staff member of the Bureau, Dr. Allen was an assistant professor of physics in Michigan State College. He has also been a consultant to the Bureau.

## World Population Trends

The 1960 edition of the *Demographic Yearbook* of the United Nations Organization has as its special feature an analysis of the evolution of the population of various countries, and includes a table showing