CORRESPONDENCE

Preserving Rare Breeds

SIR,—I was interested to read your report, "Keeping Fossils Alive"[1], of a conference on "rare breed survival" which was held on October 15. This correctly refers to the fact that rare breeds of cattle, sheep and poultry had been kept as a "gene bank" at Whipsnade, but is wrong in saying that the animals "had to be dispersed when the Zoological Society of London needed the space".

The story is as follows. On a decision taken by the Society's council, small flocks and herds of rare native domesticated breeds were collected and established at Whipsnade in 1961 with the object of preserving them, not merely as historic remnants, but as material for study by geneticists, physiologists and other scientists. An offer to put the animals at the disposal of *bona fide* investigators and to collaborate in their research projects was made in your journal in 1964[2]. A useful study of the blood groups of sheep was carried out by Tucker[3]; otherwise the response to our offer was disappointing, and we failed either to stimulate interest or to obtain financial support for the appointment of scientists to our own staff to study these animals.

After exchanges with other scientific bodies, and following much deliberation by its scientific committees, the council of the Society was advised that greater use might be made of these valuable stocks if they were transferred to agricultural institutions where they would attract the interest of students, and where better facilities for rearing the young would be available.

Accordingly, in 1968, flocks of three breeds of sheep were transferred to Professor Bowman at the School of Agriculture, University of Reading. Arrangements were made with Mr Christopher Dadd, Director of the National Agricultural Centre, for the transfer of the remaining four breeds of sheep to Stoneleigh Park, Kenilworth, where they have now attracted considerable public interest. In 1970, the NAC was also presented with surplus animals from the Zoological Society's herd of Chartley Cattle at Whipsnade.

What I should like to correct is the statement that the Society dispersed the gene bank it had established on its own initiative because "space was needed". The animals were sent to institutions where it was hoped they would attract more interest than they had done at Whipsnade and where they would consequently be of greater value to agricultural science.

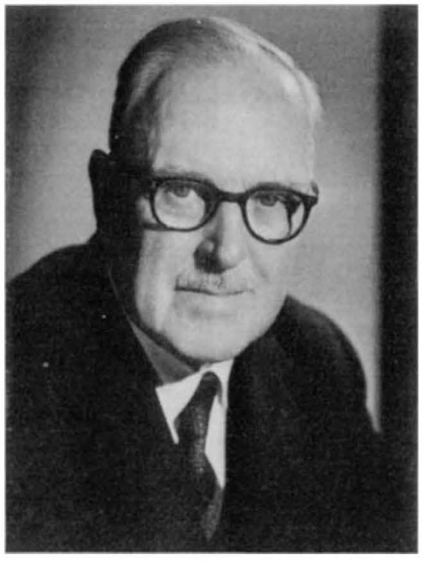
Yours faithfully,

LORD ZUCKERMAN
Secretary
Zoological Society of London,
Regent's Park, London NW1 4RY

[1] *Nature*, **233**, 587 (1971).
[2] Rowlands, I. W., *Nature*, **200**, 131 (1964).
[3] Tucker, E. M., *Nature*, **216**, 684 (1967).

Obituary

Sir Ernest Marsden



[Photo by Walter Bird

ERNEST MARSDEN, who died at the end of last year, was born at Rishton, Lancashire, on February 19, 1889. His mother had a hardware shop, selling cooking utensils, nails and similar goods. Ernest was one of four sons, and helped in the shop from time to time. In the school holidays he used to go to his aunt's at Blackpool, where he helped with washing up, cleaning knives and peeling potatoes, to earn pocket money. After attending the local school at Rishton, where he had already exhibited ability, he was sent to the Grammar School at Blackburn.

In 1906, when he was eighteen, he enrolled in the department of physics at Manchester University. Schuster and Petavel were still professors, and in 1908 he began research in atmospheric physics under Petavel. With the arrival of Rutherford in that year he changed to atomic physics. In 1909 Rutherford assigned him to assist Geiger in research on the scattering of α-particles. Before he had graduated, and before he was twenty years old, Marsden collaborated in the crucial experiment from which Rutherford established the nuclear structure of the atom. Five years later, pursuing Rutherford's general plan of exploring the collision of swift particles with matter, Marsden observed that when α-particles were projected into hydrogen, a few of the hydrogen nuclei were knocked forward far beyond the range of the α-particles.

His brilliant work and general capabilities caused Rutherford to recommend him for the most important chair of physics in his native land, at Victoria University College, Wellington, New Zealand. Marsden was appointed at the age of twenty-five. Rutherford asked him whether he would mind his taking over the experiments on the impact of α-particles on hydrogen gas. In the following two years, during the First World War, Rutherford continued these experiments; by 1917 he had evidence that protons were being ejected from atoms—that the artificial disintegration of the atom had been achieved. Thus Marsden contributed to two of the most significant experiments in modern physics. In the early work on large-angle scattering, Marsden perceived that his observations implied that the atom might have a nuclear structure. But he was too young to have the confidence, or to have acquired the scientific knowledge and maturity, to put the idea forward and prove that it was true. The full force of Rutherford's genius was needed to do that.

In stature Marsden was short and stocky. He had the physique and liveliness of the Lancashire man of his period, and he spoke with the local accent. He was a Lancashire lad, generally referred to as "Ernie" behind his back, a typical descendant of the people who had done so much to create the industrial revolution, with their combination of intelligence, ingenuity and enterprising common-sense. Like his great master, Rutherford, he had a feeling for people, and inspired them by his genuine interest in their concerns,

however bluff his comments might be.

Shortly after arriving in New Zealand in 1915, Marsden was commissioned in the New Zealand Engineers. He was seconded to the 1st NZ Expeditionary Force, and embarked for Europe in 1916. He served with distinction in the development and operation of sound-ranging, being twice mentioned in dispatches, and was awarded the Military Cross.

After demobilization in 1919 he returned to his chair. He taught the varied collection of Wellington students with a natural enthusiasm and love of his subject, and persuaded the authorities to build a handsome new laboratory.

Almost as soon as he had launched these developments in physics his human as well as his scientific qualities attracted the attention of the Government. In 1922 he was appointed Deputy Director of Education in New Zealand. He became involved especially in matters connected with science. The need for the systematic organization of scientific and industrial research had become patent, so, in 1926, the New Zealand Department of Scientific and Industrial Research was set up, with Marsden as its first Secretary. He organized the first industrial research associations, promoting research over a wide range of sciences including physics, chemistry, geology, and food and agriculture problems. He inspired the harnessing of thermal energy from the ground, as well as the investigation of the causes of cracks in cheese, poor spreadability in butter, the control of weeds, poor baking quality in wheat, deterioration in frozen meat and chilled fruit cargoes to Britain. During the depression of 1933–39 he stimulated the application of geophysics to the development of New Zealand mineral resources, and new possibilities for the utilization of plant and animal products. Among the successful subjects of research were the treatment of bush sickness, the quality of wheats, and the transport of beef.

In the Second World War Marsden had the leading part in adapting and developing New Zealand's scientific resources to meet the situation. He expanded the Dominion Physical Laboratory, and promoted research in submarine detection. The Radar Development Laboratory which he established supplied US forces in the Pacific with 110 radar sets before these could be provided from home American sources. He originated the Defence Science Corps.

Marsden naturally became the chief representative of New Zealand science on the national and international scene. He became a familiar and much respected figure as Scientific Liaison Officer in London, both in military and civil matters. In 1947 he was appointed New Zealand Government Scientific Adviser in London. As such, he became the chief New Zealand representative in the post-war United Nations scientific developments.

Marsden retired in 1954, but continued an active scientific life up to his seventy-seventh year. He became particularly interested in bioradiation and cancer research. He believed that radioactivity inhaled from tobacco smoke was a cause of lung cancer, the radioactivity being derived from the soil in which the tobacco had been grown.

Marsden was elected a Fellow of the Royal Society in 1946, and President of the Royal Society of New Zealand in 1947. He was knighted in 1958. He received many scientific awards and distinctions, but one which he very specially valued was his presidency of the Rutherford Jubilee International Conference at Manchester in 1961, in celebration of the fiftieth anniversary of the demonstration of the nuclear theory of the atom.

In 1913 Marsden married Margaret Sutcliffe. They had a son and a daughter, both of whom are in New Zealand. He married Joyce Winifred Chote in 1958. He died on December 14, 1970.

Errata

The review in last week's *Nature* by Lancelot Law Whyte "Science and Synthesis" (*Nature*, **234**, 159; 1971) was unfortunately published under the wrong bibliography. This should have been as follows: *Science and Synthesis*. (An International Colloquium organized by Unesco on the Tenth Anniversary of the Death of Albert Einstein and Teilhard de Chardin.) Pp. vii+206. (Springer: Berlin and New York, 1971.) 38.50 DM; $10.50.

In the article by E. A. Barnard, J. Wiekowski and T. H. Chiu on page 207 of this issue, the manuscript was received on June 23 and was not revised as stated.

International Meetings

December 7, **The Determination of Non Metals by Atomic Spectroscopy,** London (Society for Analytical Chemistry, 9–10 Savile Row, London W1X 1AF).

December 14, **Financial Control of R and D,** London (Science Policy Foundation, Benjamin Franklin House, 36 Craven Street, London WC2N 5NG).

December 15, **Public Participation in Highway Planning,** London (Institute of Civil Engineers, Great George Street, London SW1).

December 17, **Applications of Vibrational Spectroscopy to High Polymers,** London (Dr W. O. George, School of Chemical Science and Technology, Kingston Polytechnic, Penrhyn Road, Kingston upon Thames, Surrey).

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