During the eclipse of June 30, 1954, the Sun was unusually inactive, and it was possible to deduce the distribution of sources of ionizing radiation across it. It was found that there was an intensification near the east and west limbs, and a weakening near the poles. The results coincided closely with the distribution of decimetre radio noise radiation over the solar disk.

The *E*-layer character figure and the intensity of the 10-cm. wave-length noise radiation appear to be closely related as regards their variation from day to day, their variation with the solar cycle, and their variation over the solar disk. It cannot yet, however, be

concluded that both types of radiation have a common origin. Recent estimates of how the temperature varies with height in the solar atmosphere suggest that the chromosphere and lower corona, which are responsible for most of the decimetre wave emission, would not make as important a contribution to the ionizing radiation as would the Lyman continuum from photospheric levels. A comparison of the ionospheric curves with those of solar noise emission on 3, 10 and 20 cm. wave-lengths might enable the height of emission of the ionizing radiation to be established.

OBITUARIES

Sir Percival Hartley, C.B.E., F.R.S.

SIR PERCIVAL HARTLEY, formerly director of the Department of Biological Standards at the National Institute for Medical Research, London, died in London on February 16 at the age of seventy-five.

He was born on May 28, 1881, at Calverly in Yorkshire and was educated at the University of Leeds, where he graduated B.Sc. in 1905. With a Grocer's Company Research Scholarship he went to the Lister Institute of Preventive Medicine, London. In 1909 he obtained a D.Sc. in the University of London and joined the staff of the Imperial Bacteriological Laboratory at Muktesar in India. In 1913 he returned to the Lister Institute.

During the First World War he served as a captain in the R.A.M.C., and in 1917 was awarded the Military Cross. On demobilization he spent two years at the Wellcome Research Laboratories. It was during this time that he began the study of diphtheria prophylactics with which his name will always be associated.

In 1922 he joined the staff of the National Institute for Medical Research, where he became the director of the new Department of Biological Standards, an appointment he held until he retired in 1946. During this time, Percival Hartley, more than any other man, was responsible for the introduction of the International Biological Standards. He educated world opinion as to their need. He provided not only the immunological standards but also, frequently, methods of standardization as well.

There is no doubt that the years he spent at the National Institute for Medical Research were both the happiest and most productive of his life. His work on the prevention of diphtheria is well known, but it is seldom appreciated that the regulations which he formulated to be used in Great Britain guaranteed the purity, safety and potency of immunological reagents in general and diphtheria prophylactics in particular.

It was remarkable that with all his administrative responsibilities and obligations he managed to find time for research. Among the many subjects he studied were the role of non-specific factors on antibody production, the nature of anaphylaxis, the care and maintenance of laboratory animals, the standardization and quality of media. Hartley's broth is world known.

During this time he received many honours. In 1927 he was awarded the William Julius Mickle Fellowship of the University of London. In 1936 he was appointed a Commander of the British Empire ;

in 1937 he was elected to the Fellowship of the Royal Society ; in 1944 he was knighted. When he retired in 1946 he laid down his heavy routine duties, but a new phase in his career developed. He held a series of appointments. During 1946-48 he was Wands-worth Fellow of the London School of Hygiene and Tropical Medicine. During 1948-49 he was at the Sir William Dunn School of Pathology in Oxford. During 1949-53 he returned to the Lister Institute. He was a member of the British Pharmacopœia Commission from 1933 until 1948, and he served on the Medical Research Council during 1949-53. Throughout this time he continued his research—in particular, the effect of purification of antitoxin on its ability to cross the placental barrier.

Hartley taught students and staff alike. His teaching was simple and practical. He spoke with authority, as one who had spent a life-time in the laboratory and had grown up with the great men and great events of the world of science. An enthusiast himself, by example he made his students enthusiastic.

In 1948 his old University of Leeds conferred on him the honorary degree of D.Sc. In his oration he talked of the history of diphtheria prophylactics and treatment. I remember the care with which he prepared his lecture ; each lantern slide produced a flood of recollection. Much of the story was from his own experience.

This précis of the successful career of a brilliant man, of his achievements and of the honours he received, gives no indication of his courtesy, his charm, the tremendous whole-hearted warmth with which he greeted his friends ; his selflessness, his modesty and his kindness to his juniors. A sensitive man, who hesitated to protest unless in defence of his scientific beliefs or high principles, he was capable of a fine flow of invective when faced with stubborn inefficiency that would not yield to gentler measures. But even then he could not maintain his anger and sought the earliest opportunity to make amends.

He married Miss Olga Parnell in 1920. Lady Hartley died in 1950. He is survived by two daughters of the marriage.

D. A. LONG

Mr. A. G. Davis

ARTHUR GEORGE DAVIS, who died at his London home on March 1 at the age of sixty-four, had long played an invaluable and peculiar part in the progress of geology in south-east England. He was primarily an enthusiastic and highly successful collector of fossils whose zeal did not wane with the passing years. Many a fruitful temporary section would have