OBITUARIES

Dr. Roy Chapman Andrews

DR. ROY CHAPMAN ANDREWS, famous for his Gobi Desert discoveries in the early 1920's, died in New York early in March. He was seventy-six. He was born at Beloit, Wisconsin, on January 26, 1884, and was educated at the comparatively small College there, graduating A.B. in 1906. He then proceeded to Columbia, where he took his A.M. degree in 1913. He also had some experience in the Museum of Comparative Zoology at Harvard. His later education was interrupted by his absences on expeditions, those forays and excursions, often with important scientific and geographical results, that were to be the main interest of his life and the foundations of his undoubted eminence.

His association with the American Museum of Natural History began in 1908 when he joined an expedition to Alaska; he did exploration work on the St. Lawrence in 1909, shortly afterwards becoming naturalist in the U.S.S. *Albatross*, which visited the Dutch East Indies and Borneo in 1909-10. During 1911 and 1912 he was in Korea and in 1913 he was back in Alaska. These were, however, but preludes to his main task, which came when, in 1916, he was appointed leader of the American Museum expeditions to Central Asia. From 1917 until 1931 he was intermittently in Mongolia and in China in pursuit of vertebrate fossils and the remains of man.

His chief, the distinguished director of the Museum, Prof. Henry Fairfield Osborn, held the theory that the likely area of the dispersal of mammals and of man was to be found in the Orient, and the expedition's results, if not exactly convincing for this theory, were encouraging in the considerable materials that they produced. Dinosaurs and dinosaurs' eggs earned the expedition fame, though the dinosaurs were not so important as many that had already been found, and dinosaurs' eggs had been discovered earlier in England and in France. Andrews also found small Cretaceous mammals and giant Tertiary mammals and mastodons, but not a scrap of the fossil man he was working for, though *Sinanthropus* was later to turn up not so very far from the house where he kept palaeontological court in Peking.

Judged by any standards, Andrews's Asiatic expeditions were a success, and resulted in considerable additions to many museums other than his own, for the American Museum was generous, and excellent representatives of the dinosaurs from the expeditions are in the British Museum (Natural History).

Scientific and other honours rightly came to him. He was made Sc.D. of both his native Beloit and of Brown University, Rhode Island. He also received many medals, mainly for the geographical aspect of his work, from the National Geographic Society and the Explorers' Club in his own country, and from the national geographical societies of Sweden and Hungary.

During 1931-35 Andrews was vice-director in charge of exploration and research at the American Museum of Natural History, and from 1935 until 1942 he was director. He retired in 1942 with the title of honorary director.

He was the author of ten books and many scientific papers. Most of these were written in his beautiful homes in Connecticut or in California, where successively he lived after his retirement. But they were far from being his only interests. The Boy Scout movement and many sports, mostly connected with horses, engaged his attention, and he was always a hospitable man.

His name will be remembered in the annals of vertebrate palaeontology and in the history of the distinguished Museum he served so well for so long.

W. E. SWINTON

Mr. C. A. Shain

CHARLES ALEXANDER SHAIN, an outstanding member of the radio astronomy group at the Commonwealth Scientific and Industrial Research Organization (Australia) Radiophysics Laboratory in Sydney, died on February 11 at the early age of thirty-eight. His contribution to radio astronomy lay in the frequency-range around 20 Mc./s. where he pioneered the study of the two features peculiar to this range of radio astronomy: absorption in ionized interstellar hydrogen (H II regions), and absorption and refraction in the ionosphere. Observations in this frequency-range are particularly difficult owing to interference from radio stations and the complicating effects of the ionosphere; but they give unique information of great importance to radio astronomy. Shain's work is basic in this field.

Shain studied physics in the University of Melbourne and graduated in 1942. He immediately entered the second Australian Imperial Force, but was discharged on medical grounds late in 1943. He then joined the staff of the Radiophysics Laboratory, where he stayed until his death. During the remaining stages of the War, he worked on radar counter-measures, and from 1945 on various aspects of decametre-wave radio astronomy.

His work in radio astronomy began with a study of Moon echoes at a frequency of 20 Mc./s. This work, which was an immediate follow-up of the pioneering American and Hungarian experiments, led to the recognition of the dual causes of the fading of Moon echoes: libration of the Moon and propagation effects in the ionosphere. Using parts of the same equipment, he then began the observations of the distribution over the sky of relatively low-frequency (20-Mc./s.) cosmic radio waves which he continued until his death. He first used broadside arrays, the largest of which consisted of 30 half-wave dipoles and had a beam-width of 17°, and then a 'Mills cross' with arms 3,500 ft. long and a resolution of 1.4°.

In the first phase of these investigations he was able to show conclusively that the brightness distribution over the Milky Way at this frequency was markedly influenced by absorption in H II regions; but he had insufficient angular resolution to delineate even the largest of these regions, and his 'Mills cross' was designed to overcome this limitation. At the time of his death he had nearly completed a 19-Mc./s. map of the greater part of the Milky Way, which shows numerous examples of the obscuring