of biophysics at the Central University, Caracas. His electron microscope studies have established his reputation as an authority on the sub-microscopic organization of vertebrate nerve fibres. Much of this work was due to his development of a microtome for cutting sections of nervous and other tissues (including undecalcified bones and teeth) at thicknesses of 100 Å. or less, which are necessary for good electron microscope investigations. For this machine he also designed a diamond knife which could be made from industrial diamonds. In the Institute, Dr. Fernandez-Moran will take charge of the work on fine structure of nervous tissue, and he has established a special department to continue the development work on the diamond knife and on microtomes to use with them.

During my visit to the Institute last summer, it was a revelation to see the energy and speed with which Dr. Moran tackled and coped with the innumerable details of equipping and starting the Institute in time for the opening.

Venezuela is in an extremely fortunate financial position due to the exploitation of her oil and other natural resources, and she is extremely fortunate that she has at such a moment someone like Dr. Fernandez-Moran, who was able to conceive and to execute such a remarkable scheme, and an enlightened Minister of Health and President, who were far-sighted enough to see that money invested in this way would benefit not only Venezuela itself but ultimately the rest of the world as well. The Venezuelan Institute for Neurology and Brain Research is a practical step forward in international scientific research.

OBITUARIES

Dr. J. W. Nicholson, F.R.S.

DR. J. W. NICHOLSON, an outstanding mathematician and man of science, died on October 10, aged seventy-three. He was the eldest son of the late J. W. Nicholson, of Redcar, Yorkshire, and began the serious study of mathematics and physical science at the University of Manchester. Later, he entered Trinity College, Cambridge, where his brilliant career began. He was 12th Wrangler in 1904 and Isaac Newton Student in 1906. In 1907 he was Smith's Prizeman. He was Adam's Prizeman twice—in 1913 and 1917. He lectured at the Cavendish Laboratory and later at The Queen's University, Belfast.

In 1912 he was appointed professor of mathematics in the University of London, King's College, and occupied this chair until 1921, when he became tutor at Balliol College, Oxford, where he was director of studies in mathematics and physics until serious illness forced him to retire in 1930.

Nicholson was one of the most brilliant mathematicians and astrophysicists of his time. In 1917 he was elected into the Royal Society. He was also a Fellow of the Royal Astronomical and the London Mathematical Societies, past president of the Röntgen Society, a former vice-president of the Physical Society and a member of the Société de Physique. He was an excellent lecturer and teacher, and probably no teacher in King's College in his time was so much appreciated and admired by his students and colleagues as he was.

Nicholson's scientific achievements are much more important than is generally realized in these days:

the elucidation of the electronic structure of atoms owes as much to Nicholson as to any other one man. Before his appointment to King's College, he became interested in certain nebular spectra (the nebula in Orion among others) and the spectrum of the solar corona; and the first of a most remarkable sequence of papers on this subject appeared in the *Monthly Notices of the Royal Astronomical Society* (72, 49; 1912), entitled "The Spectrum of Nebulium". In this he attributed certain nebular spectral lines to a primitive type of atom which he named nebulium. This he imagined to consist of a small central massive positively charged nucleus with four electrons travelling around it on the same circular orbit. He was thus enabled to account for certain spectral lines which, it seemed, could not be ascribed to hydrogen or helium. His work was inspired by Clerk Maxwell's famous paper on Saturn's rings. He was, in fact, able to identify a large number of nebular spectral lines with those which his nebulium would be expected to emit. Indeed, he predicted a nebular spectral line the wave-length of which he calculated to be 4352.9 Å. before it was observed. It was later observed and measured by Prof. F. J. M. Stratton, who estimated it to be 4353.3 Å.

Perhaps the most remarkable feature of Nicholson's work was the discovery that angular momentum is an integral multiple of $h/2\pi$. There is no doubt that this work inspired his pupil, Niels Bohr, to explore the consequences of assuming the hydrogen atom to have a single electron travelling in a circle around a massive nucleus, and it was certainly part of the inspiration of the $spdq = nh$ condition enunciated by one of his colleagues at King's College and which was later adopted by Bohr.

One must not omit to mention the important work in which Nicholson collaborated with the distinguished spectroscopist, Sir Thomas Merton, and which was published in the *Philosophical Transactions of the Royal Society* (A, 216, 459; 1916; A, 217, 237; 1917; and A, 220, 137; 1919). It dealt with the distribution of intensity in broadened spectral lines and with intensity relations in the spectra of hydrogen and helium.

Nicholson was a friendly and generous man who took great pleasure in being helpful to both students and colleagues. He was a man of high character and in that respect reminded me of our colleague, H. Stanley Allen, and of the great Max Planck. All of us who knew him were deeply distressed by his tragic illness. As a mathematician he impressed me as very sound, and I learned more from him than from any other man, with the exception, perhaps, of the German mathematician, Carl Neumann. I shall always treasure his memory.

Nicholson married Dr. Dorothy Wrinch, Fellow of Girton College, Cambridge, in 1922, and had one daughter; the marriage was dissolved in 1938.

WM. WILSON

Mr. Alexander Keiller

ALEXANDER KEILLER, who died at the end of September at the age of sixty-five, was one of the long line of distinguished amateur British archaeologists which goes back to Aubrey and Stukeley. Of these perhaps the greatest was Pitt-Rivers, on whom Keiller, like him with leisure and abundant means at his disposal, admittedly modelled his own work.