

Patrick M.S. Blackett - Biographical



Patrick Maynard Stuart Blackett was born on 18th November, 1897, the son of Arthur Stuart Blackett. He was originally trained as a regular officer for the Navy (Osborne Naval College, 1917; Dartmouth, 1912), and started his career as a naval cadet (1914), taking part, during the First World War, in the battles of Falkland Islands and Jutland. At the end of the war he resigned with the rank of Lieutenant, and took up studies of physics under **Lord Rutherford** at Cambridge.

After having taken his B.A. degree in 1921, he started research with cloud chambers which resulted, in 1924, in the first photographs of the transmutation of nitrogen into an oxygen isotope. During 1924-1925 he worked at Göttingen with **James Franck**, after which he returned to Cambridge. In 1932, together with a young Italian scientist, G.P.S. Occhialini, he designed the counter-controlled cloud chamber, a brilliant invention by which they managed to make cosmic

rays take their own photographs. By this method the cloud chamber is brought into function only when the impulses from two Geiger-Muller tubes, placed one above and one below the vertical Wilson chamber, coincide as the result of the passing of an electrically charged particle through both of them.

In the spring of 1933 they not only confirmed Anderson's discovery of the positive electron, but also demonstrated the existence of "showers" of positive and negative electrons, both in approximately equal numbers. This fact and the knowledge that positive particles (positrons) do not normally exist as normal constituents of matter on the earth, formed the basis of their conception that gamma rays can transform into two material particles (positrons and electrons), plus a certain amount of kinetic energy - a phenomenon usually called *pair production*. The reverse process - a collision between a positron and an electron in which both are transformed into gamma radiation, so-called *annihilation radiation* - was also verified experimentally. In the interpretation of these experiments Blackett and Occhialini were guided by Dirac's theory of the electron.

Blackett became Professor at Birkbeck College, London, in 1933, and there continued cosmic ray research work, hereby collecting a cosmopolitan school of research workers. In 1937 he succeeded **Sir Lawrence Bragg** at Manchester University, Bragg himself having succeeded Rutherford there; his school of cosmic research work continued to develop, and since the war the Manchester laboratory has extended its field of activity, particularly into that of the radar investigation of meteor trails under Dr. Lovell.

At the start of World War II, Blackett joined the Instrument Section of the Royal Aircraft Establishment. Early in 1940, he became Scientific Advisor to Air Marshall Joubert at Coastal Command, and started the analytical study of the anti U-boat war, building up a strong operational research group. In the same year he became Director of Naval Operational Research at the Admiralty, and continued the study of the anti U-boat war and other naval operations: later in 1940 he was appointed Scientific Advisor to General Pile, C.M.C., Anti-Aircraft Command, and built up an operational research group to study scientifically the various aspects of Staff work. During the blitz he was also concerned with the employment and use of anti-aircraft defence of England.

In 1945, at the end of the Second World War, work was resumed on cosmic ray investigations in the University of

Manchester: in particular on the further study of cosmic ray particles by the counter-controlled cloud chamber in a strong magnetic field, built and used before the War. In 1947, Rochester and Butler, working in the laboratory, discovered the first two of what is now known to be a large family of the so-called strange particles. They identified one charged and one uncharged particle which were intrinsically unstable and decayed with a lifetime of some 10^{-10} of a second into lighter particles. This result was confirmed a few years later by Carl Anderson in Pasadena.

Soon after this discovery, the magnet and cloud chamber were moved to the Pic du Midi Observatory in the Pyrenees in order to take advantage of the greater intensity of cosmic ray particles at a very high altitude. This move was rewarded almost immediately by the discovery by Butler and coworkers, within a few hours of starting work, of a new and still stranger strange particle, which was called the negative cascade hyperon. This was a particle of more than protonic mass which decayed into a (π)-meson and another unstable hyperon, also of more than protonic mass, which itself decayed into a proton and (π)-meson.

In 1948 Blackett followed up speculations about the isotropy of cosmic rays and began speculating on the origin of the interstellar magnetic fields, and in so doing revived interest in some 30-year old speculations of Schuster and H. A. Wilson, and others, on the origin of the magnetic field of the earth and sun. Although these speculations are not now considered as likely to be valid, they led him to interest in the history of the earth's magnetic field, and so to the newly born subject of the study of rock magnetism.

Professor Blackett was appointed Head of the Physics Department of the Imperial College of Science and Technology, London, in 1953 and retired in July, 1963. He is continuing at the Imperial College as Professor of Physics and Pro-Rector.

Over the last ten years or so a group under his direction have studied many aspects of the properties of rocks with the object of finding out the precise history of the earth's magnetic field, in magnitude and direction back to the earliest geological times. Such results, together with those of workers in many other countries, seem to indicate that the rock magnetism data supports strongly the conclusions of Wegener and Du Toit that the continents have drifted relative to each other markedly in the course of geological history.

The study is now being continued, directed to explaining the remarkable phenomenon that about 50% of all rocks are reversely magnetized. The experiments are directed towards deciding whether this reversed magnetization is due to reversal of the earth's magnetic field or to a complicated physical or chemical process occurring in the rocks.

Blackett was awarded the Royal Medal by the Royal Society in 1940 and the American Medal for Merit, for operational research work in connection with the U-boat campaign, in 1946. He is the author of *Military and Political Consequences of Atomic Energy* (1948; revised edition 1949; American edition *Fear, War, and the Bomb*, 1949).

In 1924 he married Constanza Bayon; they have one son and one daughter.

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Patrick M.S. Blackett died on July 13, 1974.

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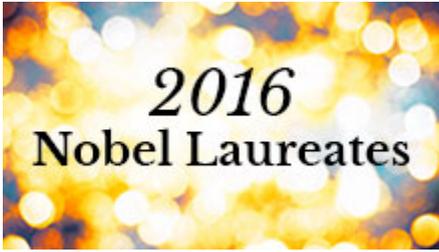
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