tinuum mechanics in his experimental work, which enabled him to contribute further to the formulation of these theories. In a paper delivered in 1957, he presented a critical analysis of the rheological theories of fluids then extant, which has had widespread influence in codifying them.

Sir John Cockcroft, Cambridge Physicist and Nobel Laureate

John Douglas Cockcroft, a man who held a unique position in British physics, died suddenly at his Cambridge College on 18 Sept. at the age of 70. He had been in full possession of his health and vigor right up to the end; at the beginning of the month he attended a Pugwash meeting in Sweden and agreed to take over the chairmanship from Earl Russell; he hoped to attend later in the month the annual conference of the United Kingdom's Liberal Party and had accepted the party presidency for 1968–69.

John Cockcroft was born in 1897 in Todmorden, a small manufacturing town in the North of England, and during his early education there he showed that ability to do everything well, from mathematics to cricket, which later everyone took for granted. At the age of 18, however, his military service in the first world war began, and he came safely through the great battles of Loos and the Somme. After the war he entered a Manchester engineering firm as an apprentice and did

COCKCROFT

so well that he was persuaded to go to Cambridge in his mid-twenty's to study for the very exacting undergraduate course in mathematics offered by that university, the mathematical tripos. He always used to say that this was the hardest thing he had ever attempted. When he went from his undergraduate course to do research under Rutherford in the Cavendish Laboratory, he had what most of his colleagues there had not got, a practical knowledge of electrical engineering as well as of mathematics. It was his engineering background that enabled him, together with Ernest T. S. Walton, to bring off his most sensational achievement—the construction of an impulse generator that would accelerate protons to an energy of more than 700 000 eV and thus produce the first disintegration of atomic nuclei by artificially accelerated particles. In the Cavendish this was the first breakaway from the tradition of using small-scale equipment. Cockcroft's first paper with Walton on "Experiments with High Velocity Positive Ions," communicated to the *Proceedings of the Royal Society* in 1930, indicated a need for such experiments to verify George Gamow's prediction that protons could go through as well as over a potential barrier. It described the proton source and accelerator developed with the help of his Manchester firm (the Metropolitan Vickers Electrical Company) reaching 300 000 volts and indicated that these particles produced a nuclear reaction. Subsequent papers described the generator reaching 700 000 volts, disintegration of lithium and of other elements, dependence of yield on velocity and a detailed comparison with the Gamow theory. For this work Cockcroft and Walton were awarded the Nobel Prize for physics in 1951.

He was appointed to the Jacksonian Chair of Natural Philosophy in Cambridge in 1939, and, before that, he had undertaken the major responsibility for the planning of the new Cavendish building (the Austin Wing) that was opened in 1940. The time in which he could devote himself to university work, however, did not last long. From 1941–44 he was director of one of the two main centers for the development of military radar in the UK. When the war was nearly over

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and the successful production of the atomic bomb imminent, he was chosen for the directorship of the atomic energy division of the National Research Council of Canada, where he was responsible for the building up of the Chalk River Laboratories.

Until then he had been on leave from Cambridge, but in 1946 he resigned his chair and came back to England to start the Harwell laboratory, charged with the responsibility for the fundamental work in nonmilitary applications of atomic energy. His influence was immense; Harwell is his creation. British physics owes it to him that Harwell has adopted a liberal policy with the universities, has become outstanding in nuclear, neutron- and solid-state physics, and that its facilities were so freely available to all who needed them. Sir John Cockcroft should be remembered for what he did for Harwell perhaps more than for anything else. He was also an influential member of the UK Atomic Energy Authority, and although he was offered opportunities to return to academic life and accept the most attractive chairs, he felt, perhaps with regret, that his duty remained in government science.

In 1959, however, with the foundation of a new science-based college in Cambridge to commemorate Winston Churchill, he felt that he could accept the offer from the Queen of the first mastership. In Churchill College his last years were singularly relaxed and happy, as the father figure of British nuclear physics and the popular head of a college of young men. He travelled widely and loved to travel, to Ghana to advise on reactors, to Australia as Chancellor of the National University at Canberra, and indeed to any place where he could be useful. He continued to receive honors that gave him real and sincere pleasure, more than twenty honorary degrees, the Order of Merit and the United States Atoms for Peace Prize awarded in 1961. He took an interest in all that happened in Cambridge University and served on committees where his unrivalled authority could resolve the toughest academic problems. He was frequently in the Cavendish to listen to talks and to help the many people who wanted his advice.

His friends will remember his helpfulness, his little "black book" in which he took notes of what they said, and his effectiveness. Cockcroft was a strong personality who knew how to get things done. At the same time he was a man of the deepest loyalty to his friends, to physics, and to his country.

NEVILL MOTT
Cavendish Laboratory□

BAINBRIDGE

COCKCROFT (left) and Gamow at Cavendish Laboratory (Dec. 1933)