

A. J. MOORADIAN, F. R. S. C.

Wilfrid Bennett Lewis

1908–1987



WILFRID BENNETT LEWIS, who was responsible for the scientific direction of the Canadian nuclear program from 1946 to 1973, died at Deep River on 10 January, 1987.

Dr. Lewis was born at Castle Carrock in Cumberland, England, on 24 June, 1908. His father was a civil engineer and at first Lewis too, wanted to be an engineer, but by the time he entered Cambridge he had chosen to become a physicist.

He arrived with quite unusual electronics expertise, developed from boyhood experiments in a laboratory at his home. He applied this expertise in his research at the Cavendish Laboratory first, starting in 1930, to the properties of alpha particles - ranges and energies - next to the construction of the Cambridge cyclotron, and finally to the study of nuclear reactions and induced radioactivity. Much of this work was carried out in co-operation with Dr. J.D. Cockcroft.

In 1939, with the outbreak of war, Lewis was seconded to the Telecommunications Research Establishment - a deliberate misnomer for the organization that carried out research and development on radar for the Air Ministry. By 1945 he was Chief Superintendent of the TRE, now located at Malvern. Recognition of his contributions from this period included election to Fellowship in the Royal Society of London (1945), appointment as Commander of the Order of the British Empire (1946), and award of the American Medal of Freedom with Silver Palms (1947).

Dr. Lewis came to Canada in 1946 to take over as Director of NRC's Division of Atomic Energy Research at Chalk River from Cockcroft, who had been recalled to the UK. Lewis tackled his new scientific and management challenges with typical zest, recruiting excellent staff and expanding the laboratories. A voracious reader, he was soon thoroughly familiar with all aspects of the work at Chalk River and his detailed knowledge of physics, chemistry, metallurgy, and biology allowed him not only to direct but also to inspire projects.

The contribution to science and technology for which Dr. Lewis is best known, and for which he will be longest remembered, was associated with his key role in the development of a unique Canadian nuclear power reactor system, CANDU. In retrospect, it seems unlikely that this undertaking could have been successfully concluded without his outstanding contribution. When Atomic Energy of Canada Limited (AECL) was formed in 1952, Dr. Lewis was appointed Vice-President, Research and Development. From this position, and the later position of Senior Vice-President, Science, to which he rose in 1963, Dr. Lewis initiated and quarterbacked the drive for nuclear power in Canada via a distinctively Canadian system. His total commitment, involvement, and dedication to this objective inspired and motivated the large group of scientists, engineers and administrators, both within AECL and outside it, that such a large program required to realize this great Canadian achievement.

In the conceptual stage of the program, Dr. Lewis was at the centre of all the major reactor physics and nuclear engineering discussions, providing his own ideas and analyzing the ideas of others. His well-established capacity for hard work (he carried home two briefcases every night) and his catholic technical interests and capabilities proved invaluable in establishing the basic concept. He not only assimilated the details of all proposals, drawing them into a coherent whole, but in doing so exhibited an uncanny ability to anticipate the principles that time has proved to be of key importance, such as neutron economy and on-power refuelling.

Throughout the program, R&D was required in many diverse fields such as reactor physics, fuel engineering, material behaviour, and radiation chemistry. Dr. Lewis maintained a personal interest in, and direct contact with, every element of R&D, providing suggestions, criticism

and encouragement that served to keep all the pieces of the puzzle on course and well focused, as well as demonstrating to the participants the importance of their work.

In the period 1955-1962, the program incorporated the detailed design and construction of a demonstration nuclear power reactor, NPD, at Rolphton, Ontario. While not an engineer, Dr. Lewis became heavily involved in this area also. Through his chairmanship of the NPD Technical Committee, he retained essential control over the project and, at the same time, provided the vehicle for the effective inter-disciplinary, inter-organizational communication that was vital to success. Even after NPD became operational in 1962, Dr. Lewis acted as a senior consultant and advisor in the application of the technology to the prototype and fully commercial nuclear power units that followed.

The culmination of the vision of a viable Canadian nuclear power system came with the successful commercialization of the concept in the Pickering Nuclear Generating Station in 1971. On his retirement from AECL in 1973, Dr. Lewis could look back on a job well done: commercial nuclear power had been launched in Canada on the basis of a distinctive Canadian concept.

During all this period, he gave invaluable support to a wide range of scientific activities that constituted the "underlying" research base of the nuclear program. One of the most prominent was "pure" nuclear physics research, and he played an important role in ensuring that Chalk River's accelerator facilities were second to none. In the first instance, this led to the High Voltage Engineering Company of Burlington, Massachusetts, developing the first tandem accelerator for Chalk River. When HVEC subsequently developed large tandems, Lewis saw to it that, with the purchase of an MP tandem, CRNL did not fall behind.

Given this strong base, the laboratory was capable of responding effectively to the challenges raised by new ideas, particularly those from Lewis himself. Notable among these was his recognition in 1952 of the importance of the high yield of neutrons from the bombardment of heavy elements by high energy protons and the consequent possibility of "electronuclear breeding," along with the possibility of generating very intense neutron fluxes. The latter idea culminated in the multi-million dollar ING proposal which, to Lewis' great disappointment, was turned down by the government as too expensive.

Following his retirement from AECL in 1973, he became a Distinguished Professor of Science at Queen's University and continued to write and lecture on nuclear energy. He also remained active in international scientific organizations until failing health forced his complete retirement in 1982.

Dr. Lewis was one of the few who can embrace concepts as large as humanity and civilization. Those who worked with him knew a man of enormous breadth, with a tremendous capacity for hard work, an insatiable appetite for knowledge and an outstanding talent for synthesis. He himself claimed that he was not so much an originator as a synthesizer.

(NOTE: Contributions to this obituary have been made by E. Critoph, G.C. Hanna, J.C.D. Milton, and J.D. Hepburn.)