GEORGE CRAIG LAURENCE, 1905 - 1987

George Laurence was Canada's first reactor physicist who went on to a distinguished career in the development of CANDU and, later, in reactor safeguards when he headed the Atomic Energy Control Board (AECB). He was born in Charlottetown, P.E.I. in 1905 and obtained his B.Sc. degree from Dalhousie University in 1925. After his degree, he completed a research project at Dalhousie on a novel new way of measuring accurately the ranges of alpha particles from uranium. His success with this difficult experiment led to an 1851 Exhibition Scholarship to work on his Ph.D. degree in Cambridge, under Rutherford. Having completed his doctorate in 1930, with more alpha particle measurements, Laurence returned to Canada to work at the new National Research Council (NRC) laboratories in Ottawa.

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Laurence working at the NRC was the right person at the right place at the right time. During his first twelve years at the NRC he headed a small laboratory to standardize the measurement of X-rays and radium gamma rays in terms of the Roentgen. After fission was discovered and announced in January 1940, he became the first person in the world to induce fission in a very large quantity of uranium surrounded by carbon, to investigate the possibility that the fission chain reaction could be produced in this way. In his experiments, in 1940, he used a ton of uranium oxide and ten tons of carbon powder arranged in a lattice in a nine-foot diameter sphere. Fermi built a similar lattice in mid-1941. Fermi found then, as Laurence did a few months later, that higher purity uranium oxide would be required to produce a self-sustaining graphite uranium reactor. Laurence was clearly on the ground floor of such experiments but it was Fermi, with his greater US resources, who soon after built the first chain reaction, with graphite and uranium, at Stagg Field in Chicago.

The arrival in Canada of the world's supply of heavy water, as well as the decisions of Churchill, Roosevelt and King at Quebec City in 1943, led to Canada being assigned the development of heavy-water-uranium reactors at the Montreal Laboratory, as described elsewhere in this issue. The graphite-uranium reactors became part of the American program. Laurence joined the Canadian effort at Montreal.

The work of Laurence at the Chalk River Nuclear Laboratories (CRNL) for the CANDU program was of great importance. He directed the groups developing and often fabricating the new instruments needed for CRNL's first reactor, ZEEP, and then for NRX. He also was the leader of the branches involved in the design of NRU. These were the best reactors in the world for neutron physics. The NRX accident in 1952, in which a power surge occurred due to operator error and equipment malfunction, had a very deep impact on Laurence. Subsequently he devoted much of his career to the safety of nuclear power in Canada. This naturally led to his appointment, in 1961, to succeed C.J. Mackenzie as President of the Atomic Energy Control Board (AECB), a post which he filled with great distinction.

As President of the AECB, Laurence was also responsible for the construction and operating grants to university accelerator laboratories in Canada. He was very visionary and highly effective in achieving the construction funding of TRIUMF in 1968. He was a civil servant who remained a true physicist and who reported directly to the relevant federal cabinet minister. Although a true pioneer for nuclear energy, Laurence retained a youthful enthusiasm for science throughout his administrative years. He was a good man, an excellent physicist, and a true servant of Canada. He died in Deep River, Ontario, on November 7, 1987, in his eighty-third year.

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