



**DISTINGUISHED
NUCLEAR PIONEER
LECTURER—1972
FRANCIS PERRIN**

Francis Perrin is the son of the great French physicist, Jean Perrin, who received the Nobel Prize in 1926 for his work on the Brownian movement and the reality of molecules and who died in New York in 1942 during the German occupation of France.

Francis Perrin was born in Paris in 1901. His first visit to America was during the fall of 1913 when his father was invited by Columbia University to be visiting professor for three months. During these three months he was a pupil at Horace Mann Elementary School (Teacher's College of Columbia University).

He graduated from the University of Paris and the Ecole Normale Supérieure in 1922. After one year in the Army, he was appointed assistant in his father's laboratory for physical chemistry where he started research work in the field of fluorescence of organic dyes in solution. In 1928 he received the degree of doctor in mathematics for a thesis on the Brownian movement of rotation of a sphere, and the following year he received the degree of doctor in physics for a thesis on the polarization of the fluores-

cence of solutions and the first determination of the mean life of activated fluorescent molecules (mean life of a few nanoseconds).

After 1930 he worked mainly in theoretical nuclear and corpuscular physics: zero mass of the neutrino, electron-pair production and annihilation, absorption of slow neutrons by nuclei. In 1933 he was appointed assistant professor and in 1935 professor in the department of theoretical physics of the Faculté des Sciences of the University of Paris. As such he lectured mainly on quantum statistical mechanics and published a book on this subject in 1939.

In the spring of 1939, a few months after the discovery by Otto Hahn of the possible fission of uranium nuclei by neutrons, F. Joliot, H. Halban, and L. Kowarski proved that the fission of the nucleus of an uranium atom by one neutron is followed by the emission of more than two neutrons, showing the possibility of divergent chains of nuclear fissions. Soon after, Francis Perrin established the theoretical conditions for the development of such chains. He showed that a self-sustaining chain reaction, in a

suitable association of uranium and neutron moderator would necessitate some minimal, or critical, size and obtained formulas relating critical size to nuclear cross sections. He then joined the team working under the leadership of Frédéric Joliot and contributed to the draft of the first fundamental patents on future nuclear reactors, including the main features of those which were realized a few years later in America.

The beginning of the Second World War interrupted his scientific activity. After a few months spent as a lieutenant in an antiaircraft regiment, he was included in a team working in Paris on radar. After the armistice in France, he returned to his position in the University of Paris under German occupation until he received an invitation to join Columbia University as a visiting professor. Eventually, he managed to arrive in New York with his wife and three children two months before Pearl Harbor. During the following years, Francis Perrin, while teaching quantum mechanics to graduate students in the Chemistry Department of Columbia University, worked part time on war research with two private companies of French origin established in America.

On arriving in the United States Francis Perrin joined the Organization France Forever, which nominated him in January 1944 to represent the Free French living in America in the Consultative Assembly created by General de Gaulle when he became head of the provisional French Government in Algiers. After the liberation of Paris, Francis Perrin went back to Europe, first to London where he worked on operations research in a Franco-British team, and then to Paris where the Consultative Assembly had moved.

Soon after the first atomic bombs were dropped on Japan, Frédéric Joliot persuaded General de Gaulle of the importance for France to restart large-scale research toward the peaceful applications of atomic energy. The result was the creation of a very powerful Government Organization, the Commissariat à l'Énergie Atomique, headed by Frédéric Joliot, as High Commissioner, and an Administrator General. Francis Perrin and Irène Joliot-Curie were members of the Board of Directors from the start.

After the dismissal for political reasons of Frédéric Joliot in April 1950, Francis Perrin assumed his responsibilities and was eventually appointed High Commissioner of the Commissariat à l'Énergie Atomique a year later. As such, during the following 20 years, he shared with four successive Administrators General the direction of the Commissariat à l'Énergie Atomique, himself being responsible for all scientific and technical activities.

During this period, the Commissariat à l'Énergie Atomique became a very large research and industrial organization with a total staff of more than 30,000. Its activities covered uranium prospecting and mining, production of pure uranium metal, enrichment of uranium in a diffusion plant, production of plutonium, construction and operation of large reactors (including a land-based prototype for submarine nuclear boilers, and a fast breeder), manufacture and testing of nuclear weapons up to megaton thermonuclear bombs, and production of radioisotopes and labeled compounds for scientific, technical, and medical use. As High Commissioner of the Commissariat à l'Énergie Atomique, Francis Perrin was specially responsible for radiosafety and radioprotection of workers and of populations around the "atomic" establishments and in the vicinity of the weapon-testing sites in the South Pacific.

Francis Perrin resigned from his position of High Commissioner in July 1970. He is now still professor at the Collège de France, where he was appointed in 1946, but will soon retire from this last position.

Francis Perrin is a member of the French Académie des Sciences (since 1953); he is a foreign or honorary member of several other Academies of Sciences (Rio de Janeiro, Madrid, New York, Heidelberg, and Belgrade).

In June 1968 in Washington Glenn T. Seaborg, Chairman of the USAEC, presented a special citation with an award jointly to Frédéric Joliot (represented by his daughter), Hans Halban (represented by his son), Lew Kowarski, and Francis Perrin in recognition of "their outstanding scientific contribution to the development of nuclear energy" resulting from their work in 1939.