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(*b*. Paris, France, 27 April 1875; *d*. Neuillysur-Seine, France, 14 July 1960)

physics.

The ancient family of de Broglie has long supplied France with soldiers, diplomats, and politicians of the highest rank. Maurice, the second of the family's five children and the eldest son, was virtually required by tradition to follow a diplomatic or a military career. After some discussion, his grandfather, the head of the family, allowed him to enter the navy, the most technically demanding of the services, which Maurice preferred partly from a taste for the sea and partly from a youthful but sincere interest in the physical sciences. After a brilliant career at the École Navale (1893–1895), he was assigned to the Mediterranean Squadron, which he improved by installing the first French shipboard wireless. Simultaneously he continued his education in the schools of Toulon and Marseilles University, from which he emerged with the *licence ès science* in 1900.

As Maurice de Broglie's experience of science and technology grew, he thought to resign his commission and to follow a career in physics. In 1898 he broached the possibility to his family. His grandfather was scandalized. "Science," said the old duke, "an old lady content with the attractions of old men," was no career for a de Broglie. A compromise was effected: Maurice fitted out a room of the family mansion as a laboratory and returned to the navy. There he so distinguished himself in wireless work that it appeared that he might add lustre to the family name by following his bent; and so he was able, after the death of his grandfather, to convert the furlough he obtained for his marriage in 1904 into an indefinite leave, which lasted until he formally resigned his commission in 1908. During those years he prepared for his new career, first at the observatory at Meudon, where he studied spectroscopy with Deslandres, and then at the Collège de France, where, in 1908, he successfully defended a thesis on ionic mobilities which he had prepared under the direction of Paul Langevin.

The "ions" of de Broglie's thesis were charged particles of smoke and dust floating about in a gas. His research involved two central problems in the physics of the time, the mechanism of ionization and the measurement of Brownian motion. He accordingly had occasion to work with and to improve upon some of the most advanced techniques then employed in studying and producing ionization; in particular, he tried to improve the capricious apparatus used to generate X rays. The research was done in his own home, in his unusually well-equipped private laboratory, in which he was to work for the rest of his long career.

For a time de Broglie pursued themes suggested by his thesis, either alone or in collaboration with his old teacher from Toulon, L. Brizard. These investigations, which were gradually moving him out of the mainstream of physics, ended in 1912, when Laue and the Braggs showed that X rays could yield diffraction patterns. De Broglie immediately took up the study of X-ray spectra, which became the chief field of his researches and the subject of his most notable discoveries. His earliest important contribution was the "method of the rotating crystal," an application, and perhaps an independent discovery, of the "focusing effect" first described by the Braggs. With this technique, which eliminates spurious spectral lines arising from local imperfections in the face of the diffracting crystal, de Broglie explored the X-ray emission spectra at the same time that Moseley was preparing his classic papers (1913–1914); but whereas the latter breathlessly mapped a few high-frequency lines from many elements, and so arrived at his well-known formulas, the former, proceeding more cautiously, investigated a wider spectrum in only a few metals and found no regularities. World War I interrupted the work of both men. Moseley enlisted in the army and was killed at Gallipoli; de Broglie rejoined the navy and labored on submarine communications, for which he received a medal. Meanwhile the neutral Swedes, particularly Manne Siegbahn, advanced the study of X-ray spectra by extending Moseley's mapping with the aid of de Broglie's technique.

After the war de Broglie returned to his laboratory and the X rays, attending primarily to their absorption spectra, which he had briefly examined during a period of leave in 1916. Then he had made the capital discovery of the third L absorption edge, a matter of great theoretical interest; now he began (partly with the aid of A. Dauvillier) a careful study of the fine structure of the various edges. This investigation led naturally to the exploration of "corpuscular spectra," i.e., of the velocities of photoelectrons released by X rays of a given frequency ν. These "spectra" can reveal the various absorption edges of an atom, as the difference between $h\nu$ and the kinetic energy of a liberated electron gives the energy of the absorption edge with which that electron was associated before its release. De Broglie was joined in these researches, which date from 1921–1922, by his brother Louis, still undecided about whether to settle on physics for his own career; and their cooperation proved very helpful in refining Bohr's specification of the substructure of the various atomic shells. Subsequently (1924) the brothers briefly studied an analogous phenomenon together, the Compton effect.

In the mid-1920's de Broglie began to direct more of his energy toward the leadership of his laboratory. Although he continued to work on diverse problems involving X rays, he began increasingly to look for other aspects of the interaction between radiation and matter. His private laboratory, kept up to date, began to attract students, some of whom were to become leaders of French science. The first group included (besides Dauvillier and L. de Broglie) J. Thibaud, J. Trillat, F. Dupré la Tour, and L. Leprince-Ringuet. After their initiation they tended to follow their own interests, and so de Broglie's private laboratory became the scene of pioneering studies in nuclear physics and cosmic radiation. He followed this work closely, initially (1930–1932) as a collaborator, and subsequently as an influential, inspirational master. In this last role, for which his informed, independent, natural—we might even say aristocratic—authority admirably prepared him, he made what are perhaps his most lasting contributions to French physics.

Many honors came to de Broglie, among which we may single out election to the Académie des Sciences (1924), the Académie Française (1934), the French Atomic Energy Commission, the Académie de Marine, and the Institut Océanographique. He also played a part in international science—for example, through his participation in the Solvay Congresses and his successful early texts on X rays, one of which was translated into English. He was also, perhaps, the last representative of a type that has contributed mightily to the advancement of science—the wealthy independent experimentalist who could follow what he pleased as far as his energies and ability might carry him.

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Adrienne R. Weill-Brunschvicg

John L. Heilbron