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The reception of the De Broglie principle in England

IN 1923, THE ARISTOCRAT LOUIS DE BROGLIE published three papers in the Comptes Rendus of the Academy of Sciences in which he tried to reconcile relativity, quantum mechanics and the electron. His dissertation, submitted the following year, established the duality principle by which electrons could be thought to have both wave and particle properties. In 1926, the principle was used by Erwin Schrödinger to formalise the new quantum mechanics in a way that was soon to be seen consistent with Heisenberg and Bohr's formalisation.

The theoretical development of quantum mechanics was mainly a continental enterprise. Göttingen and Copenhagen were the main centres of such development, while British universities remained in the periphery of theoretical quantum physics. One of the big names of British physics, Ernst Rutherford, head of the Cavendish laboratory in Cambridge, was somewhat reluctant to engage in what he saw as esoteric and philosophical discussions. His approach to physics paid a major attention to the experimental work.

In this paper I want to study the reception of de Broglie's principle in England, especially in Cambridge. Charles Ellis, working at the Cavendish, was soon interested in the duality principle and in the possibility of detecting the wave associated to an electron. Rutherford, however, discouraged him from such experiments. Another Cambridge man, G.P. Thomson, then head of the newly created laboratory of physics in Aberdeen, was to be the first to measure the wave associated to the electron, observations for which he was to receive the Nobel Prize in 1938. The core of this paper will focus on the transfer of theoretical and experimental skills from Cambridge to Aberdeen, and on the comparison of these with the theoretical context in which de Broglie's principle was formulated.

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