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From Bohm to Aspect: Philosophy Enters the Optics Laboratory[1]

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My talk deals with the shifting boundary between philosophy and science from the 1950s to the 1980s, as it relates to the foundations of quantum mechanics. The poor reception of Bohm's causal interpretation of quantum mechanics was related to the idea that it was merely a philosophical inquiry. The controversy it stirred up, however, produced, as a byproduct, the reanalysis of John von Neumann's proof, and 10 years later, this led John Stewart Bell to his theorem. In telling this story, I examine the professional circumstances, backgrounds, and profiles of three physicists, Abner Shimony, John F. Clauser, and Alain Aspect, who were associated with the path from Bell's theoretical work to the experimental tests of the Bell inequalities. I argue that: (1) What was considered good physics after Aspect's 1982 experiments was once considered by many a philosophical matter instead of a scientific one. (2) The path from philosophy to physics was a slow and sinuous one and involved a change in the physics community's attitude about the status of the foundations of quantum mechanics. (3) Foundations of quantum mechanics entered the optics laboratory, but did not lose its philosophical implications.

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