

Hugh Everett, III
Arlington Towers, T-438
Arlington, Virginia
May 31, 1957

Professor Norbert Wiener
Department of Mathematics
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

Dear Professor Wiener:

I am writing in reply to your letter of April 9 concerning my paper, "On the Foundations of Quantum Mechanics." I regret that pressing matters have prevented a more prompt response.

First, I would like to correct any impression that my theory requires a Lebesgue measure on Hilbert space. The only measure which I introduced was a measure on the orthogonal states which are superposed to form another state -- a measure which presents no mathematical difficulties -- and not a measure on the Hilbert space itself, the difficulties of which I am fully aware. Perhaps you were misled by my analogy with the case of classical statistical mechanics. Although in classical statistical mechanics the measure on trajectories does derive from the Lebesgue measure on the phase space itself, my measure on trajectories does not derive from a measure on Hilbert space itself.

You also raise the question of what it means to say that a fact or a group of facts is actually realized. Now I realize that this question poses a serious difficulty for the conventional formulation of quantum mechanics, and was in fact one of the main motives for my reformulation. The difficulty is removed in the new formulation, however, since it is quite unnecessary in this theory ever to say anything like "Case A is actually realized."

Since I have discussed this point of the transition from "possible to actual" with Dr. Bryce DeWitt, who also raised the question, I am enclosing a copy of our correspondence in lieu of a fuller discussion here.

I shall be grateful to receive any further comments or criticisms that may occur to you.

Professor Norbert Wiener
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Page 2

Sincerely yours,

Hugh Everett, III

Note: Address after August 1:

607 Pelham Street
Alexandria, Virginia

HE:nge

Copy sent to Wheeler

Enclosure: Copy of De Witt's letter + reply