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REALITY IN PHYSICS¹

By Dr. W. F. G. SWANN

DIRECTOR OF THE BARTOL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE

I SUPPOSE there are few things concerning which one could find so many differences of opinion as the question of what constitutes a theory in physical science. The pure mathematician would probably be content with a procedure of the following kind. He will set up a branch of mathematics founded upon certain postulates having to do with quantities, letters, etc., that he chooses to be talking about. In this mathematical scheme, there will appear relationships between certain quantities which occur in the mathematics, and it will be his hope to invent a scheme of mathematics of this kind which shall form an analogue of the regularities of nature in the sense that there may be a one-to-one correspondence between certain things in the mathematics and the observable phenom-

ena in nature. It has been said that the pure mathematician is never as happy as when he does not know what he is talking about; and, in the foregoing method, he establishes contacts with the physical world with a minimum degree of shock to his own conscience, by a procedure in which he ceases to think of anything physical until he has completed his mathematical structure, and confines all physical contamination of that structure to the act of setting up the correspondence to which I have already referred. When the correspondence has been set up, the postulates of his mathematics become the laws of nature in the physics. It is possible that he may choose his postulates in various ways. In the journeys which he takes from his postulates as starting points, he arrives at multitudes of conclusions. He might gather together a suitable collection of these at any stage and

¹ Address of the president of the American Physical Society given at New Orleans on December 30, 1931.

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