

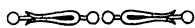
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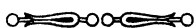
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CONTENTS

Causality in the New Physics James A. McWilliams 51	Herbart and Aquinas.....Paul C. Reinert 67
Reality and Culture.....Editorial 53	Book Reviews:
Kant's Critique.....John M. Robb 55	<i>The Christian Social Manifesto</i>
The Return to Reality.....Joseph E. Douglas 57	Rev. Joseph Husslein, S. J. 70
Matter and Form in Plato's Timaeus Stephen E. Donlon 59	<i>Man as Psychology Sees Him</i>
Relative Space.....Victor J. Blum 61	Edward S. Robinson 70
The Grecian Fount of the New Humanism Aloysius R. Caponigri 63	<i>St. Albert the Great</i>
Where Is Formal Color.....Joseph S. McHattie 65	Rev. Thomas M. Schwertner, O. P. 70
	<i>The History of Science and the New</i>
	<i>Humanism</i>George Sarton 71
	<i>Experimental Psychology</i>
	Rev. Hubert Gruender, S. J. 71



Causality in the New Physics

JAMES A. MCWILLIAMS

*Professor of Philosophy and Director of the Department
St. Louis University*

The quantity of scientific literature coming from the press today on the subject of causality is enormous. That is because many thinkers realize that the scientific notion of causality needs revision. To understand the predicament of the scientists it must be borne in mind that causality in their terminology has for a long time past meant something entirely different from what it means in scholastic philosophy. The physicists in particular, far from intending the term to refer to all four of the causes (material, formal, final and efficient), have restricted its application to efficient cause alone. From this, again, they have proceeded to exclude the causality of free agents, and have limited their consideration to necessary causes, to those, namely, which, given certain conditions, act of necessity and in a predetermined manner. Dry tinder put into the fire is a condition from which the burning of the tinder necessarily follows. From repeated experiments of this kind the scientist observes a constancy of results, which constancy he calls a law. On the strength of that law he can predict what will happen if the condition is repeated. He has thus reduced the whole of causality to the fact of predictability. The philosopher will maintain that there

is an *influxus* of the fire on the tinder, and that this influence is the reason why the tinder burns. The scientist, though he admits the influence, is not, as a scientist, interested in that phase of the question; he wants to know the law, the sequence, the predictability.

This assuredly is a very narrow definition of causality. But the end is not yet. Many scientists have further restricted causality to mean mechanical causality. This is really a restriction, because not all necessary causality is mechanical. The vital activity of organisms is necessary causality, and yet it is not mechanical. Why then did these scientists restrict the necessity to that of the mechanical order? Principally because they wished to subject their experimental data to mathematical handling, and could not conveniently do so with any but mechanical data. Mechanics may be represented as the phenomena of mass and motion. Both of these can easily be brought under the category of quantity; and mathematics is the proper instrument for logical deductions in the realm of quantity. Physical quantities are determined in the last resort by some definite distance on a scale or gauge, by some indicator-reading. Distance is easily measured; and motion in-