

# THE PHILOSOPHICAL REVIEW

## TIME AND CAUSALITY

### I

THE revival of nominalistic empiricism in contemporary philosophy of science has naturally borne with it a refurbished correlational interpretation of causality.<sup>1</sup> But the mathematical development of the physical sciences has profoundly modified the correlational view. In place of Hume's uniform sequences of perceptions we now have equations (especially differential equations) expressing constant relations between variables. This may still claim to be in the Humian tradition in that it involves no appeal beyond the empirical scenes to any mysterious production of effect by cause or to any necessary connection between the two. But it has definitely dropped out an empirical aspect of causality considered essential by Hume, *viz.*, the temporal separateness of cause and effect, the fact that causality has a temporal direction. In place of a sequential relation between cause and effect, it puts a functional (*i.e.*, mathematical) relation between values of variables. "So science does not speak of causes and effects, but of functional relations between measurable quantities; it starts with measurements of quantities rather than with description of occurrences."<sup>2</sup>

Now if this view simply means that physical science has not discovered any fruitful method of dealing with the causal relation, and so has neglected it and emphasized functional relations, I have no objection. But if it means that causality can really be reduced to functions expressible in mathematical equations, I find myself in disagreement. For there is an undeniable empirical fact, his-

<sup>1</sup> I was particularly impressed with this in reading several of the papers in *Causality*, University of California Publications in Philosophy XV.

<sup>2</sup> Moritz Schlick in *op. cit.* III.