

Wesley C. Salmon

Four Decades of Scientific Explanation.

Minneapolis: University of Minnesota Press

1990. Pp. xiv+234.

US \$14.95 ISBN 0-8166-1825-9.

Nobody can fail to be struck by the complexity and sophistication of recent philosophical reflection on scientific explanation. In this 'personal odyssey' (180) Wesley Salmon unravels some of the threads and dispels some of the mystery by reviewing a number of important issues concerning explanations that exercised philosophers between 1948 and 1988. Taking the historical approach to be 'the best way' to obtain 'a more than superficial understanding of [the] issues' (ix), Salmon carefully examines the 'covering law model', the 'statistical relevance model', the 'causal-mechanical conception', the pragmatic theory of explanation and much else besides. More helpfully still he candidly recognizes the shortcomings of the various approaches that have been defended, his own included.

Briefly stated Salmon's historical story runs like this. The major event of the first decade was the appearance of Carl Hempel and Paul Oppenheim's 'Studies in the Logic of Explanation', in which explanation was taken to involve the deduction of 'explananda' from laws and antecedent conditions. In the second decade, work in the area thrived with the discovery of counter-examples to the 'deductive-nomological' model and with Hempel's attempt to extend his account to cover statistical explanations. Then in the third decade important arguments were advanced for replacing the Hempelian requirement for statistical explanations (that the explananda be highly probable given their explanans) with the requirement of statistical relevance (that the explanans 'make a difference' to the explananda). Finally in the fourth decade there was a dwindling of interest in models accompanied by a revived interest in causality and the role of pragmatic considerations.

The heroes of this story are Hempel, Alberto Coffa and Peter Railton (and I might add Salmon himself). Salmon is sympathetic to Hempel's approach and it is only reluctantly that he rejects his requirement of high probability for statistical explanations, his treatment of explanations as arguments, his separation of explanation from causality, and his preference for formal models. As for Coffa and Railton, Salmon takes them to have performed the singular service of directing attention to the objective conception of explanation, a conception that he himself favours. He praises Coffa for propounding an account that avoids treating explanation as epistemically relativized and he judges Railton's 1980 dissertation, in which a 'mechanistic' account is defended, to be 'quite possibly the best thing written on scientific explanation since Hempel's "Aspects [of Scientific Explanation]"' (120).

Salmon concludes that the consensus of the first decade has not survived (ix) and that there is 'not to any very noticeable extent' a new one (180). What we can now see — and Salmon is remarkably frank about this — is that neither the statistical-relevance model, the propensity model, the pragmatic theory nor even the causal-mechanical conception provides us with a fully

satisfactory alternative to Hempel's account. Nonetheless Salmon remains optimistic. Somewhat unexpectedly given his earlier remarks, he suggests in a brief conclusion entitled 'Peaceful Coexistence?' that it may be possible to reconcile the 'unification' account (a successor to Hempel's account), the causal-mechanical account and the pragmatic account by regarding the first as a 'top-down' view, the second as a 'bottom-up' one and the third as subsidiary to the other two.

Salmon's narrative makes it clear how different recent contributions are from Hempel's early work both in style and content. True, philosophers continue to focus on a small range of examples — a tendency deplored by Salmon (117); intuition continues to be called on when the going gets tough (compare pp. 118 and 144); and the cogency of notions continues to be thought of as standing and falling with the existence of precise analyses for them (compare pp. 130 and 148). But it is also true that philosophers now proceed with a much closer eye on scientific practice and with a much keener appreciation of the general philosophical implications of the various options open to them. As Salmon emphasizes, philosophers no longer expect to get clear about explanation without also getting clear about causality, mechanism, lawlikeness, physical indeterminacy and the relative merits of empiricism, realism and pragmatism.

While this wider perspective is surely all to the good, one can be forgiven for wondering whether the exercise still has a clear purpose. Despite Salmon's characterization of the fourth decade as 'a time of maturation' (117), it is difficult to shake the impression that the debate has become amorphous, some would even say aimless. Hempel's attempt to develop models of explanation doubtless made good sense given his concern with distinguishing genuine explanations from pseudoexplanations involving final causes, entelechies and the like (4 and 26). But it is not so easy to see the need for a general philosophical account of explanation when the Hempelian project is set aside. In particular if the aim is — as it now seems to be — one of understanding scientific practice, why can't we get by with a perspicuous account of the multitude of ways in which scientists proceed?

Be this as it may, there can be no denying the value of this volume — and not only as 'an introductory book' (ix). It should not be criticized because it is, as Salmon himself warns us, not 'unbiased history' (180), Salmon having been a major participant in the debates of the last two decades. Nor should it be criticized because it has little to say about the philosophical and cultural context in which philosophical ideas about scientific explanation have been proposed and discussed, Salmon's express concern being with the ideas themselves and whether they are any good. It is all too rare for those centrally involved in philosophical debates to take the time to reconsider their roles in them and to clear the way for future philosophical reflection. Whatever happens in the fifth decade we can be sure that Salmon's contribution to the discussion, so well documented here, will have to be accorded the same careful attention that he bestows on the classics.

Andrew Lugg
University of Ottawa