

****This is a Pre-Print Draft****
****Please DO NOT Quote This Version****

Causality: An Empirically Informed Plea for Pluralism

Phyllis Illari & Federica Russo: Causality: Philosophical Theory Meets Scientific Practice. Oxford: Oxford University Press, 2014, 310pp, £29.99 HB

Christopher J. Austin

Perhaps now more than ever, the discipline of philosophy finds itself theoretically entwined with the contemporary sciences: the conceptual resources philosophical research affords are increasingly being put to work in everything from fundamental physics to evolutionary biology. That being the case, reflecting on the nature of philosophy's theoretical role with respect to the natural sciences is an ever-increasingly important and necessary task. In *Causality: Philosophical Theory Meets Scientific Practice*, Phyllis Illari and Federica Russo do so by examining one of the most central concepts at the foundation of many, if not all, philosophical frameworks employed in conceptualising phenomena in the natural sciences – namely, 'causality'.

The aim of the book is to both introduce practising scientists to the various philosophical accounts of causality and introduce practising philosophers to the various scientific applications of that concept. To that end, the book covers an impressively wide range of interrelated topics in the philosophy of causation and their application to the natural sciences, and with a prose highly readable, often entertaining, and sprinkled with interesting, relevant, and illustrative historical anecdotes. For these reasons alone, it's easy to recommend this book to interested colleagues in either discipline: a highly accessible and candid treatment of this complex topic which sacrifices neither breadth nor depth no doubt deserves the attention of both parties.

The book begins by addressing properly basic, "meta" topics, such as *why* philosophers ought to be interested in the scientific methodology of experimentally discerning causation, and *how* philosophical insight into the conceptual structure of 'causation' might aid in scientific theorising. In keeping with this theme, throughout the book much emphasis is placed on the importance of an awareness and careful study of various evidentiary methods, and their utility in aiding insight into various key concepts in causal reasoning – 'invariance', 'modularity', 'regularity', etc. The main section of the book introduces and critically discusses some of the central philosophical accounts of causality, and although each of the central chapters can be independently understood and digested, Illari and Russo neatly distinguish five important remits of the concept of 'cause' – inference, prediction, explanation, control, and reasoning – which function as interpretive guidelines through which those principal accounts are measured.

Helpfully, nearly every account of causation discussed is prominent in the contemporary literature in some form or another – causation as (1) probability alteration, (2) counterfactual dependence, (3) invariant manipulation, (4) processual tracing, (5) mechanistic mediation, and (6) information transfer. Each account is given its own chapter, and is motivated and discussed in a way which will pique cross-disciplinary interest. And while I suspect that philosophers working in causation may deem their content too thin, due to the scope and aims of the book, this is surely to some degree necessary, and so difficult to see as a significant shortcoming – for the philosophically uninitiated reader, it may even be a virtue; readers wishing for a more in-depth overview of contemporary philosophical accounts of causation might consult Paul & Hall (2013).

Following Hall's (2004) conceptual distinction, Illari and Russo divide the six accounts in to two main categories – 'production' and 'difference-making': roughly, *difference-making* accounts focus on the ontological consequences of two events/variables/etc. being causally related, while *production* accounts are concerned with the ontology of the causal relation which links them; it should be noted that, even in making such a division, the authors argue that *both* types of accounts are important, required for probing the causal structure of the world, and often intertwined. According to the authors, (1) – (3) are difference-making accounts, while (4) – (6) are production accounts. As wide-spread and perhaps structurally helpful this conceptual carving-up is, it isn't a dichotomy that requires no defence. Illari and Russo mainly motivate the distinction by appealing to the methodology of the sciences: some investigations of causal relationships proceed by tracking event/variable correlation – that is, *via* difference-making – and others by tracing the mediating pathway between events/variables – that is, *via* production.

There are two issues here – one methodological, one metaphysical. With respect to the latter, although the authors introduce the distinction in the epistemological context of discerning evidence of causation, their eventual implicit endorsement of 'ontological pluralism' made it difficult to tell whether they intended the reader to understand this as a classification which metaphysically "carved at the joints". If this distinction *is* meant to be a reflection of the *ontology* of these accounts, a more motivated defence of that division would have been welcome. I suspect that most philosophers will have no difficulties understanding the concept of 'difference-making' – the bread and butter of many a philosophical career consists of waxing poetic on the logic and semantics of counterfactuals within a particular sub-discipline - but I don't think the same can be said for 'production'. The authors cite, though rather quickly dismiss, the scepticism of Psillos (2009), and I must admit that I don't have a firm grip on what 'production' amounts to either: the book lacks an argument for why the links which constitute the connective chains of 'production' are ontologically anything more than, or are importantly distinct from difference-making relations.

Putting that issue aside, a methodological worry remains. As with any purported categorisation project, there are issues with overlapping or borderline cases wherein such conceptual divisions look rather *ad hoc*. A case in point is the book's classification of information transfer (6) as a production account, which struck me as rather odd. As far as I can tell, they do so on account of their analysing information transfer, following Collier (2011), in terms of "...the identity of information as various stages in [an] informational channel" [140]. No one can deny the reality of the process of information transfer, but the notion that some identifiable, self-same 'packet' of information can be effectively traced through such a process is, at the very least, peculiar – and concrete examples are unfortunately absent. The causal pathway from DNA to protein, for instance, surely one of the scientific paragons of information transfer, doesn't look amenable to that model: each stage of that pathway clearly "informs" the next, but nothing is *transferred* in the aforementioned sense, and what's *traceable* is little more than a spatio-temporally successive reduction of entropy.

What's more, (Shannon-) information relations look to be difference-making relations *par excellence*: for two states to be connected by an information relation *just is* for them to co-vary in the correct ways, *a la* (1) – (3). Indeed, this identification forms the foundation of the arguments made for the currently *en vogue* 'Developmental Systems Theory' in biology: the fact that developmental fate counterfactually depends equally on embryo *and* environment (in certain fine-grained ways) is understood as there being an *informational* parity between the two factors with respect to that fate (Stegmann 2012). In short, tracing a chain of information transfer appears to amount to little more than tracing a chain of difference-making relations. That said, even if (6)'s status as a 'production' account is only a heuristic categorisation which isn't meant to cut any ontological ice, it's nonetheless a questionable one. I suspect

that, given sufficient scrutiny, this sort of classificatory confusion abounds, calling into question the value of such categorisation for philosophers and scientists alike.

To its credit, and much to the aid of the uninitiated, each account of causality discussed is summarised by spelling-out its ‘core ideas’ and its associated ‘distinctions and warnings’. With the respect to the latter, Illari and Russo provide a “grading” of each view with a fairly consistent implicit rubric which makes clear each view’s empirical applicability and conceptual limitations. Most of the criteria – and the conclusions drawn from them - won’t be unfamiliar to philosophers working in causation, but whether some of them ought to be included in such an evaluative measure is certainly contestable. A particularly striking example of this is the book’s assessing every production account according to whether it can account for ‘absence causation’. While I remain thoroughly unpersuaded of the need to satisfy this criterion and found the supposed empirical instances insufficiently motivated, it must be said that the impetus for its inclusion in the rubric is certainly in line with the spirit of the book in engaging the data of the natural sciences through the lens of philosophical insight.

This brings us neatly to the final sections of the book, where Illari and Russo outline their ‘Causality in the Sciences’ approach. Here the reader is presented with the central theme of the book - a plea for reflective equilibrium between philosophical theory and scientific data in the study of the concept of ‘causation’. To this end, the authors conceptualise various concepts of causality and their associated evidentiary methodologies as constitutive pieces which must be brought together to form interpretive ‘mosaics’ with which to understand the various natural sciences: forming, refining, and applying these mosaics is a task cooperatively undertaken by both philosophers and scientists. Throughout the book, the authors convincingly make the case that while philosophical examination can generate novel and sharpen existing concepts, the sciences are an important factor in selecting relevant problems for those concepts and aid in providing a “testing ground” for those concepts. To my mind, this call for philosophers to be ‘Baconian bees’, ingesting and digesting data from the natural sciences to produce valuable theoretical fruit, is one whose heeding is vital to the future of the discipline. In this book, Illari and Russo have provided an accessibly comprehensive and compelling vision of what that future might look like.

References

- Collier, J. (2011). Information, Causation and Computation. In G. D. Crnkovic, & M. Burgin (Eds.), *Information and Computation: Essays on Scientific and Philosophical Understanding of Foundations of Information and Computation* (pp. 89-107). Singapore: World Scientific.
- Hall, N. (2004). Two Concepts of Causation. In J. Collins, N. Hall, & L. Paul (Eds.), *Causation and Counterfactuals* (pp. 225-276). Cambridge: MIT Press.
- Paul, L., & Hall, N. (2013). *Causation: A User's Guide*. Oxford: Oxford University Press.
- Psillos, S. (2009). Causation and Regularity. In H. Beebe, P. Menzies, & C. Hitchcock (Eds.), *Oxford Handbook of Causation* (pp. 131-157). Oxford: Oxford University Press.
- Shannon, C. (1948). A Mathematical Theory of Communication. *Bell Systems Technical Journal*, 379-423, 623-656.
- Stegmann, U. E. (2012). Varieties of Parity. *Biology & Philosophy*, 903-918.

