
any case, one may harbor doubts about the distinction between direct and indirect causes, notwithstanding Humphreys’s defense of this on pp. 76–77.) Perhaps Humphreys should be more sympathetic than he is (pp. 95–97) to the idea that we need to refer to connecting processes or mechanisms in making sense of causal claims.

The last chapter, on causal explanation in the sciences, is less technically daunting than the previous one and contains many novel insights. It is to be regretted, however, that Humphreys does not engage at all with David Lewis’s recent work on this subject, for Lewis has challenged an assumption that underlies Humphreys’s approach, namely, that to give a causal explanation of an event is (always) to cite some of its causes (see p. 101). According to Lewis it is, rather, to provide some information about the event’s causal history—a much broader notion.

One final point: considerably enlightened though I was by this book, I found the (supposedly objectivist) conception of chance that lies at its heart an oddly elusive one. Humphreys acknowledges that much of what he has to say about what causes are is negative (p. 62) and encapsulates his view in the slogan “Chance is literally nothing” (p. 65). I felt a little mystified that such an interesting and informative book could be written about nothing.

E. J. Lowe


Paul Hoyningen-Huene provides a philosophical reconstruction of Thomas S. Kuhn’s classic Structure of Scientific Revolutions. Part 1, "Introduction," deals with some preliminary issues concerning the topic or theme of Kuhn’s philosophy of science and problems of historiography. Part 2 deals with "Scientific Knowledge and Its Subject Matter," and Part 3 treats "The Dynamics of Scientific Knowledge." A helpful summary concludes each part and helps the reader to see the overall reconstruction. After pointing out the difficulties of identifying exactly what the fundamental claims of Kuhn’s theory of science are, let alone how to determine their truth values, Hoyningen-Huene raises the question as to the exact subject matter of the Kuhnian theses. Do they belong to epistemology, history of science, sociology, or even to philosophy of history or philosophy of historiography? Whatever the exact answer to these questions, Hoyningen-Huene clearly believes that the term structure in the title of Kuhn’s book indicates a prior need for an investigation of epistemological and ontological foundations so that we can understand why Kuhn interprets normal science and scientific revolutions in the way that he does.

In the process of carrying out these epistemological and ontological inquiries, Hoyningen-Huene reconstructs from Kuhn’s writings “the theory of world constitution,” a theory informed by the philosophy of Kant. Hoyningen-Huene argues that Kuhn uses the word world ambiguously. In one sense, “world” refers to experience that has already been perceptually and conceptually sliced up and categorized in a certain way. It is a world to which we have both everyday access and scientific access. In science, paradigms are constitutive of this world. Stated another way, the scientist or human subject of knowledge contributes to the constitution of the objects of knowledge as far as he structures, via paradigms, the world of these objects of knowledge.

The second sense of “world” can be understood by considering what would remain if one subtracted all the human contributions, all of the scientist’s perceptual and conceptual structuring. Whatever this objective world may be, we cannot, according to Kuhn, have access to it. Thus, we have a version of Kant’s distinction between phenomenon and noumenon. According to Kuhn, we can only have knowledge of what Hoyningen-Huene (following Kant) calls the world of appearances.

Hoyningen-Huene claims that Kuhn does not notice the ambiguity of the word world and that this leads to much confusion when he writes of scientists practicing their professions in two different worlds following a revolution. But this latter claim can be clarified if the distinction between the two senses of the word world is made, and when one realizes that this more "picturesque" versatility thesis must

How do the scientists...

According to Hoyningen-Huene, argues that this educational similarity relations like exemplars of a similarity relation, but for science, for the respective appearances.

Consider the following:

I learned the similarities and differences between whale and swans. The perception in a whale, or a swan, or a waterfowl; (b) in designators (form vs. similarity relations, like examples in a similarity relation, for science, for the respective appearances.

But Hoyningen-Huene isn’t the first to point out that world of appearances gained a certain certain above classification. Hoyningen-Huene, the similarity relation to mor. These, too, are instances of the phenomena the role of the respective appearances also go...
e difficulties fundamental once are, let values, question as to the Kuhnian epistemology, or even to the sophy of his fact answer to so clearly the title need for logical and one can understand the way that he put these epistemic questions from the many world of philosophy by the Hoyninger-Huene argued world ambiguity refers to except perceptually categorized in to which we and scientific constitutions, are constitutions, the way of knowledge on of the objects of id" can be unit would contribute to perceptual and ever this object, according this, we have a between pheno. According to wedge of what the Kanta calls that Kuhn does the word world confusion when inticing their proofs following a sim can be a few between the two is made, and is more "pic-

turesque" version of the incommensurability thesis must refer to the world of appearances. The central question now becomes, How do the subjects of knowledge constitute their world of appearances?

According to Hoyningen-Huene, Kuhn investigates world constitution by considering the process by which a member of a certain culture gains access to the world of appearances that is characteristic for that culture. The means of access is education. Hoyningen-Huene, developing Kuhn's insights, argues that the central element in this educational process consists of similarity relations learned first by ostension to exemplars of a given similarity class. Such similarity relations are constitutive for perception, for some empirical concepts, and for the respective region of the world of appearances.

Consider the taxonomy student who has learned the similarity and dissimilarity relations that hold among, say, ducks, geese, and swans. The student (a) has trained his vision in a way that he can see ducks, geese, or swans, and not just unidentified waterfowl; (b) in so far as he has learned the designators (terms) of the respective similarity classes, he has also learned the use of these concepts. A theory of meaning is now taking shape, one that generally follows Wittgenstein's theory of meaning as use. But Hoyningen-Huene further analyzes this theory of meaning into the fundamental principle of similarity and dissimilarity relations. Finally, (c) this particular region of the world of appearances (of waterfowl) has gained a certain structure, namely, the above classification. According to Hoyningen-Huene, the situation is analogous with respect to more theoretical concepts. These, too, are learned through similarity relations between problem situations, and the respective regions of the world of appearances also gain their structure by these similarity relations. However, the analysis with respect to theoretical terms is much harder to spell out. Hoyningen-Huene also relates his reconstructive theory to Kuhn's discussion of implicit knowledge.

We are now in a position to see how Hoyningen-Huene can apply his theory of world constitution and his theory of meaning to the problem of incommensurability. More specifically, with the conceptual tools he has developed so far, the author can (a) provide the theory of meaning that can be used to adjudicate whether or not a central term has changed meaning; and (b) show why meaning-variance incommensurability occurs; and (c) relate (a) and (b) to his theory of world constitution, and thereby to Kuhn's epistemological and ontological foundations.

In scientific revolutions, two successive theories are incommensurable because the central terms of each theory are not mutually translatable. Why? According to Hoyningen-Huene, this is because in such revolutions there has been a change of some similarity and dissimilarity relations that are constitutive of the relevant vocabulary change. To use one of Kuhn's examples: in the Ptolemaic theory there is a similarity between Mars and the sun, since both celestial bodies are held to be planets circling the Earth. However, in the Copernican theory the similarity between Mars and the sun is replaced by a massive dissimilarity between them. Moreover, the extremely dissimilar Earth and Jupiter of Ptolemaic theory have, after the Copernican revolution, undergone a major change, now becoming members of the same similarity class, namely, Copernican planets. Thus we have an example of a meaning change of the word planet, a change grounded in the fundamental similarity and dissimilarity relations central to the theory of world constitution. Furthermore, changes in immediate similarity relations imply a change of the extensions (denotations) of some concepts and, therefore, a change in the basic classification of objects. In this way, incommensurability is linked to Kuhn's fundamental epistemological and ontological doctrines.

Much more can be said about Hoyningen-Huene's overall reconstruction of Kuhn's theory of science. One should also refer to some of Hoyningen-Huene's published articles. The book represents high scholarship and is a welcome addition to the secondary literature on Kuhn's Structure.

Paul C. L. Tang


Despite its subtitle, this book is largely devoted to Karl Popper's social, political, and