

THE CORRESPONDENCE RELATION

In the rest of this book I modify the notion of explanatory translation in order to define a general correspondence relation, and I apply the results to some actual cases of scientific change. I shall not consider such Kuhnian questions as how scientific changes have taken place historically, how communication breakdowns have been handled and scientists persuaded by means of translation or learning, or how scientists have experienced the changes. Much of what I shall do is, however, relevant to the second question. There is nothing in principle that would prevent us from saying that translations of local utterances and literary texts are correspondence relations, but for historical reasons I reserve this term for certain relations between scientific theories – theories of the human sciences and aesthetics included.

Most of what follows is partly reconstructive in nature. On the other hand, if I have managed at all to realistically present the character of explanatory translation in earlier applications, and if I shall be able to persuade the reader in this and later chapters that pragmatic and hermeneutic considerations are closely associated with logical ones when the notion of correspondence relation is applied, the reader will also see the realistic side of my forthcoming reconstructions. While Kuhn emphasizes the role of pragmatics and hermeneutics in theory choice, I try to point out that they are also important for problems concerning intertheoretic relations and intertheoretic explanations, that is, in the context of justification.

The most intricate kind of correspondence relation is the so-called counterfactual correspondence – particularly its special form, limiting case correspondence – since it involves contrary-to-fact assumptions, similar to the ones we investigated earlier in some examples of local translation. As we shall see in later chapters, this notion plays an important role in many actual cases of scientific change that Kuhn calls revolutionary. The correspondence relation is investigated in this

chapter with respect to both nonformal and formalized theories.

5.1. THE CORRESPONDENCE OF THEORIES

Even if the languages of two theories have terms in common, they call for a translation whenever the terms are given different meanings within the two theories. It is often an explanatory, even corrective, global translation that is needed,¹ which, as noticed earlier, does not in general meet Kuhn's criteria of adequacy, and therefore it would not be a translation by his standards. It follows that the existence of an explanatory translation does not suggest commensurability in his sense. On the other hand, Pearce (1987) argues that Kuhn's notion of commensurability can be challenged and replaced by weaker notions that admit of the cognitive comparability of theories in a sufficiently strict sense. I shall point out later on that the notions of corrective and explanatory translation in a global sense are the first step toward a type of cognitive comparability that is different from the kinds discussed earlier in the literature, but which is in many ways congenial with Kuhn's (1970) insights.² Therefore, I start by applying, *mutatis mutandis*, what we have so far learned to scientific theories, in order to define the notion of correspondence relation. It will appear, however, that we need something more than merely this notion to understand revolutionary conceptual change. What it is that is needed depends largely on the kind of change one is studying.

If a theory is formal or can be formalized, the questions of the composition of its language and of the type of possible worlds it describes are assumed to be solved.³ Otherwise there may not be any exact conventions as to what belongs to its language – and this is true, in particular, about theories belonging to sciences that are not exact. A similar uncertainty concerns then the structure of possible worlds that the theory is describing. It also concerns the question of which of those worlds are correlated with worlds described by another theory. It turns out that something like Kuhn's notion of paradigm is what is here needed. If paradigms or scientific communities play such a crucial role in interpretation as he argues, they determine how these and similar questions should be answered.

Though the import of notions related to speech acts may here become even less obvious and less important than, for instance, in the

case of fictional texts, it is natural to say that (in a given context) a scientific community (belonging to an appropriate paradigm), or even an individual researcher trained in that community, is a speaker and another community or individual (possibly of another paradigm) a hearer. Consequently, our earlier principles and concepts concerning interpretation, translation, and their cooperation with a speaker's, hearer's, and actual worlds become meaningful and applicable to scientific theories, whether formal or not. Furthermore, since the correspondence relation can be taken as a type of explanatory translation, it means that a theory which is in a correspondence relation to another, that is, whose language is translated into the language of the other, will be explained and possibly corrected from a point of view of the paradigm associated with the latter theory rather than of some other paradigm or framework.

In so far as the relevant collections of linguistic expressions and possible worlds for the theories in question can be delineated, the correspondence relation can be defined as follows. Consider first the collection of all sentences belonging to the language of a theory *T*, a *secondary theory*. If the collection is vague, it can nevertheless happen that only the sentences belonging to some subcollection *S*, which can be more strictly delineated, need to be translated into sentences of another theory *T'*, a *primary theory*.⁴ Next, let *K'* be a collection of possible worlds that are described by *T'* and possibly some special conditions, that is, at which the principles and laws and axioms of *T'* and the special conditions are true. *K'* may, for instance, consist of worlds that are considered relevant to an explanation of *T*, in some sense of explanation (to be specified in each case). It need not contain all the worlds described by *T'*. In terms of speech acts, the worlds in *K'* are what we have been calling a hearer's worlds. *K'* may sometimes result from an application of a relevant minimizing transformation, in the sense discussed earlier, to some of the worlds that *T'* is supposed to describe in the first place. These intended worlds, which in the philosophy of science are sometimes called 'intended applications' of the theory, play here the role of actual worlds. As before, if the minimization principle is used in a radical, counterfactual way, the respective minimizing transformation may lead to worlds that differ radically from the actual worlds.⁵

Now let *I* be a *translation mapping* which converts the sentences

belonging to S into sentences of the language of T' , and let F be a *correlation*, which is a mapping from K' to possible worlds described by T (plus possibly by other conditions), i.e., to a speaker's worlds. If condition (4.1.1) of Section 4.1 holds for all sentences in S and all worlds in K' , then the pair $\langle F, I \rangle$ is called a *correspondence* of T to T' .⁶ We may add here the requirement that the collection K' be definable, or more loosely characterizable, in the language of the theory T' , but this requirement is as sensitive to the effects of vagueness as the assumptions concerning K' itself and the two mappings.⁷

Since Aristotle, philosophers have kept saying that the research of history differs from natural science in that its task is not to search for general laws but describe particular events, but this view is opposed by some modern scholars, as, for instance, Hempel (1965) who tries to point out that general laws are an important instrument in historical research. They can be used in historical explanations. If this is true and such laws can be found for theories of history, then our notion of correspondence would be applicable to such theories – presupposing, furthermore, that the above conditions concerning the delineation of the languages and possible worlds of the theories in question are satisfied. Hempel goes on to say that since laws, and other relevant conditions, in history are in most cases only vaguely indicated, we should in such cases talk about explanation sketches rather than explanations in a proper sense of the word. To turn it into an explanation, an explanation sketch would need to be completed by inserting further details. The same holds for other fields of research in the human and social sciences. Now it is straightforward to carry Hempel's idea over to the notion of correspondence and say that in cases where laws and the relevant collections needed in its definition are only vaguely indicated, and no correspondence relation can be defined in any precise sense, we may still have a *correspondence sketch*. Thus we may continue to talk about correspondence even on pain of being inaccurate if what we mean are correspondence sketches.

5.2. NARRATIVE CORRESPONDENCE

The view that historical research presents narratives, that its descriptions of past events are organized into temporal sequences of sentences, is evidently more popular, currently, than the view that they

present universal laws. According to Danto (1968), for example, historical research explains changes by using narratives; its task is to organize the past into temporal wholes. However, many criticize the idea that history describes the past as temporal sequences. The reasons are similar to those which we indicated in the previous chapter. Thus Solomon and Higgins (1993) ask whether any historical story is ever really over since history is constantly rewritten, and 'history' is ambiguous meaning both the sequence of events and the ordering of this sequence. A narrative text is an integrated whole, and therefore it is evident that if the text is continued by descriptions of new historical facts, the meaning of the text may change.

In any case, if theories of history are narrative sequences in the first place, and not sets of independent laws or lawlike sentences, then our definition of correspondence is not applicable to them. We have to consider condition (4.1.2), Section 4.1, in order to define the correspondence relation for theories of history. From our discussion concerning global translations of literary narratives we may see that there is similar vagueness here (and the same holds, of course, for local translations of speech acts), similar to what Hempel is talking about, wherefore we should rather talk about correspondence sketches here, too. Whether sketches or more precisely definable, I shall in what follows distinguish the notion of correspondence as applied to narrative theories by simply calling it *narrative correspondence*. Since historical narratives also have the connotative dimension in the sense discussed above, that is, the dimension consisting of possible worlds constructed by means of narratives, it is conceivable that the notion of correspondence (sketch) in our original sense, as defined in the previous section, is relevant here as well. This is at least the case if historical narratives suggest connotations that have sufficiently great universal importance, even though they could not be regarded as laws or lawlike statements.

Now the kind of criticism Solomon and Higgins present against Danto's view of historical theories as temporal narratives suggests in fact an opportunity to apply narrative correspondence to historical theories. As soon as a given narrative is rewritten or continued, we have two theories of history, of which the new dislodges the original one, and it is then natural to pose questions concerning their relationship, similar to questions usually posed about scientific change more gener-

Explanatory Translation

Beyond the Kuhnian Model of Conceptual Change

Rantala, V.

2002, XX, 321 p., Hardcover

ISBN: 978-1-4020-0827-6