

Kuhn's Ontological Relativism*

HOWARD SANKEY

*Department of History and Philosophy of Science, University of Melbourne, Parkville,
Australia 3052*

In *The Structure of Scientific Revolutions*, Thomas S. Kuhn presented a model of scientific development on which science is characterized by periods of unified research intermittently disrupted by revolutionary change of paradigm. Ever since Kuhn first proposed this model of scientific theory change, relativism, in one form or another, has been associated with his work. There has, for example, been widespread discussion of Kuhn's suggestion that scientific rationality varies relative to the changing rules and standards employed by different paradigms. There has also been much discussion of his account of conceptual change in science by philosophers who saw in it an extreme conceptual relativism of radically incommensurable conceptual schemes. Yet in recent years Kuhn has retreated from many of the claims which were responsible for these earlier reactions to his position. In his later work, Kuhn presents instead an ontological form of relativism, which involves an anti-realist denial of objective natural kinds.

According to the new Kuhnian position which has lately begun to emerge, scientific theories are the source of alternative sets of taxonomic categories which are imposed by theories on the world. A set of such categories constitutes a localized complex of interconnected concepts, such that terms for such categories are unable to be translated from one set of categories into another such set. Rather than reflecting reality, these categories constitute, at most, ways of ordering experience; such categories do not reflect reality because it is not possible to do so. Given that there is no objectively right way to represent the world, and that the sets of categories imposed on the world vary with theory, there is a sense in which, as theories change, the world changes with them.

The aim of this paper is to document Kuhn's move away from conceptual relativism and rationality-relativism, and to provide an analysis of his present ontological form of relativism. I will start by discussing Kuhn's shift away from a relativistic stance about rationality and conceptual schemes. I will then turn to matters of ontology by considering Kuhn's earlier idealist-sounding talk of world-change and his later idea of changes in the taxonomic categories which theories impose on the world.

* Previously published in D. Ginev and R.S. Cohen (eds.), *Issues and Images in the Philosophy of Science*, pp. 305–320, 1997, Kluwer Academic Publishers, Dordrecht.

RELATIVISM ABOUT RATIONALITY

In *The Structure of Scientific Revolutions*, Kuhn made a number of claims about methodological standards, which suggested that the rationality of scientists' epistemic choices is relative to operative paradigm. He claimed that paradigms 'are the source of the methods, problem-field, and standards of solution accepted by any mature scientific community at any given time' (1970a, p. 103). Because of the paradigm-dependence of methodology, 'when paradigms change, there are usually significant shifts in the criteria determining the legitimacy of problems and of proposed solutions' (1970a, p. 109). Such criteria and standards cannot, however, be applied to the choice between paradigms, since 'the choice is not and cannot be determined merely by the evaluative procedures characteristic of normal science' (1970a, p. 94). Yet there are no extra-paradigmatic standards to govern this choice, since, 'as in political revolutions, so in paradigm choice – there is no standard higher than the assent of the relevant community' (1970a, p. 94).

Critics were quick to object to this combination of the paradigm-dependence of methodological standards and the absence of extra-paradigmatic standards. Popper saw Kuhn as an advocate of the *myth of the framework*, according to which 'the rationality of science presupposes a common framework', so that rational choice and communication break down in the absence of a shared framework provided by a paradigm (1970, p. 56). On Lakatos's interpretation of Kuhn, 'each paradigm contains its own standards' and 'there are no super-paradigmatic standards', hence '*scientific revolution is irrational, a matter for mob psychology*' (1970, p. 178). While for Siegel, Kuhn's 'irrationalist portrayal of theory choice makes scientific knowledge relative as well, since judgments of factual and theoretical adequacy are on this picture relative to the incompatible criteria of evaluation fostered by rival paradigms' (1987, p. 54).

The key relativist tendency in Kuhn's position detected by these critics centers upon the combination of the claim of paradigm-dependent evaluative criteria with the denial of higher-order criteria. For without any possible appeal to paradigm-independent criteria of theory-choice by means of which to decide between paradigms, there may be no objective, rational basis for the decision to accept one paradigm over another. Thus, if there is any sense in which scientific practice and theory-acceptance may be rational, it can at most be dependent on the operative standards of normal science, which vary with and are internal to paradigms. As a result, rationality in science is relative to accepted paradigm, while the decision between paradigms cannot be made on rational grounds.

The relativist tendency of Kuhn's original position is so pronounced that some of those sympathetic to Kuhn have attempted to defend him by presenting a more defensible version of relativism. Gerald Doppelt, for example, criticizes the interpretation of Kuhn as a conceptual relativist, only to provide a novel interpretation of 'Kuhn's epistemological relativ-

ism' (1982). Doppelt objects to the undue emphasis placed on Kuhn's meaning variance thesis in the conceptual relativist interpretation, and draws attention instead to the extent to which the problems dealt with by paradigms are incorporated into the evaluative standards employed by scientists. According to Doppelt's interpretation of Kuhn, the incommensurability of paradigms is due to variation in their problem-solving agendas, and rationality is relative to paradigm because scientists' standards of evaluation depend on these agendas.

By the early 1970s, however, an apparent change of stance can be found in Kuhn's writings. In several publications dating from about 1970, Kuhn insists on the existence of generally applicable methodological criteria, allows an active yet limited role for rational argument in scientific theory choice, and rejects a mechanical or algorithmic view of such choice (1970a, pp. 184–185, 199–200; 1970b, pp. 259–266). This modified position is developed at greatest length in 'Objectivity, Value Judgment and Theory Choice', where Kuhn claims that there is a partially shifting, though broadly invariant set of methodological criteria, which function as values rather than as rules, and which serve to guide or influence scientists in their choices of theory (1977, pp. 322–325, 335). The set of values he describes (e.g., accuracy, consistency, simplicity) does not, however, unequivocally determine choice between theories, since the values may conflict in application and are not preferentially ordered. Moreover, Kuhn claims, particular values may be subject to variant interpretation, and so do not even themselves yield unambiguous choice of theory.

In the years after publication of *The Structure of Scientific Revolutions*, then, Kuhn has progressively moved away from the relativism about scientific rationality which characterized his original position. The position he later developed is one according to which rational factors play an important role in choice between scientific theories, though there are limitations on what rational argument can achieve in the course of such decisions. These limitations are in part due to the intrinsic inability of the various applicable methodological criteria to unambiguously determine choice in favour of one theory as opposed to an alternative. While there is, on this later view, scope for rational disagreement between advocates of rival paradigms, the position avoids a radical relativization of scientific rationality to variant methodological standards which are entirely dependent on paradigm.

CONCEPTUAL RELATIVISM

A second form of relativism often attributed to Kuhn is the doctrine of *conceptual relativism*. In relation to Kuhn's model of scientific theory change, this doctrine is usually associated with the ideas of meaning variance and semantic incommensurability. Kuhn holds that, in revolutionary transition between paradigms, there is 'a need to change the meaning of

established and familiar concepts', which leads to a 'displacement of the conceptual network through which scientists view the world' (1970a, p. 102). A number of different consequences have been held to flow from such meaning variance, such as the inability to translate or communicate between theories, absence of overlap between the consequences of theories and incomparability of theoretical content.

The doctrine of conceptual relativism may be formulated in a variety of different ways. Davidson, for example, presents it as the thesis that there may be totally untranslatable languages, to which reality and truth are relative. However, a version of conceptual relativism appropriate to Kuhn's model requires a close connection between paradigms and the conceptual apparatus which they employ. For, on Kuhn's model, significant conceptual variation occurs in the transition between paradigms, with the result that rival paradigms are the source of divergent conceptual schemes. In light of Kuhn's frequent remarks to the effect that 'when paradigms change, the world itself changes with them' (1970a, p. 111) and that in the transition between paradigms a 'whole conceptual web' had to be 'shifted and laid down again on nature whole' (1970a, p. 149), it is tempting to interpret the conceptual variation involved in paradigm change as a profound change resulting in replacement of an entire conceptual scheme.

If paradigm change is taken to involve wholesale displacement of conceptual scheme, semantic incommensurability may be interpreted as radical incomparability of paradigms due to conceptual disparity. On such an interpretation, there is translation failure between the languages employed by rival paradigms, as well as communication failure between the adherents of such paradigms. As a result of translation failure, incommensurable paradigms are incomparable for content, since no consequence of one paradigm may be matched against an identical consequence of a rival paradigm or the negation of such a consequence. Moreover, the conflict between paradigms which are incomparable for content may not be resolved by means of empirical test, since such paradigms share no observational consequences in common. Indeed, given that observation is itself thoroughly impregnated by theoretical assumptions originating from background paradigm, the very possibility of objective empirical evidence for or against a theory is thrown into serious doubt. Ultimately, the ideas of objective truth and reality also come under threat. For without the possibility of an objective test or comparative evaluation of paradigms, the prospects of obtaining an accurate reflection of theory-transcendent reality seem poor.

It is doubtful that Kuhn ever meant to endorse such a radical conceptual relativism. Nevertheless, a number of Kuhn's philosophical commentators have taken such relativism to be a central feature of his work, and have objected to it accordingly. Dudley Shapere, for example, traces the relativism he attributes to Kuhn to the incomparability of paradigms due to meaning variance, and objects that such incomparability makes it inexplic-

able how incommensurable paradigms are able to constitute genuine rivals (1984, pp. 45–46, 82–83). Moreover, in his all-out attack on conceptual relativism and the dualism of conceptual scheme and empirical content on which it depends, Donald Davidson places Kuhn among a group of thinkers who are in the clutches of the conceptual scheme idea (Davidson, 1984). In the course of his attack, Davidson raises a number of objections to conceptual relativism, the main thrust of which is to seriously challenge the idea that we may coherently conceive of the possibility of a totally untranslatable language.

Kuhn himself shed little light on the issue of conceptual relativism until the early 1980s. In his paper ‘Commensurability, Comparability, Communicability’, Kuhn explicitly addresses objections of incoherence raised against the incommensurability thesis by authors such as Davidson and Shapere. Instead of a relativism of radically incommensurable conceptual schemes, Kuhn there endorses a thesis of local incommensurability. According to this thesis, there may be localized failure of exact translation, within the context of an inclusive natural language, between the special languages employed by theories. Such languages contain complexes of terms, which are holistically interdefined, and which are unable to be translated in piecemeal fashion into another complex of terms in which the relevant semantic relations do not obtain.

The restricted untranslatability thesis enables Kuhn to meet Shapere’s rivalry objection, since language peripheral to non-intertranslatable complexes of terms provides sufficient common ground for partial comparison of the content of theories. It also enables Kuhn to meet a key objection of Davidson’s that the argument for translation failure typically proceeds within the very language into which translation allegedly fails. For one may argue, within some fragment of a background natural language taken as metalanguage, that a pair of alternative theoretical languages fails to be intertranslatable (see Sankey, 1994, Chapter 4).

While the local version of the incommensurability thesis permits Kuhn to avoid radical conceptual relativism and various associated objections, the account he offers of the reasons for translation failure contains the seeds of his ontological relativism. For Kuhn claims that translation fails due to variation in the taxonomic structures which theories impose on the world. Before turning to that topic, however, I will discuss Kuhn’s idealist-sounding talk of world-changes in his earlier work.

THE WORLD-CHANGE IMAGE

The Structure of Scientific Revolutions contains numerous suggestions that the world itself changes in the transition between competing paradigms. Kuhn remarks, for instance, that a historian considering past science might be inclined to say that ‘when paradigms change, the world itself changes with them’, for ‘it is rather as if the professional community had been

suddenly transported to another planet' (1970a, p. 111). Remarks such as these are accompanied by talk of new entities coming into existence and scientists seeing different things when they observe the world. For example, Kuhn says that 'pendulums were brought into existence by something very like a paradigm-induced gestalt switch' (1970a, p. 120), and 'Lavoisier . . . saw oxygen where Priestley had seen dephlogisticated air' (1970a, p. 118).

Although Kuhn's use of the world-change image is usually qualified, philosophical critics nevertheless detected a strong idealistic tendency in his views. However, this was not entirely due to Kuhn's use of the world-change image. Kuhn endorsed a strong version of the thesis of theory-dependence of observation, and denied that empirical factors determine choice of theory. This created the impression that reality does little to constrain theory on his model of science. In addition, the apparent conceptual relativism of Kuhn's original model portrayed scientists as if they were cut off from reality and isolated within radically variant conceptual schemes. Thus, rather than the world-change image by itself, it is Kuhn's use of the image conjoined with the anti-empirical, conceptual relativist flavour of his model, which suggests idealism. For they present a picture of science on which a drastically reduced role is played by an independent reality external to human thought and experience.

Such a denial of a role to external reality is consistent with two forms of idealism. The first form of idealism is a mentalistic doctrine which denies altogether the existence of an independent reality beyond thought and experience. There are, however, strong grounds against attributing this form of idealism to Kuhn, since, as has been argued by a number of authors, Kuhn assumes the existence of an independent reality throughout his work (e.g., Devitt, 1984; Mandelbaum, 1982). The assumption of such a reality is consistent with a second, *constructivist* form of idealism, which admits an independent reality but denies the possibility of epistemic access to it. The latter doctrine is a broadly Kantian position, according to which, despite the impinging of external reality on us in sense perception, the world inhabited by human cognizers is at least partly constituted by our own conceptual contribution.

On such a constructivist reading of Kuhn's metaphysical stance, different 'phenomenal worlds' are constituted by the conceptual schemes of alternative paradigms.¹ Thus, in the transition between paradigms, the phenomenal world of one paradigm is exchanged for the phenomenal world of another. While the phenomenal world of a paradigm is not reality itself, since reality is inaccessible, the phenomenal world with which a scientist is epistemically engaged depends on the paradigm accepted by the scientist. Such a constructivist reading of Kuhn, therefore, yields a sense in which the way the world is is relative to operative paradigm.

TAXONOMIC CHANGE AND TRANSLATION FAILURE

The third, ontological, strand of relativism has been a persistent theme throughout Kuhn's work. As we have just seen, the idea that how the world is is somehow relative to paradigm was already present in his idealistic handling of the world-change image in *The Structure of Scientific Revolutions*. However, in Kuhn's later work the idea has taken on a novel form as Kuhn has developed the idea that scientific revolutions involve changes of taxonomic categories.

Since the early 1970s, Kuhn has repeatedly stressed that scientific revolutions produce changes in the systems of classification employed by scientists. Here I quote an early statement of his view, though numerous similar passages might be cited from his more recent work:

One aspect of every revolution is, then, that some of the similarity relations change. Objects which were grouped in the same set before are grouped in different sets afterwards and *vice versa*. Think of the sun, moon, Mars, and earth before and after Copernicus; of free fall, pendular, and planetary motion before and after Galileo; or of salts, alloys, and a sulphur-iron filing mix before and after Dalton. Since most objects within even the altered sets continue to be grouped together, the names of the sets are generally preserved. (1970b, p. 275)

Thus, a scientific revolution is not merely a transition between theories which make conflicting claims about entities which they classify in the same way. Rather, entities which are classified as belonging to one category by one theory may be classified as belonging to a different category by another theory. This is because the explanatory purposes of a theory may be best-served by classifying the entities in its domain of application differently from previous theories, as, for example, classifying the Earth as a planet served the explanatory purposes of Copernican astronomy.

A number of important features of Kuhn's view of categorical change may be gleaned from the above quotation. First, the categorical change at issue is not a wholesale displacement of classificatory framework. Rather, change in membership is restricted to only some categories within a classificational system. Second, change of category-membership is not restricted to redistribution of individual objects among different classes. Rather, sets of objects may also be assigned to new categories, as, for example, the alloys were shifted from the class of compounds to the class of mixtures (Kuhn 1970b, p. 269). Third, it is possible to identify at least some of the objects and sets of objects as the same things across classificatory schemes. Thus, there is a common, or at least a broadly overlapping, domain of objects and sets of objects, which is shared between alternative theoretical systems of classification.

Kuhn's views about categorical change have important semantic consequences for the kind terms involved in such change. To the extent that there is retention of terminology across classificatory change, there may be extensional, as well as intensional, variation affecting such terminology. As Kuhn comments,

... the distinctive character of revolutionary change in language is that it alters not only the criteria by which terms attach to nature but also, massively, the set of objects or situations to which those terms attach. (1987, p. 19)

Because such semantic change involves membership redistribution among interconnected categories, such change is not isolated, but has a holistic effect:

What characterizes revolutions is, thus, change in several of the taxonomic categories prerequisite to scientific descriptions and generalizations. That change, furthermore, is an adjustment not only of criteria relevant to categorization, but also of the way in which given objects and situations are distributed among preexisting categories. Since such redistribution always involves more than one category and since those categories are interdefined, this sort of alteration is necessarily holistic. (1987, p. 20)

The holistic nature of the changes brought about by categorial change is, according to Kuhn, directly responsible for failure to translate from the language of one theory into the language of another.

Where I have spoken of the language of a theory, Kuhn now tends to speak of a lexicon. A lexicon is a 'structured vocabulary' (1990, p. 300), which incorporates a taxonomic structure that is employed in describing the world. Such a taxonomy, which Kuhn sometimes calls a 'lexical structure', is what provides the 'invariants of translation' (1983, pp. 682–683). For, in order to translate a word from the lexicon of one theory into the lexicon of another, there must be a 'homology of lexical structure' (1983, p. 683). Because items are redistributed among categories in revolutionary transition between theories, the categories of one theory are unable to be mapped onto the categories of another. Translation fails because the meaning of a name for a given category depends upon terms which refer to other categories within the taxonomy. Because of the holistic way in which such terms are interdefined, they are unable to be translated into a lexical structure which employs a variant categorial system.

In philosophical discussions of semantic incommensurability, the claim of meaning variance has met with less resistance than has the claim of referential variance. Thus, a philosopher sympathetic to the claim that terms may shift their meaning in the transition between theories, might nevertheless object to Kuhn's claim that the names of taxonomic categories change their reference in scientific revolutions. For, as has been argued by advocates of the causal theory of reference, the reference of natural kind terms may be fixed, independently of theoretical descriptions of the kinds to which they refer, by means of direct causal relations with members of such kinds. Thus, it might be thought that Kuhn's thesis of translation failure between theories is objectionable because it mistakenly rests on a thesis of the referential variance of natural kind terms.

However, Kuhn's thesis of categorial change is not on as shaky ground as this may suggest. The application to science of the idea of non-descriptive reference-fixing at initial naming-ceremonies has proven deeply problematic in the context of theoretical terminology. Rather than reference

being fixed once and for all at initial naming-ceremonies, the reference of terms used in science is subject to variation, and there tends instead to be a shift in the pattern of groundings by which terms are applied to their referents (cf. Devitt, 1979). Moreover, it is necessary to incorporate into the causal theory a role for descriptions in securing reference to unobservable entities, which creates the potential for variation in the reference of theoretical terms with significant variation in descriptive content (cf. Kroon, 1985; Nola, 1980). Given the need to allow reference change subsequent to original term-introduction and to grant a reference-determining role to descriptions, the causal theory does not provide a basis on which to reject Kuhn's thesis of referential variance in the course of scientific revolution.

Yet, while there may be reasons internal to the theory of reference for thinking Kuhn's reference change thesis is defensible, the significance of such change to Kuhn's philosophical position is not confined to merely semantic issues. In particular, his thesis of change of taxonomic structure plays a major role in his ontological relativist position, according to which the existence of natural kinds or categories is relative to the phenomenal world of a theory. In preparation for that topic, I will now discuss Hacking's suggestion that Kuhn's position amounts to a new form of nominalism.

REVOLUTIONARY TRANSCENDENTAL NOMINALISM

Ian Hacking has suggested that Kuhn's views on the nature of scientific categorization amount to a form of nominalism, which he calls *revolutionary transcendental nominalism*. On such an interpretation, Kuhn is not to be read as an idealist who denies that there is a reality existing independently of human thought. Rather, Kuhn denies that the kinds to which individual things belong have any existence prior to thought.

The common thread running through all versions of nominalism is the thesis that all that exists are individual objects. There are neither Platonic forms existing over and above individual objects, nor do the kinds or categories to which such objects belong have any existence independently of human classificatory activity. As such, nominalism is a distinct doctrine from idealism or constructivism. For, rather than deny the mind-independent existence of reality or of objects, nominalism denies only that the classification of objects into kinds may represent kinds which exist independently of the mental.

As we saw previously, Kuhn holds that the changes of classificatory scheme which take place in scientific revolution are partial rather than total. Hacking's nominalist rendering of Kuhn preserves this aspect of Kuhn's position:

Kuhn like some other contemporaries might be called an empirical realist and transcen-

dental nominalist. That is, a great many of our commonplace sortings are a given fact of the interactions of any human group and the world in which it lives. That is the empirical realism . . . [According to] transcendental nominalism, there is not some uniquely right conceptualization of the world, nor is the world of itself constituted by more than merely superficial 'kinds of things'. The 'kinds' that enter our theoretical speculations are man-made . . . (Hacking 1979, p. 230)

Thus, according to Hacking, Kuhn is an 'empirical realist' because he grants the existence of 'commonplace' kinds:

many of our prescientific categories *are* natural kinds: people and grass, flesh and horse-flesh. The world simply does have horses and grass in it, no matter what we think, and any conceptual scheme will acknowledge that. (1983, p. 110)

However, at a level which transcends such ordinary empirical groupings of things, the world is not itself divided up into kinds of things; at the trans-empirical level, kinds depend on human classificatory activity. Such a combination of realism and nominalism fits well with Kuhn's example of the alloys; they constitute an empirical kind which survives alteration of the higher-level categories of compound and mixture.

A second feature of Hacking's interpretation which accords well with Kuhn involves the instability of trans-empirical kinds. For Hacking argues that, unlike the classical nominalist, Kuhn holds that human-imposed categorial schemes are subject to revision in the course of scientific revolution. This is why Kuhn's is a *revolutionary* form of transcendental nominalism.

The old-fashioned nominalist of times gone by held that our systems of classification are products of the human mind. But he did not suppose that they could be radically altered. Kuhn has changed all that. The categories have been altered and may be altered again. (Hacking 1983, p. 110)

Thus, on the overall picture which emerges from Hacking's reading of Kuhn, while there are empirical kinds, trans-empirical kinds depend on human classificatory activity, and are subject to variation with change of theory.

Hacking's nominalist rendering of Kuhn permits a novel reading of Kuhn's world-change image. For while the world itself may not change, the world of kinds may do so:

The world does not change, but we work in a new world. The world that does not change is a world of individuals. The world in and with which we work is a world of kinds. The latter changes; the former does not. After a scientific revolution, the scientist works in a world of new kinds. (1993, p. 306)

Since the world of individual objects is unaltered by change of theory, there is a robust sense in which the world is stable. Yet since we must think and interact with the world in terms of categories supplied by us, the world of kinds which we inhabit is a world in flux.

Hacking's interpretation of Kuhn as a kind of nominalist fits well with Kuhn's suggestion that there may be taxonomic change with change of theory, and it makes plausible sense of the world-change image. Yet there

remains in Kuhn's work a strong tendency toward the mind-dependence of objects. Recently, for instance, Kuhn has suggested that the individuation of things as objects depends on our application of sortal concepts which enable the identification of particular objects (1991b, pp. 20–21). And he has explicitly responded to Hacking that the latter's

nominalist version of my position – that there are real individuals out there, and we divide them into kinds at will – does not quite face my problems . . . I need a notion of 'kinds' . . . that will populate the world as well as divide up a preexisting population. (1993, p. 316)

It therefore appears that Kuhn's position differs from Hacking's nominalist interpretation of it by denying that individual objects are to be conceived as existing entirely independently of human conceptual activity.

Nevertheless, Kuhn's apparent commitment to the view that there are both individual objects (e.g., the sun, moon and Earth) and kinds (e.g., alloys, salts), which survive variation of higher-order category (e.g., planet, compound), suggests an intermediate view. While ultimately objects and kinds depend for their individuation upon classification, lower-level empirical objects and kinds tend, on the whole, to survive changes in higher-order, theoretical classification. Thus, Kuhn's transcendental nominalism is combined with a mitigated empirical realism, according to which low-level objects and kinds, though by and large resistant to change, are classification-dependent.

ONTOLOGICAL RELATIVISM

On the interpretation of Kuhn's ontological relativism which I propose, Hacking's transcendental nominalism provides a key element of Kuhn's position. According to transcendental nominalism, beyond the level of commonplace empirical groupings, the world does not itself contain divisions between naturally occurring kinds of things. Rather, classification of the trans-empirical world into taxonomic kinds depends entirely on human conceptual contribution. Such classificational systems are developed in the course of scientific theorizing, and they are subject to revision in the transition between theories.

However, in addition to transcendental nominalism, I suggest that Kuhn's metaphysical stance be interpreted as a Kantian one of the kind earlier described as constructivism. On such a view, there is indeed a reality independent of all human mental activity. But such a reality is, Kuhn says, 'ineffable, undescribable, undiscussible' (1991a, p. 12). Presumably, it is also largely, if not entirely, unknowable (cf. 1979, p. 418). Instead of such a thoroughly mind-independent reality, the world experienced by humans is a phenomenal world that is a joint product of sensory input, deriving ultimately from reality itself, and of our human conceptual contribution. Such a phenomenal world is a constructed world

which contains the kinds of entities which are described by the categorial scheme of the operative theory.

It must be emphasized that Kuhn's view is not that the phenomenal world experienced by the scientist is entirely produced by the categorial scheme of a theory. Rather, the taxonomic categories of the scheme provide a structure for possible experience:

Insofar as the structure of the world can be experienced and the experience communicated, it is constrained by the structure of the lexicon of the community which inhabits it. (1991a, p. 10)

The idea that the lexicon provides a structure which constrains experience is, as Kuhn notes, heavily Kantian: 'like the Kantian categories, the lexicon supplies preconditions of possible experience' (1991a, p. 12). And again,

Both [lexical structures and Kant's *a priori* categories] are constitutive of *possible experience* of the world, but neither dictates what that experience must be. Rather they are constitutive of the infinite range of possible experiences that might conceivably occur in the actual world to which they give access. (1993, p. 331)

Thus, Kuhn's position is one on which the manner in which incoming sensory input is experienced is determined by categorial scheme, and so the phenomenal world of the scientist varies relative to operative categorial scheme.

Such constructivist variation of phenomenal world with categorial scheme, combined with the transcendental nominalist rejection of mind-independent trans-empirical kinds, provides the basis for my reading of Kuhn's ontological relativism. This interpretation of Kuhn takes over from transcendental nominalism the thesis that there are no higher-level trans-empirical natural kinds for the categorial schemes of theories to reflect accurately or inaccurately. And it conjoins with such nominalism the constructivist thesis that the phenomenal world experienced by the scientist depends on the categorial scheme of the theory employed by the scientist.

On the metaphysical picture yielded by this combination of nominalism and constructivism, the taxonomic structure of the phenomenal world of a theory depends on the categorial scheme employed by the theory. As a result, the phenomenal worlds of scientific theories associated with different categorial schemes contain divergent systems of natural kinds. Thus, the set of natural kinds constitutive of the taxonomic structure of the phenomenal world of a theory depends on the categorial scheme of the theory. Given that such phenomenal worlds vary relative to the categorial scheme of operative theory, the existence of a set of natural kinds which populates the phenomenal world of the scientist is therefore a form of existence which is relative to prior choice of scientific theory.

KUHN'S VIEW OF TRUTH

As further evidence that Kuhn's ontological relativism is a position of the kind I have just outlined, I wish now to discuss Kuhn's views on the nature of truth. Kuhn has been a long-standing critic of the application of the correspondence theory of truth to the relation between scientific theories and reality (cf. 1970a, p. 206). In his recent work, Kuhn continues to oppose the correspondence theory, and has also sketched his position about the nature of truth in the context of the idea of variant lexical structures.

According to Kuhn's present views on the subject of truth, the correspondence theory of truth must be rejected, though there remains a necessary role to be played by a weaker conception of truth. The required weaker notion of truth must have an application that is internal to lexical frameworks. For, while a claim may properly be said to be true or false within the context of a given lexicon, the categorial system embedded in the lexicon is not itself capable of being true or false.

In rejecting the correspondence theory of truth, Kuhn wishes to reject the idea that the categorial structure of a theory might accurately reflect the way the world is independently of theory. That such structures cannot themselves be correspondence-true is suggested by the following passage, in which Kuhn claims that the form of life associated with a given lexicon cannot itself be true or false.

Experience and description are possible only with the described and describer separated, and the lexical structure which marks that separation can do so in different ways, each resulting in a different, though never wholly different, form of life. Some ways are better suited to some purposes, some to others. But none is to be accepted as true or rejected as false; none gives privileged access to a real, as against an invented, world. The ways of being-in-the-world which a lexicon provides are not candidates for true/false. (1991a, p. 12)

Such a denial that the taxonomic structures of theoretical lexicons may even constitute possible candidates for truth or falsity accords well with the present reading of Kuhn's ontological relativism. For on such a view, the world itself has no natural kind structure for categorial schemes to correspond with, and taxonomic structures only come into play once one has entered a given phenomenal world.

While Kuhn rejects application of the correspondence theory to the relation between categorial systems and reality, he holds that a weaker notion of truth is required, which may be applied internally to the lexical structures of theories:

... lexicons are not ... the sorts of things that can be true or false. A lexicon or lexical structure is the long-term product of tribal experience in the natural and social worlds, but its logical status, like that of word-meanings in general, is that of convention. Each lexicon makes possible a corresponding form of life within which the truth or falsity of propositions may be both claimed and rationally justified, but the justification of lexicons or of lexical change can only be pragmatic. With the Aristotelian lexicon in place it does

make sense to speak of the truth or falsity of Aristotelian assertions in which terms like 'force' or 'void' play an essential role, but the truth values arrived at need have no bearing on the truth or falsity of apparently similar assertions made with the Newtonian lexicon. (1993, pp. 330–331)

Kuhn thus allows that there is a notion of truth which has a valid use within the context of a given lexicon; the notion he has in mind might, he says, be provided by 'something like a redundancy theory of truth' (1991a, p. 8).

Since Kuhn makes application of the concept of truth internal to lexicon, it might appear that he adopts a relativistic view of truth. However, Kuhn does not make the truth of scientific claims relative to operative theory. It is rather the case that a claim which may be true within the lexical framework of one theory fails to correspond to any comparable claim asserted or denied by an alternative theory. This point is closely connected with the incommensurability of such theories:

Within the world of each practice, true laws must be universal, but some of the laws governing one of these worlds cannot even be stated in the conceptual vocabulary deployed in, and partially constitutive of, another. The same no-overlap principle that necessitates the universality of true laws bars the practitioners resident in one world from importing certain of the laws that govern another. The point is not that laws true in one world may be false in another but that they may be ineffable, unavailable for conceptual or observational scrutiny. It is effability, not truth, that my view relativizes to worlds and practices. (1993, p. 336)

Thus, rather than a relativistic view on which the truth of shared claims about the world varies with theory, Kuhn's view is one on which claims about the world may fail to be shared across such theories. Hence, true claims made by one theory are unable even to be expressed within the context of another theory.

Kuhn's remarks about truth comport well with my interpretation of his ontological relativism. For one thing, consider Kuhn's rejection of the correspondence theory of truth. Kuhn denies that a categorial scheme may accurately reflect reality in the sense of the correspondence theory of truth. This accords with the transcendental nominalist denial that reality is itself divided up into natural kinds independently of human conceptual intervention. For another thing, Kuhn's notion of truth internal to a lexicon sits well with the constructivist thesis that the phenomenal world of the scientist depends on the categorial scheme of accepted theory. For, given that scientists occupy a particular phenomenal world, they will be able to decide on questions of truth and falsity arising within such a world. Yet, due to differences in the categorial structure of theories, questions of the truth-value of a particular claim made by a theory need not arise within the context of a theory with which it is incommensurable.

CONCLUSION

I wish to conclude by re-stating some of the central themes I have developed here. One of my central claims has been a historical one about the development of the relativistic position which characterizes Kuhn's philosophy of science. As originally elaborated in *The Structure of Scientific Revolutions*, Kuhn's position appeared to contain both a relativistic stance towards matters of scientific rationality and a radical conceptual relativism of incommensurable conceptual schemes. However, both of these claims were moderated, as Kuhn admitted the existence of extra-paradigmatic methodological factors informing rational theory-choice, and reduced the scope of conceptual variation between theories with his thesis of local incommensurability.

However, there continues to be a strong tendency towards relativism in Kuhn's work. This tendency centers on his denial of the existence of a reality which has an inbuilt natural kind structure independent of human conceptual intervention. This aspect of Kuhn's relativism places his views in sharp contrast with those scientific realists who hold that there is a mind-independent reality, replete with objective natural kinds, the existence and constitution of which are completely independent of human mental activity. A second key feature of Kuhn's ontological relativism is his commitment to the Kantian view that the world phenomenally presented to the scientist is in large part determined by the taxonomic structure which theories impose on the world. This aspect of his position places Kuhn in close proximity to those idealist or idealistically-inclined philosophers who have insisted on the impossibility of extricating ourselves from our conceptual frameworks to compare our thoughts and concepts directly with reality. Finally, Kuhn's rejection of correspondence truth in favour of truth internal to a lexicon represents both a rejection of standard forms of scientific realism, as well as an attempt to present a relativistic position which avoids familiar objections to relativism about truth. In short, while Kuhn's ontological relativism sets him in conflict with classic forms of scientific realism, his work shares many common themes with anti-realist, internalist and pragmatist approaches currently much in vogue.³

NOTES

¹ I take the expression 'phenomenal world' from Paul Hoyningen-Huene, who draws an explicit parallel between Kuhn and Kant: 'For both Kant and Kuhn, epistemic *subjects* are constitutive of [the phenomenal world]'. Drawing an analogy with Kant's idea of a thing-in-itself, Hoyningen-Huene contrasts the phenomenal world of a scientist with 'the world-in-itself', which is both invariant and unknowable. See Hoyningen-Huene (1993, pp. 32–5).

² It is important to note that the requirement of sameness of taxonomic structure across lexicons is meant by Kuhn to be stronger than a merely extensionalist requirement that the taxonomic categories of different classificatory schemes have the same items in their extensions. The extensions of such categories must not only be specified as objects belonging in

the extension; they must also be represented in some way as constituting a natural kind (1983, p. 676). Presumably, this requires that there must be some minimal retention of sortal or categorial vocabulary across taxonomic systems. However, Kuhn appears to hold that the same kinds may be picked out within different systems of classification, even though no criteria of categorization are shared across classificatory system (1983, pp. 681–683). For discussion of this issue, see my (1994, pp. 95–100).

³ This paper was written while I held a Visiting Fellowship at the Center for Philosophy of Science at the University of Pittsburgh. I am grateful to the Center for hospitality and for providing a stimulating environment in which to pursue research. I also thank Dimitri Ginev for the invitation to contribute to this volume.

REFERENCES

- Davidson, Donald: 1984, 'On the Very Idea of a Conceptual Scheme', in *Inquiries into Truth and Interpretation*, Oxford University Press, Oxford.
- Devitt, Michael: 1979, 'Against Incommensurability', *Australasian Journal of Philosophy* 57, 29–50.
- Devitt, Michael: 1984, *Realism and Truth*, Blackwell, Oxford.
- Doppelt, Gerald: 1982, 'Kuhn's Epistemological Relativism: An Interpretation and Defense', in M. Krausz and J.W. Meiland (eds.), *Relativism: Cognitive and Moral*, University of Notre Dame Press, Notre Dame.
- Hacking, Ian: 1979, 'Review of The Essential Tension', *History and Theory* 18, 223–236.
- Hacking, Ian: 1983, *Representing and Intervening*, Cambridge University Press, Cambridge.
- Hacking, Ian: 1993, 'Working in a New World: The Taxonomic Solution', in P. Horwich (ed.), *World Changes: Thomas Kuhn and the Nature of Science*, MIT Press, Cambridge.
- Hoyningen-Huene, Paul: 1993, *Reconstructing Scientific Revolutions: Thomas S. Kuhn's Philosophy of Science*, University of Chicago Press, Chicago.
- Kroon, Frederick W.: 1985, 'Theoretical Terms and the Causal View of Reference', *Australasian Journal of Philosophy* 63, 143–166.
- Kuhn, Thomas S.: 1970a, *The Structure of Scientific Revolutions*, 2nd edn., University of Chicago Press, Chicago.
- Kuhn, Thomas S.: 1970b, 'Reflections on my Critics', in I. Lakatos and A.E. Musgrave (eds.), *Criticism and the Growth of Knowledge*, Cambridge University Press, Cambridge.
- Kuhn, Thomas S.: 1977, 'Objectivity, Value Judgment and Theory Choice', in *The Essential Tension*, University of Chicago Press, Chicago.
- Kuhn, Thomas S.: 1979, 'Metaphor in Science', in A. Ortony (ed.), *Metaphor and Thought*, Cambridge University Press, Cambridge.
- Kuhn, Thomas S.: 1983, 'Commensurability, Comparability, Communicability', in P.D. Asquith and T. Nickles (eds.), *PSA 1982*, Vol. 2, Philosophy of Science Association, East Lansing Michigan, pp. 669–688.
- Kuhn, Thomas S.: 1987, 'What Are Scientific Revolutions?', in L. Kruger, L.J. Daston & M. Heidelberger (eds.), *The Probabilistic Revolution*, MIT Press, Cambridge.
- Kuhn, Thomas S.: 1990, 'Dubbing and Redubbing: the Vulnerability of Rigid Designation', in C.W. Savage (ed.), *Scientific Theories: Minnesota Studies*, Vol. 14, University of Minnesota Press, Minneapolis.
- Kuhn, Thomas S.: 1991a, 'The Road Since Structure', in A. Fine, M. Forbes and L. Wessels (eds.), *PSA 1990*, Vol. 2, Philosophy of Science Association, East Lansing, pp. 2–13.
- Kuhn, Thomas S.: 1991b, 'The Natural and the Human Sciences', in D.R. Hiley, J.F. Bohman and R. Shusterman (eds.), *The Interpretative Turn: Philosophy, Science, Culture*, Cornell University Press, Ithaca.
- Kuhn, Thomas S.: 1993, 'Afterwords', in P. Horwich (ed.), *World Changes: Thomas Kuhn and the Nature of Science*, MIT Press, Cambridge.
- Lakatos, Imre: 1970, 'Falsification and the Methodology of Scientific Research Programmes',

- in I. Lakatos and A.E. Musgrave (eds.), *Criticism and the Growth of Knowledge*, Cambridge University Press, Cambridge.
- Mandelbaum, Maurice: 1982, 'Subjective, Objective and Conceptual Relativisms', in J.W. Meiland and M. Krausz (eds.), *Relativism: Cognitive and Moral*, University of Notre Dame Press, Notre Dame.
- Nola, Robert: 1980, 'Fixing the Reference of Theoretical Terms', *Philosophy of Science* **47**, 505–531.
- Popper, Karl: 1970, 'Normal Science and its Dangers', in I. Lakatos and A.E. Musgrave (eds.), *Criticism and the Growth of Knowledge*, Cambridge University Press, Cambridge.
- Putnam, Hilary: 1981, *Reason, Truth and History*, Cambridge University Press, Cambridge.
- Sankey, Howard: 1994, *The Incommensurability Thesis*, Avebury, Aldershot.
- Shapere, Dudley: 1984, *Reason and the Search for Knowledge*, Reidel, Dordrecht.
- Siegel, Harvey: 1987, *Relativism Refuted*, Reidel, Dordrecht.