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THE WORLD IN ITSELF: NEITHER UNIFORM  
NOR PHYSICAL

Shouldn't philosophers be permitted to rise above  
faith in grammar?

Friedrich Nietzsche  
*Beyond Good and Evil*

Philosophers sometimes mistake features of discourse  
for features of the subject of discourse.

Nelson Goodman  
*The Way the World Is*

**ABSTRACT.** Since Hume, philosophers of induction have debated the question of whether we have any reason for assuming that nature is uniform. This debate has always presumed that the uniformity hypothesis is itself coherent. In Part 1 of the following I argue that a proper appreciation of Nelson Goodman's so-called *grue-green problem*<sup>1</sup> should lead us to the conclusion that the uniformity hypothesis, under its usual interpretation as a strictly ontological thesis, is incoherent. In Part 2 I argue that further consideration of the *grue-green problem* leads to the conclusion that certain popular versions of the thesis of physical supervenience/the primacy of physics, under their usual interpretation as strictly ontological theses, are false. In Part 3 I argue that the notions of natural kinds and nature's joints should not be taken as ontologically objective notions but as interest relative. Together Parts 1, 2, and 3 provide support for the Nietzsche-Goodman thesis that philosophers are prone to mistakenly identify as *absolute*, mind and language independent, features of the world which are in fact only features of a particular discourse, or of the world *relative* to a particular discourse.

1. THE UNIFORMITY OF NATURE: A REFUTATION

1.1. *The Rejection of Unrestricted Uniformity Hypotheses*

The following three statements are logically inconsistent:

- (1) All emeralds are green.
- (2) All emeralds are *grue*.<sup>2</sup>
- (3) Some emeralds will exist after the year 2000 AD.

Presumably, at the present time, (3) and the following two statements have, and deserve to have, a high credibility for both reader and author:

- (4) All of the many observed emeralds have been green (at the time of observation).
- (5) No emerald has yet been examined after the year 2000 AD.

(4) and (5) together entail:

- (6) All of the many observed emeralds have been grue (at the time of observation).

Let us then assume, as seems reasonable, that we are justified in believing (3), (4), (5) and (6).

Now if we were to accept and act in accordance with the rough, unrestricted rule:

- (R1) Assume the future will be like the past

or its more precise counterpart

- (R2) From (i) All observed *As* are *B*  
infer (ii) All *As* are *B*.

we would find ourselves in the contradictory position of affirming (1), (2) and (3), that is, the contradictory position of affirming that some emerald existing after the year 2000 AD is both wholly blue and wholly green.

We are, of course, strongly inclined to reject the inference from (6) to (2). Contra (R1), we are not willing to accept the claim that in respect of grueness the future will always be like the past. Contra (R2), where 'grue' takes the place of '*B*' we are not (always) willing to accept the inference from (i) to (ii). Our resistance to the inference from (6) to (2) shows that we are not willing to accept and follow the unrestricted rules (R1) and (R2).

### 1.2. *Hume's Uniformity Hypothesis, a Revision and Defeated Defense*

Hume, for one, thought that our normal inductive inferences could be (shown to be) justified if we had epistemic access to (i.e., good reason for believing) the hypothesis that the future will be like the past: that nature is uniform. Moreover, Hume claimed there is a tacit assumption of the truth of this hypothesis that underlies our natural presumption of the reasonableness of our inductive practices. Thus in the *Enquiry* Hume says

... all inferences from experience suppose, as their foundation, that the future will resemble the past, and that similar powers will be conjoined with similar sensible qualities. If there be any suspicion that the course of nature may change, and that the past may be no rule for the future, all experience becomes useless, and can give rise to no inference or conclusion.<sup>3</sup>

And in another place he writes that

... all reasonings from experience are founded on the supposition that the course of nature will continue uniformly the same.<sup>4</sup>

Nor was Hume alone in making this claim. For instance Mill in one of the seminal texts of inductive logic writes

... the proposition that the course of nature is uniform is the fundamental principle, or general axiom of induction.<sup>5</sup>

Notoriously, Hume went on to question the legitimacy of our inductive practices by questioning this supposed tacit assumption.

Hume questioned the legitimacy of inductive inferences by posing the following type of question: what reason, if any, do we have for assuming that the course of events will not change, that the future will not be radically different from the past? Yet, as we saw above, this assumption, inasmuch as it represents a commitment to (R1) and/or (R2), is not an assumption we are willing to endorse. In fact, with respect to grueness we do not expect that the course of events will not change. In respect of grueness we do believe that the future, or at least that part of it occurring after 2000 AD, will be radically different from the past. While we believe that for any past time  $t$  any emerald existing at  $t$  was grue at  $t$ , we do not believe that for any future time  $t$  any emerald existing at  $t$  will be grue at  $t$ . We expect that after the year 2000 AD emeralds will "change" from grue to bleen.

Now perhaps we might attempt to subvert this criticism of the uniformity hypothesis by claiming that (R1) and (R2) are here being taken too literally. Thus we can imagine a would-be objector arguing as follows: certainly we do not expect the future to be like the past in *all* respects. Nor did anyone, including Hume, ever think that we did. Thus Hume was presumably aware that we are not willing to infer such conclusions as 'All emeralds have been observed' from such premises as 'All observed emeralds have been observed'. Nevertheless, in most respects we expect the future to be like the past. Thus (R1), for instance, is best understood as short-hand for:

(R3) Assume that the future will, by and large, be like the past.

That we do not expect the future to be like the past in regard to some respects, such as greenness, does not count against (R3).

As it stands this attempted defense of the uniformity hypothesis will not work. The problem is that there are an infinite number of respects in regard to which the future will not resemble the past and in regard to which we do not expect the future to resemble the past. Indeed for any arbitrary predicate  $P$  in regard to which we expect the future to be like the past we may construct a predicate  $P'$  in regard to which we do not expect the future to be like the past. Thus we define  $P'$  as follows:

$$\begin{aligned} x \text{ is } P' \text{ at time } t &= df, \\ x \text{ is } P \text{ and } t < 200 \text{ AD, or,} \\ x \text{ is not } P \text{ and } t \geq 2000 \text{ AD.} \end{aligned}$$

Thus there are at least as many respects, or at least as many predicates,<sup>6</sup> in regard to which we expect the future to differ from the past as there are respects, or predicates, in regard to which we expect the future to be like the past. Yet save that we believe that the future *by and large* will be like the past we have no reason to accept (R3). The natural understanding of 'by and large' here is in the sense of 'in most respects'. By this interpretation (R3) is *prima facie* unacceptable.

### 1.3. *Real Change and Nominal Change, Properties and Uniformity*

Recall that earlier I wrote of our expectation that emeralds will "change" from grue to bleen after 2000 AD. Here it might be objected that so-called change from grue to bleen after the year 2000 AD is no *real* change, for underlying this nominal change is a persistence in real color, namely a persistence in greenness. According to this objection it is change from, for instance, green to blue that constitutes real change of color.

However, against this it may equally be objected that that so-called change from green to blue after the year 2000 AD is no real change, for underlying this nominal change is a persistence in real color, namely a persistence in greenness.

Certainly the sceptical, anti-metaphysical, empiricist Hume could not provide the philosophical framework to sustain the first claim over

the second. However, others of a less exacting nature might be willing to invoke recondite entities in order to achieve this effect. Thus, those who are willing to include properties or natural kinds in their ontology might claim that 'grue' and 'bleen' do not name real color properties/natural kinds, while 'green' and 'blue' do. Combining this with the claim that real change involves a change of properties/natural kinds, they will conclude that "change" from grue to bleen at the year 2000 AD does not constitute a real change.

Developing this line, it might be claimed that (R1), (R2) and (R3) above all involve implicit reference to the notion of uniformity of *properties/natural kinds*. Thus it may be argued that they are all in fact shorthand for:

- (R4) Assume that the future will, in respect of real properties/natural kinds, be, by and large, like the past.

Now even granting this somewhat baroque ontology of properties/natural kinds, the uniformity hypothesis is still highly questionable. After all, if it is grue-type-predicates rather than green-type-predicates that name properties/natural kinds, then presumably the future will not, by and large, be like the past in respect of real properties/natural kinds. How then are we to know, indeed what if any reason do the partisans of properties/natural kinds have for believing, that green-type-predicates rather than grue-type-predicates name properties/natural kinds?

The adherents of properties/natural kinds have merely swapped an ontological problem for an epistemological problem. By assuming that only certain predicates name properties/natural kinds and that real change involves change of properties/natural kinds, they have provided a framework in which one can make sense of the claim that the future will, by and large, be like the past. However they have given no reason to believe that that claim even embodies our actual expectations, for instance, our expectation that emeralds will remain green after the year 2000 AD. If it is 'grue' and grue-like predicates, rather than 'green' and green-like predicates, that name properties/natural kinds, then the claim that in respect of properties/natural kinds the future will be, by and large, like the past, contradicts our actual expectations – for instance our expectation that all future emeralds will be green.

For the moment we will disregard the properties/natural kinds

response. In Part 3 below I argue that one of the traditional reasons for positing natural kinds is misguided.

#### 1.4. *Real Change, Microstructure and Observationality*

Those who still intuit that predicates such as ‘green’ and ‘blue’ “limn the true structure of the universe” and that predicates such as ‘grue’ and ‘bleen’ are mere *Menschenwerk* might be tempted by either or both of the following attempted defenses of that intuition.

First, it might be claimed that change from green to blue at 2000 AD constitutes a real change, while change from grue to bleen at 2000 AD does not, because the former involves an accompanying microstructural change while the latter does not.

This claim meets with the objection that along with grue-type-predicates for describing macroscopic phenomena there are also grue-type-predicates for describing microstructural phenomena, and hence that microstructural change is at least as problematical as “real color change”.

Suppose that anything that is green has a type *X* microstructure whereas anything that is blue has a type *Y* microstructure. Then let us define type gre*X* and type bl*Y* microstructure as follows:

*w* has type gre*X* microstructure at time  $t = df.$  (*w* has type *X* microstructure and  $t < 2000$  AD) or (*w* has type *Y* microstructure and  $t \geq 2000$  AD).

*w* has type bl*Y* microstructure at time  $t = df.$  (*w* has type *Y* microstructure and  $t < 2000$  AD) or (*w* has *X* microstructure and  $t \geq 2000$  AD).

While something that changes from green to blue at the year 2000 AD changes from having microstructure *X* to having microstructure *Y*, something that changes from grue to bleen at the year 2000 AD changes from having microstructure gre*X* to having microstructure bl*Y*. Now we have no reason for believing that change from microstructure *X* to microstructure *Y* constitutes real microstructural change while change from microstructure gre*X* to microstructure bl*Y* does not. Thus even admitting the premise that real change involves some accompanying microstructural change still gives us no reason for believing that change from green to blue constitutes real change while change from grue to bleen does not.

Second, it might be claimed – indeed, it has been claimed<sup>7</sup> – that predicates such as ‘blue’ and ‘green’, unlike such predicates as ‘grue’ and ‘bleen’, “limn the true structure of reality”, or at least are appropriate predicates for use in inductive inferences, because they are ostensively definable predicates.<sup>8</sup>

One problem with this claim is that any predicate *can* be defined by ostensive definition. A predicate is ostensively definable *for individual x* if *x* could be taught its correct usage through the non-verbal indication of positive and negative instances. Now it is true that for typical humans ‘green’ may be grasped through ostensive definition whereas ‘grue’ may not be so grasped. Yet consider the case of an individual who is such that at the year 2000 AD he will undergo certain physiological changes so that after 2000 AD blue things will affect him as green things did before the year 2000 AD and green things will affect him as blue things did before 2000 AD. For instance, after 2000 AD blue things cause him to have qualitatively the same visual impressions as green things typically produced in him before 2000 AD. For such an individual ‘grue’ is ostensively learnable while ‘green’ is not so learnable.<sup>9</sup>

Of course, it might be claimed that predicates such as ‘green’, rather than predicates such as ‘grue’, limn the true structure of the universe because they are ostensively learnable *for us*. Yet, since what is ostensively learnable for us is partially a function of our own physiological make-up, this raises the question: why should our physiology have a purchase on the structure of the universe? This matter will be further dealt with in Part 3 below.

### 1.5. *The Moral: Change is Relative*

Rather than motivating ontological indulgences or other evasive manoeuvres, I believe the lesson to be learned from Goodman’s grue-green problem is that the notion of real or absolute change should be dispensed with. In its place we must learn to make do with the notion of relative change. We have already learned to abandon the notion of absolute change of motion and position in favor of frame-of-reference-dependent notions of change of motion and position. We must now learn to live with the notion of frame-of-reference-dependent change of color, size, shape, microstructure or any other respect. There is no absolute fact about when an individual changes its

position, shape, motion or color. Change is always relative to a frame of reference.

Usually frames of reference are incorporated into predicate structures. Thus relative to our normal structure of color predicates (which includes 'red', 'blue', 'green', etc., but not 'grue') an object *X* which is green before 2000 AD and thereafter green is an object that has not undergone color change, whereas an object *Y* that is green before 2000 AD and thereafter blue is one that has undergone color change. However, relative to a color structure which includes 'grue' and 'bleen', but not 'blue' or 'green', it is object *X* that has changed color and *Y* that has not undergone a change of color.

Hume thought our inductive habits covered a tacit assumption that there will be no radical change in the course of nature. Here Hume implicitly takes change to be an absolute, non-relative notion. Goodman's insight shows that at most our tacit assumption is that with respect to our favored frame of reference (Goodman's so-called entrenched predicates) we assume the future will be like the past. Goodman's insight brings into question the very notion of absolute, non-relative change. It is crucial here to realize that Goodman's insight is not merely an epistemological insight though Goodman himself often stresses its epistemological implications. What is at stake is not merely the questions of whether we do believe, and whether we have good reason for believing, that nature is, by and large, uniform, and that change is an absolute-frame independent fact. The very coherence of the uniformity thesis and of the notion of non-relative change is being challenged.

The universe *in itself* is neither uniform nor non-uniform. Rather, it is uniform relative to certain frames of reference and non-uniform relative to certain other frames of reference. Here then, we have the answer to the old question of whether the world is changeless or in flux. Relative to certain frames of reference it is changeless; relative to others it is in constant flux.

Thus passes Parmenides' problem.

## 2. PHYSICAL SUPERVENIENCE: A REFUTATION

### 2.1. *Further Ramifications: Grue and Supervenience*

Considerations of the above type should not simply lead us to the conclusion that change alone is relative to a frame of reference. They

should also lead us to conclude that certain related notions, for instance the notions of similarity and difference, are also frame-of-reference dependent.<sup>10</sup>

Thus, considered from a frame of reference which includes grue color predicates but not our standard color predicates, emerald  $X$  which is green at 1980 is the same color as emerald  $Y$  which is blue at 2001 (they are both grue), though  $X$  is different in color from emerald  $Z$  which is green at 2001 ( $X$  is grue, while  $Z$  is bleen). Yet considered from a frame of reference which includes our standard color predicates, but not grue color predicates, emerald  $X$  is the same color as  $Z$  (both are green) and is different from  $Y$  as regards color ( $X$  is green while  $Y$  is blue).

Now if we accept the claim that similarity and difference are frame-of-reference dependent notions we will need to reconsider the status of various theses that utilize these notions. One such thesis, as we shall soon see, is that of physical supervenience: the thesis that all facts/states of affairs supervene upon physical facts/states of affairs, that physics is “the ultimate parameter of reality”. This is a thesis that many physicalists have retreated to after the perceived collapse of reductive physicalism (roughly, all facts are reducible to physical facts) and token identity (roughly, every thing is identical to some physical thing). Thus its relativization has profound implications for what remains of the physicalist program.

## 2.2. *Supervenience and Physically Identical Worlds*

One popular version of the supervenience thesis has it that

- (S) For any two distinct atom-for-atom identical (possible) worlds  $W$  and  $W'$  whatever is true of the one is true of the other.<sup>11</sup>

Terence Horgan, for one, canvasses the following version of this type of supervenience thesis:

There do not exist any two P[hysically accessible]-worlds which are exactly alike microphysically but which differ in some other respect.<sup>12</sup>

Now suppose that world  $W^1$  is a world containing only one object  $a^1$  and that object is green, and world  $W^2$  is atom-for-atom identical with  $W^1$ . Then, by (S), there is a corresponding green object in  $W^2$ ; call it object  $a^2$ . Let the predicates ‘gwue’ and ‘bween’ be defined as follows:

$x$  is gwue = *df.*  $x$  is in  $W^1$  and  $x$  is green or  $x$  is not in  $W^1$   
and  $x$  is blue.

$x$  is bween = *df.*  $x$  is in  $W^1$  and  $x$  is blue or  $x$  is not in  $W^1$   
and  $x$  is green.

By these definitions  $a^1$  is gwue and not bween while  $a^2$  is bween and not gwue. In other words, though 'contains a gwue object' is true of  $W^1$  and 'contains a bween object' is not true of  $W^1$ , 'contains a gwue object' is not true of  $W^2$  and 'contains a bween object' is. Thus it is not the case that whatever is true of world  $W^1$  is also true of world  $W^2$ .

More generally wherever there are two atom-for-atom identical worlds  $W$  and  $W'$  and  $P$  is some predicate true of an object  $a$  in  $W$  and  $a'$  is its counterpart in  $W'$ , then we may construct predicates  $P^1$  and  $P^2$  which are respectively true of  $a$  and  $a'$ , though neither is true of both. Thus we define  $P^1$  and  $P^2$  as follows:

$x$  is  $P^1$  = *df.*  $x$  is in  $W$  and  $x$  is  $P$  or  $x$  is in  $W'$  and  $x$  is not  
 $P$ .

$x$  is  $P^2$  = *df.*  $x$  is in  $W$  and  $x$  is not  $P$  or  $x$  is in  $W'$  and  $x$  is  
 $P$ .

Of course if there are no such worlds then the supervenience thesis (S) is trivially true. Yet in this case, by the same token, so is the anti-supervenience thesis:

- (AS) For any two distinct atom-for-atom identical (possible) worlds  $W$  and  $W'$  it is not the case that whatever is true of the one is true of the other.

Clearly, in this case (S) provides no comfort to the advocates of physicalism. The supervenience thesis (S) is either false, or trivially true and irrelevant to the concerns of the physicalists.

At this point perhaps some readers will be inclined to object that predicates such as 'gwue' and 'bween' are not legitimate predicates. Where this intuition exists it is no doubt fueled by the fact that the definitions of these terms provided above involve mention of location in worlds: the definitions involve what might be called "worldly predicates". By the same token, it may be claimed that the advocates of the supervenience thesis intend such theses as (S) to be restricted to predicates that do not involve reference to possible worlds – after all it

is clearly the case that for any two distinct worlds  $W$  and  $W'$  there will always be some predicate, for instance, 'is  $W$ ', that is true of the one and not the other. Thus, it may be claimed that the supervenience thesis (S) is shorthand for the thesis:

- (S\*) For any two distinct atom for atom identical (possible) worlds  $W$  and  $W'$  any non-worldly predicate that is true of the one is true of the other.

The problem with (S\*) is that it utilizes a supposed distinction between non-worldly and worldly predicates. This supposed distinction is in fact as difficult to define as is the supposed objective distinction between grue and non-grue-like predicates.

A worldly predicate cannot simply be one that makes explicit reference to possible worlds, for our predicates 'gwue' and 'bween' make no such reference. Nor can a worldly predicate simply be an explicitly worldly predicate or a predicate that is definable in terms of explicitly worldly predicates, for in that case every predicate is a worldly predicate and hence (S\*) is trivially true. For instance, 'green' may be defined as follows:

$$x \text{ is green} = df. x \text{ is gwue and } x \text{ is in } W' \text{ or } x \text{ is not in } W' \text{ } x \text{ is bween.}$$

Those who seek to defend the supervenience thesis by invoking such notions as those of "legitimate predicates" or of "non-worldly predicates" owe us a substantial and well motivated theory of predication to clarify and justify the use of such notions. Until such an account is provided we can make little sense of such supervenience theses as (S\*). I, for one, do not believe any such theory is forthcoming.

### 2.3. *Supervenience: No difference without a Physical Difference*

(S) is not the only version of the supervenience thesis. For instance, another version has it that

- (S1) There can be no difference/change without a physical difference/change.

Or, as Quine more picturesquely states it:

Nothing happens in the world, not the flutter of an eyelid, not the flicker of a thought, without some redistribution of physical states.<sup>13</sup>

Read in the way I suspect physicalists intend it to be read (S1) is simply false.

Let  $a$  be any actual green object that our common garden variety physicalist would agree has undergone no physical change from time  $t^1$  through  $t^2$  to  $t^3$ . Let us define the predicates 'grue' and 'bleen' as follows:

$x$  is grue at  $t = df. t < t^2$  and  $x$  is green or  $t \geq t^2$  and  $x$  is blue.  
 $x$  is bleen and  $t = df. t < t^2$  and  $x$  is blue or  $t \geq t^2$  and  $x$  is green.

Now either  $a$  changed from green to some other color at  $t^2$  or it did not so change. If it did, then (S1) is false, for ex hypothesi  $a$  has undergone no physical change, yet (S1) entails that no object can undergo such a change of color without going through some physical change. If  $a$  remained green through  $t^1$  to  $t^3$  then it changed from being grue to bleen. Yet again ex hypothesi  $a$  has undergone no physical change, so in this case too (S1) is false.

It may be claimed (presumably by an uncommon physicalist) that our initial hypothesis that  $a$  has undergone no physical change from  $t^1$  through  $t^2$  to  $t^3$  is false, on the grounds that, even if *relative* to our normal physical predicates  $a$  has undergone no change, *relative* to certain non-standard grue-like physical predicates  $a$  has indeed undergone change. Thus suppose from  $t^1$  through  $t^2$  to  $t^3$   $a$  has atomic structure  $X$ . Then let us define the predicates 'has atomic structure beX' and 'has atomic structure blY' as follows:

$x$  (at  $t$ ) has atomic structure beX =  $df. t < t^2$  and  $x$  has atomic structure  $X$  or  $t \geq t^2$  and  $x$  does not have atomic structure  $X$ .  
 $x$  (at  $t$ ) has atomic structure blY =  $df. t < t^2$  and  $x$  does not have atomic structure  $X$  or  $t \geq t^2$  and  $a$  has atomic structure  $X$ .

Then ex hypothesi  $a$  has changed from having atomic structure beX to having atomic structure blY during the period from  $t^1$  to  $t^3$ .

Now if we allow that the change from having atomic structure beX to having atomic structure blY and other such changes count as physical change, then we will hold (S1) to be trivially true, for at all times every thing is going through some such physical change relative to some such grue-like physical predicate.

The supervenience thesis (S1), interpreted in this manner, provides no comfort for the physicalist inasmuch as he is an empiricistic realist. For such a physicalist wants to argue that while the non-physical, or at least the naturalistic non-physical, supervenes upon the physical, the physical does not supervene upon the (naturalistic) non-physical. Yet given the notion of change implicitly assumed in the above interpretation of (S1) the physical is supervenient upon the (naturalistic) non-physical since each thing is going through some (naturalistic) non-physical change relative to some grue-like (naturalistic) non-physical predicate.

#### 2.4. *Linguistic Supervenience and The Non-primacy of Physics*

Rather than talking *simpliciter* of the supervenience of the non-physical on the physical, we might perhaps do better to speak of the supervenience of certain restricted sets of non-physical predicates on certain restricted sets of physical predicates. Thus we might advance such limited supervenience theses as

- (CS) There can be no change of application relationships between the set of normal color predicates and a world *W* without there being a change of application relationships between the set of normal physical predicates and *W*.

Yet even if (CS) and a host of similar limited supervenience theses were true this would not serve to establish the fabled primacy of the physical. For along with such supervenience theses there will be true supervenience theses such as

- (PS) There can be no change of application relationships between the set of normal physical predicates and a world *W* without there being a change of application relationships between the set of non-normal non-physical predicates and *W*.

Alternatively, given certain generally restricted vocabularies (e.g., vocabularies which include only standard English predicates and the predicates of standard physical theory) we might frame such general supervenience theses as

- (S2) There can be no change of application relationships between a world  $W$  and the set of non-physical predicates without there also being an accompanying change of application relationships between  $W$  and the set of physical predicates, though there can be a change of application relationships between  $W$  and the set of physical predicates without there being an accompanying change of application relationships between  $W$  and the set of (naturalistic) non-physical predicates.

Indeed it may be argued that such restricted theses are what sophisticated physicalists had in mind from the beginning. Yet note that such restricted theses would need to be seen as as much a reflection of the nature and limits of the vocabularies in question as a reflection of the nature and limits of the world.

Supervenience theses provide no safe resting place for even limited, non-reductionistic, versions of the physicalist dream, where that dream incorporates the notion that from a strictly ontological point of view the world is basically a physical world.

### 3. NATURAL KINDS, NATURE'S JOINTS AND REALISM

No doubt many readers will be suspicious of the predicates, 'grue', 'bleen', 'microstructure gre $X$ ', 'microstructure bl $Y$ ', etc., used in the above arguments. Such suspicions are, I believe, well motivated. Where we must be careful is in our theorizing about why such predicates seem so odd.

Certainly such predicates do not seem to sort out things in any perspicuous manner. In other words, they represent *ad hoc* categories. The crucial point to realize, and a point that is nearly always overlooked, is that sortings and categories are not non-perspicuous or *ad hoc* in themselves, rather they are non-perspicuous or *ad hoc* to particular agents or particular types of agents. True, a human agent thinking in terms of grue-like predicates might not be able to make useful predications. Such an agent might, as Quine strangely puts it, "exhibit the pathetic but praiseworthy tendency of dying before he reproduces his kind".<sup>14</sup> But this is not because he has failed to carve nature at its joints or because the kinds he thinks in terms of are not natural kinds. It is because those kinds were not useful in predicting

change as it occurs *for him*. To establish this claim I need to introduce yet more odd predicates. For this I crave the reader's indulgence.

Consider an individual who, rather than thinking and inducing in terms of our normal predicates, thinks and induces in terms of grue-like predicates. For instance, suppose this individual, Joe, to give him a name, does not use the term 'strawberry', but uses the term 'pawberry' which we may define as follows:

$$x \text{ is a pawberry at } t =_{df} x \text{ is a strawberry and } t < 2000 \text{ AD} \\ \text{or } x \text{ is a nightshade berry and } t \geq 2000 \text{ AD.}$$

Thus Joe reasons inductively from:

All observed pawberries have been nutritious

to:

All pawberries are nutritious.

After 2000 AD Joe's chances of survival are presumably drastically reduced. But this is not because he fails to think in terms of natural kinds or because he does not carve nature at its joints. To see this consider the case of an individual, call him Bob, who is such that after 2000 AD strawberries are poisonous for him whereas nightshade berries are nutritious for him. Projecting in terms of 'strawberry' would not be conducive to his survival but projecting in terms of 'pawberry' would be conducive to his survival. It is not the point here to object that Bob must have been going through some physiological change if strawberries affect him so differently before 2000 AD than after. For while it is presumably true that relative to our standard set of physiological predicates Bob undergoes change at 2000 AD, this does not show that the kind strawberry is natural while the kind pawberry is not. After all, by Bob's set of grue predicates it is we who have undergone physiological change and he who has remained the same. For Bob, this explains why before 2000 A.D we find pawberries nutritious yet after 2000 AD we find pawberries poisonous.

We need predicates like 'strawberry' not to predict absolute change as it occurs in the world. Rather we need such predicates to predict change as it occurs *for us*. The argument offered, for instance, by Quine<sup>15</sup>, that our kinds must be natural because otherwise we would not be able to predict change and constancy in the world and hence

would not be able to survive in the world, misses the point that to survive we need only need predict change as it occurs for us. To accept that there really is absolute, objective change (that change from green to blue at 2000 AD is real objective change, while change from grue to bleen at 2000 AD is not) is to presume the very point under contention, namely, that there are natural kinds.

To put the point another way, that certain kinds are useful in predicting change as we experience it, does not show that those kinds are natural in themselves, but only that they are natural for particular agents. That our frames of reference, our predicate structures, help us get along in the world as we experience it does not show that our frames of reference, our predicate schemas, capture *the* structure of *the* world. Those who are realists about natural kinds and who blithely use the metaphor of cutting nature at its joints should pay more heed to the deep adage that "one man's meat is another man's poison". Those of us who accept that our notions of change and of kinds merely reflect the world *as we experience it* need not worry that our predicate structure does not capture *the* structure of *the* world. Only realists who retain the notion of *the* world complete with natural kinds, joints for theories to carve at, and absolute change, need spend their time in the, I believe, fruitless pursuit of explaining what is objectively wrong with grue-like predicates.

All this is not to say that those who reject the notions of natural kinds, nature's joints, and absolute change need not worry about the problem of induction. We may still ask whether the world as we experience it will be uniform with respect to our favored set of predicates rather than some set of grue-type predicates.<sup>16</sup> However, we will not have the additional question of whether the world in itself is basically uniform, nor will we have the question of whether the kinds that are natural to us really carve nature at its joints. We, unlike the realist, need not be moved by a sceptic who asks: Even if our theories are accurate accounts of the world as we experience it and as we will experience it, what, if any, reason do we have for believing that our theories are accurate of the experience independent world?<sup>17</sup>

#### CONCLUDING REMARKS

The uniformity of nature thesis and the thesis of physical supervenience/the primacy of physics are usually presented as strictly

ontological theses. Yet read as strictly ontological theses they must be regarded as false if not incoherent, save that one posits occult entities, such as properties or natural kinds, in order to explicate them. Further, even if we are willing to posit such entities, we will have no reason for believing the uniformity thesis or supervenience thesis save that we have reason for believing that our favored frames of reference, our favored predicate structures, pick out properties or natural kinds. The claim that our predicate structures are efficacious in helping us predict change as we experience it does not show that our predicate structures pick out natural kinds or carve nature at the joints.

All this, I believe, provides reason for accepting a Goodmanesque point of view: In itself the world is neither basically uniform nor physical, nor does it contain natural kinds or joints. Relative to particular frames of reference the world is uniform; physical features are primary; certain kinds are natural, and there are joints for our theories to carve at. Yet this tells us as much about the nature and limits of the frames of reference in question as it does about the nature and limits of the world. Indeed, outside of any frame of reference the world has neither nature nor limits.<sup>18</sup>

## NOTES

<sup>1</sup> Cf. N. Goodman: 1978, *Fact, Fiction, and Forecast*, third edition, Harvester Press, Sussex, (especially pp. 72–81).

<sup>2</sup> Throughout the following I shall use 'grue' and 'bleen' consonant with the following definitions;

$$x \text{ is grue at time } t = df. (x \text{ is green and } t < 2000 \text{ AD}) \text{ or } (x \text{ is blue and } t \geq 2000 \text{ AD}).$$

and

$$x \text{ is bleen at time } t = df. (x \text{ is blue and } t < 2000 \text{ AD}) \text{ or } (x \text{ is green and } t \geq 2000 \text{ AD}).$$

By saying of an object that it is green/grue/bleen it is here usually meant that at every time  $t$  during the object's existence the object in question is wholly green/grue/bleen.

<sup>3</sup> D. Hume: 1984, *An Enquiry Concerning Human Understanding*, Oxford University Press, Oxford, p. 37.

<sup>4</sup> D. Hume: 1962, 'An Abstract of a Treatise of Human Nature' in A. Flew (ed.), *Hume on Human Nature*, Collier, New York, p. 293.

<sup>5</sup> J. S. Mill: 1887, *A System of Logic*, 8th ed., Harper and Brothers, New York, p. 224.

<sup>6</sup> It would be facile to claim that this argument does not work if we distinguish between actual predicates and merely constructable predicates. For while (R3) may be true

where we interpret 'by and large' to mean 'with respect to our actual English predicates', under this interpretation (R3) is not a strictly ontological thesis. It would not be asserting that nature in itself is uniform, but that nature relative to a particular frame of reference is uniform.

<sup>7</sup> cf. W. Salmon: 'Russell on Scientific Inference or Will the Real Deductivist Please Stand Up?', in G. Nakhikian (ed.), *Bertrand Russell's Philosophy*, Duckworth, London, p. 121.

<sup>8</sup> Presumably this claim is only intended as part of an explanation of why standard predicates for so-called secondary qualities (e.g., green) are appropriate for use in inductive inferences while their grue-like counterparts are not so appropriate. After all it is patently clear that there are many projectible predicates (e.g., 'is negatively charged') that are not ostensibly learnable.

<sup>9</sup> It is of course futile to object here that 'grue' is only ostensibly learnable for individuals who undergo certain physiological changes and that hence it is not a genuine ostensibly learnable predicate. Besides questioning the inference involved in this argument we should also note that its premise presumes a notion of objective physiological change which is the very type of notion that is here being put into question – relative to certain grue-like physiological predicates an individual for whom grue is ostensibly learnable undergoes no major physiological changes.

<sup>10</sup> Arguments for this claim are ably presented by Nelson Goodman (1970) in his paper 'Seven Strictures on Similarity' in L. Foster and J. Swanson (eds.), *Experience and Theory*, Duckworth, London.

<sup>11</sup> While this is a traditional formulation of the supervenience thesis, presumably any sophisticated advocate of the supervenience thesis would want to replace this talk of atom-for-atom identical worlds with talk of two worlds with the same physical histories and governed by the same physical laws.

<sup>12</sup> T. Horgan: 1984, 'Supervenience and Cosmic Hermeneutics', *Southern Journal of Philosophy* 22, 19–38, cf. p. 20.

<sup>13</sup> W. V. O. Quine: 1981, *Theories and Things*, Harvard University Press, Cambridge, p. 98.

<sup>14</sup> W. V. O. Quine: 1969, *Ontological Relativity and Other Essays*, Columbia University Press, New York, p. 126.

<sup>15</sup> Cf. Quine, *Ontological Relativity and Other Essays*.

<sup>16</sup> Perhaps if we are willing to continue in this implicit Kantian frame we might seek to answer the inductive sceptic by claiming that the world as we experience it is, by and large, uniform with respect to our favored set of predicates because that is how we construct it. Such uniformities are a pre-condition for there being any world as we experience it.

<sup>17</sup> This and the following section have been much improved as a result of critical discussions with Robert Shaver.

<sup>18</sup> Thanks are due to Professors Camp, Hempel and Salmon, and, especially to Rob Shaver for comments on earlier drafts. Aside from this remark my enormous and obvious debts to the work of Nelson Goodman will go without saying.

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