SCIENTIFIC LAWS AND NECESSITY

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ABSTRACT

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By

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The failure of regularity theorists, Hume's descendants in recent philosophical literature, to formulate a non-necessity view of law statements in a first-order extensional language has led us to investigate the possibility of construing the law statements of science as contingent intensional metalinguistic statements which have nomic necessity. In our metalinguistic, necessity theory of laws, the laws of science are quasi-legislative reports which impute that certain true, first-order, non-strict, universal statements on the object level of language reporting past, empirical conjunctions of properties or events are to be considered as determinations (complete or partial) of a given property or event. When a property or event is determined by another property, event, or set of properties and events, the latter have been imputed by the scientific community as identity marks of the former. Law statements which legislate a necessary connection between properties and events are themselves, qua laws, contingent. However, law statements may, at times, become necessary when they function within scientific work as a priori statements. There are also lawful statements, non-vacuously deducible from intensionally contingent law statements, which are analytic and therefore necessary.

Nonetheless we have not concluded, as other writers have concluded, that a priori law statements and/or analytic lawful statements are non-empirical unfalsifiable or self evident truths. Rather we have concluded from an extensive investigation of the notions of "analyticity," "a prioricity," "necessity," "presuppositions," and our reconstructions thereof that, among other things, all presuppositions are only relatively necessary. As such, they can be falsified if the true statements entailing them become falsified. In fact we propose a relative notion of necessity which characterizes all the uses of the term "necessity" that have found wide currency in modern philosophical literature. In our view, this relative necessity is the necessity of both a priori statements (identified prematurely by Kant as necessary presuppositions of any experience whatsoever) and analytic statements.

Despite the influential view of Willard Van Orman Quine that the analytic-synthetic distinction should be abandoned rather than reconciled with the fact that sentences change their degree of falsifiability over time, we have also formulated a theory of meaning and analyticity in which non-enduring, particular statements are analytic or synthetic on a given occasion. Analytic statements are thus transient, necessary relative to the definition statements which entail them, and falsifiable when these definitions are changed. Analytic statements are also empirical when the terms within them refer to things in the empirical world.

We have concluded, therefore, that law statements are intensional, contingent metalinguistic statements about the empirical world

which legislate that members of the scientific community as well as those who follow their work should consider certain relationships between properties and events as necessary relationships which are to hold until further notice.

This explication of nomic necessity has required a radical reassessment of several classical philosophical distinctions and theories. However, it seems fitting that philosophy of science follow the example of science by considering a shift from old ways of thinking to new in the face of a persistent anomaly--the existence of apparently nomically necessary statements which are nevertheless about the empirical world.

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CHAPTER I

THE PROBLEM OF LAW STATEMENTS

Two Positions

For several decades, philosophers of science have discussed the logical status of scientific laws. But there has been little agreement among their answers to the following two questions:

1. What is the complete logical form of laws of science or lawlike statements?
2. What are the differences between them and other kinds of statements?[1]

Two major positions have emerged from the controversy generated by the above questions. One position, commonly called the regularity view, represents empiricist thought on the subject of laws. Its origins can be found in the writings of David Hume, and it has been the dominant position of twentieth century thinking on this subject until recent years. The second position is a rationalist position, which, for want of a better name, we shall call the necessity view. Early writers of this century such as A. C. Ewing and Brand Blanchard proposed forms of

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[1]R. S. Walters, "Laws of Science and Lawlike Statements," Encyclopedia of Philosophy, 1st ed., IV, 414.

the necessity view in opposition to Hume's philosophical descendants, but their view was met with little sympathy. However, the dominancy of the regularity view over the years has led to a thorough philosophical scrutiny of it; and now its drawbacks are considered so numerous and serious that philosophers are attempting to formulate an acceptable necessity view once again. As Nicholas Rescher notes, present day writers merely disagree as to how the necessity which is an aspect of scientific law statements should be characterized.[1]

The Regularity Theory and Objections

The regularity view of lawlike statements[2]

There are numerous statements in the literature which describe the basic tenet of what we (as well as others) call the regularity view of law statements. Consider the following assertions by David Hume, A. J. Ayer, and Hans Riechenbach, respectively:

> Similar objects are always conjoined with similar. Of this we have experience. Suitably to this experience, therefore, we may define a cause to be an object, followed by another, and where all the objects, similar to the first, are followed by objects similar to the second.[3]

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[1]Nicholas Rescher, Scientific Explanation, p. 103.

[2]We shall refer typically to law statements, for every law statement is at least lawlike; whereas, not every lawlike statement is a law statement.

[3]Essential Works of David Hume, ed., by Ralph Cohen, p. 100. This shall be cited henceforth as Hume, Enquiry.

> . . . a proposition expresses a law of nature when it states what invariably happens. Thus, to say that unsupported bodies fall, assuming this to be a law of nature, is to say that there is not, never has been and never will be a body that being unsupported does not fall.[1]

> . . . by a causal law[2] the scientist understands a relation of the form if - then,[3] with the addition that the same relation holds at all times. . . .[4]

We have called the common content of the above passages--that laws describe regular sequences of events--the basic tenet of the regularity view, because this initial view has been expanded upon by various regularity theorists in attempts to defend their thesis from sundry objections. In order that we may unravel the full formulation of the regularity theory as it now stands in philosophical discussions, we shall consider the objections which have been raised against the initial tenet above and the evolution of the regularity view which these objections have initiated.

Objections to the regularity view of the law statements of science

The objections which have been raised in opposition to the basic tenet of the regularity view are numerous and sometimes involved.

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[1]A. J. Ayer, The Concept of a Person, p. 220.

[2]Various writers discuss the general problem of law statements in terms of only causal law since causality was the subject of Hume's traditional discussion.

[3]No clue is given as to whether this "if-then" allows for just indicative conditionals or subjunctive as well.

[4]Hans Reichenbach, The Rise of Scientific Philosophy, p. 157.

We shall consider five major objections at some length. They are the following:

1. the vacuousness objection,
2. the hypothetical cases objection,
3. the mere coincidence objection,
4. the accidental generalization objection,
5. the subjunctive conditional objection.

The vacuousness objection

It is important to note that, in the context of this first objection as well as in that of all the others, law statements such as "All S is P" are interpreted by regularity theorists as equivalent to general implications (material implications) of the form (x) ($Sx \supset Px$). Indeed this interpretation is the prime target of many of the objections advanced against the regularity view generally. The objection of vacuousness is levelled precisely against this material implication interpretation of true lawlike generalizations, since such material implications are true whenever their antecedent is false. It thus turns out that "All unicorns have a single horn" is a universal truth which may be considered a law via the regularity view.[1] If it is suggested, however, that lawlike statements be written as equivalent to "$(x)\ (Sx \supset Px) \cdot (\exists x)\ Sx$"; the vacuosness objection can be circumvented. Yet as Ayer notes, this mode of circumvention is undesirable in that "there are certain cases in which we do wish

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[1]Ayer, op. cit., pp. 222-223.

to take general implications as expressing laws of nature, even though their antecedents are not satisfied."[1] We often find laws in science which consist of terms which denote ideal entities. An example is Newton's law that a body on which no forces are acting continues at rest or in uniform motion along a straight line.[2] If in fact there are no bodies free of forces acting upon them, this law might be said to be vacuously true.[3] One might take the option of viewing such a law as a statement of possibility such that, if there were any bodies on which no forces were acting, then they would behave according to Newton's law. However, it is agreed by some regularity theorists that the positing of a possibility-interpretation for such a law is incompatible with the basic-tenet-interpretation of laws proposed by the regularity theory.[4] It is precisely because the regularity theory excludes the introduction of modal terms such as 'possibility' in characterizations of lawlike statements that it has met with so many objections; another of which is the hypothetical cases objection.

The hypothetical cases objection

As we have just seen, considerations of the initial and somewhat non-critical vacuosness objection have already involved defendants of the regularity view in a discussion of possibilities or hypothetical

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[1] Ibid., p. 223.

[2] Ibid.

[3] Ibid.

[4] Ibid., p. 227.

cases with respect to the analysis of lawlike statements. But the raising of the possibility of possibility talk, brings the regularity theorist into very dangerous territory where objections abound. As Ayer rightly notes:

> What we want to say is that if there were any bodies on which no forces were acting then they would behave in the way that Newton's law prescribes. But we have not made any provision for such hypothetical cases : according to the view which we are now examining, statements of law cover only what is actual, not what is merely possible.[1]

William Kneale, who is not a regularity theorist, focuses upon the hypothetical cases objection in much the same way:

> If on the strength of our records we suggest that there is a law of nature that all dodos have a white feather in their tails, we say in effect that, if there had been any dodos other than those mentioned in our records, they too would have had a white feather in their tails. But an unfulfilled hypothetical proposition of this kind cannot be derived from a proposition which is concerned only with the actual. A contingent universal proposition can always be expressed in the form "There are in fact no α things which are not β," and from such a proposition it is impossible to deduce that if something which was not in fact α had been α it would also have been β.[2]

It is clear from the above comments that no one who adopts the basic tenet of the regularity theory; as expressed by Hume, Ayer, and Reichenbach; can speak about law statements pertaining to hypothetical cases. In view of this, it would seem a wise course for such theorists to avoid the introduction of possibility talk into their discussion. C. D. Broad offered a solution to the vacuosness objection which was designed exactly to follow such a course, i.e., to avoid direct

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[1] Ibid., p. 223.

[2] William Kneale, Probability and Induction, p. 75.

confrontation with the problem of possibilities or hypothetical cases. In his article "Mechanical and Teleogical Causation," Broad proposed that seemingly vacuous laws such as Newton's force free body law be thought of as referring not to hypothetical objects or events but "only to the hypothetical consequences of instantial laws."[1] In this manner, Newton's law is construed as implying that there are instantial laws about non-force free bodies which, together with the proposition that there are force free bodies, entails the conclusion that such force free bodies continue at rest or in uniform motion along a straight line. The conclusion, existentially interpreted, will be false; but it will follow as a necessary consequence of the premise and law since the premise will also be false. Ayer is dubious about the merits of this clever solution; but even if the vacuosity objection is successfully thwarted without resort to possible cases, there are other non-vacuous laws which seem to involve an analysis of lawlike statements in a discussion of hypothetical cases. These are functional laws such as 'x = Fy,' where "the range of the variable y covers all possible values of the quantity in question."[2] A law such as this cannot be regarded as just the compendious assertion, as Ayer says, of all its actual instances since the number of instances in the rage of y which are not actual is infinite. Ayer refers to the law which relates the volume and temperature of a gas under a given pressure as an example which would have the form 'x = Fy.' Ayer writes:

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[1]Cited by Ayer, op. cit., p. 223.

[2]Ibid., p. 224.

> But now it is not to be supposed that all these values are actually to be found in nature. Even if the number of different temperatures which specimens of gases have or will acquire is infinite, there still must be an infinite number missing. . . . The formulation of the law in no way indicates which the actual instances are. . . . As asserting with regard to any given value n of y that either n is not realized or that there is a corresponding value m of x? This is the most plausible alternative, but it makes the law trivial for all the values of y which happen not to be realized. It is hard to escape the conclusion that what we really mean to assert when we formulate such a law is that there is a corresponding value of x to every possible value of y.[1]

It appears that our consideration of functional laws brings us squarely back again to discussion of possibilities. These laws aside, however, there are still other important reasons why the regularity view always seems vulnerable to the hypothetical case objection one way or another. The other important reasons are in fact objections three, four and five.

The mere coincidence objection

The mere coincidence objection arises most easily in connection with causal type law statements. There are alterable cases of regular sequence which are not regarded by anyone, except the superstitious perhaps, as cases of regular causal sequence. It may happen that walking under a ladder is always followed by bad luck. But surely this regular invariable sequence or constant conjunction (as Hume might say) is not considered a causal law.

The mere coincidence objection can be easily avoided if qualification is added to typical statements of the regularity view such

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[1] Ibid., p. 225.

that the regular sequences referred to are those that occur during the justifying stage of a law's biography. A regularity theorist could then rejoin to the mere coincidence objector that lawlike statements are not compendious assertions of any old regular invariable sequences of events but of those invariable sequences of events that occur in connection with experimentation. This selectivity of constant conjunctions might eliminate mere coincidences from the stock of universal assertions of actual fact which are considered lawlike. Though such an amendment is easily added to formulations of the regularity theory, it is a mistake to think that such an amendment is unnecessary--to think the automatic status of any invariable sequence of events one of law, an absurd strawman of the regularity view. Quite the contrary, all three of our representative regularity theorists: Hume, Ayer, and Reichenbach, are in need of such a clarifying amendment in their discussions. Hume's treatment of cause is somewhat ambiguous, but commentators are generally agreed that he speaks of constant conjunctions with reference to the discovery of causes.[1] While constant conjunctions may lead to the confirmation of a causal law, they do not, in and of themselves, lead to the discovery of a cause as opposed to the discovery of a mere coincidence.

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[1]Hume's discussion is ambiguous in that he may mean by the phrase "discovery of the cause" the discovery of a causal law which is actually the confirmation of a statement that such and such is the cause of such and such.

We find it difficult to suppose that Ayer would deny the need for such an amendment to certain of his words which are misleading in this regard:

> On the view which we have now to consider, all that is required for there to be laws in nature is the existence of de facto constancies. In the most straightforward case, the constancy consists in the fact that events, or properties, or processes of different types are invariably conjoined with one another.[1]

So too, the formulation of the regularity view of Hans Reichenbach is decidedly in need of such a clarifying amendment. Reichenbach devotes a chapter of his book The Rise of Scientific Philosophy to discussion of causal law statements in terms of the regularity theory. In this chapter, "The Laws of Nature," Reichenbach curiously leaves out all reference to experimentation as a discovery tool in the search for law-like regularities and claims that repetition is all that distinguishes the causal law from a mere coincidence. Reichenbach claims that Hume's view is generally accepted now (1951, the time of his writing) by the scientist:

> To say that the electric current causes a deflection of the magnetic needle means that whenever there is an electric current there is always a deflection of the magnetic needle.[2]

Reichenbach maintains further that when we refuse to accept one event as the cause of another, it is due to the fact that the observed coincidence, the shaking of a theatre when an explosion appears on the screen, occurred only once. Since it only happened once, it is known

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[1]Ayer, op. cit., p. 222.

[2]Hans Reichenbach, op. cit., pp. 157-158.

to be a mere coincidence but if the theatre would[1] always shake when an explosion is visible on the screen, then there would be a causal relationship between the explosion on the screen and the shaking of the theatre. Though it can hardly be Reichenbach's intent, his description seems to reduce the discovery of causal connections to the act of counting rather than to the act of experimenting followed perhaps by counting.[2] We say followed perhaps by counting, for it is generally accepted that there are crucial experiments which are undertaken in order to confirm a causal law, and in these cases, one never counts past one. But this last consideration brings us beyond the mere coincidence objection which may be handled by the proposed amendment to another objection which we might call the repetition objection.

Obviously law statements based on crucial experiments cannot be regarded as the economical compendia of actual invariable sequences of events or as a shorthand denoter of regularities. However, Arthur Pap raises a further interesting objection in this regard.

Arthur Pap notes that in order to carry out his program of collecting repetitive sequences of similar events, Reichenbach must decide at each occurrence of the repeating sequence whether a particular antecedent event (c) and a particular consequent event (e), belong to classes of events C and E, such that every member of C is followed by some member of E. Unless the class C is specified, the regularity view has no clear meaning in view of the plurality of causes. If one narrows

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[1]Hans Reichenbach, op. cit., pp. 157-185.

[2]Reichenbach does not explain his use of "would." Elsewhere in his book on pp. 97 and 175 he does mention experimentation in passing.

the class of antecedents enough to ensure that each instance is relevantly similar to the preceding instances, he is bringing the regularity theory away from its basis of recurring similar sequences more and more to a unit class or one specific sequence.[1] He explains:

> By doing this the credibility of the generalization will reach a maximum if A is narrowed down to a unit-class comprising as its only member the causal antecedent under discussion!

The problem revolves around the regularity view phrase, "exactly similar circumstances," which one sometimes finds in regularity view literature. Pap's criticism is that the only antecedent exactly similar to the antecedent A is the antecedent A itself. In light of this criticism, it is the singular occurrence of an event sequence which should indicate with the most certainty that the sequence was a causal one between the antecedent and the consequent.

The accidental generalization objection

The accidental generalization objection is similar to but not quite the same as the mere coincidence objection. Ayer, among many others, notes that the accidental generalization that all the cigarettes now in his pocket are made of Virginia tobacco and the lawlike generalization that the planets of our solar system move in elliptical orbits are both formulated as '$(x)\ \Phi\ x \supset \Psi\ x$' on the regularity view. The first generalization, while not a mere coincidence, (Ayer likes Virginia tobacco) is, nevertheless, merely a generalization of fact.

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[1]Arthur Pap, "Regularity Theory of Causation," Journal of Philosophy, XLIX (1952), 659.

However, the material implication formula which expresses this generalization of fact also expresses the generalization of law about planets. In search for a formal difference between the two generalizations Ayer says:

> . . . there seems to be a sense in which the generality of what we are calling generalizations of fact is less complete. They seem to be restricted in a way that generalizations of law are not. Either they involve some spatio-temporal restriction, as in the example of the cigarette case, or they refer to particular individuals.[1]

These last words of Ayer suggest a proposal, the restrictedness solution, for distinguishing generalizations of fact from lawlike generalizations. The restrictedness solution provides that generalizations of fact are simply conjunctions of particular statements which definitely refer to individuals. In this sense, accidental generalizations may be considered restricted while lawlike statements are not. However, such a proposal will not solve the problem posed by the accidental generalization objection for there are accidental generalizations which do not refer definitely to individuals. An example of this latter kind of sentence is "All the pears in this basket are ripe" or "All members of the Greenbury School board for 1964 are bald."[2] As Hempel indicates, the sentences just mentioned as examples of non-lawlike statements do not refer definitely to any individuals and therefore are of essentially generalized form just as one might want to say lawlike statements are those which are of essentially generalized form. It is also the case

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[1]Ayer, op. cit., p. 226.

[2]Carl Hempel, Aspects of Scientific Explanation, p. 339.

that accidental generalizations can always be written so as to exclude any reference to specific places or times;[1] and, conversely, it is possible that lawlike statements can be expressed so as to contain reference to particular individuals or to specific places and times.[2] To eliminate accidental generalizations, we would have to stipulate that no general sentences are lawlike which happen to have only a finite number of instances. Restrictedness thus is now identified with a finite extension of the terms in an accidental generalization. However, this qualification cuts too deeply again for it excludes some lawlike statements of science which are concerned with a finite number of objects such as some laws derivable from those of celestial mechanics.[3] The tack of proposing a restrictedness difference between accidental generalizations and lawlike statements seems doomed unless one adopts yet another construal of restrictedness in the manner of Popper. According to his interpretation of restrictedness, a universal statement is restricted, not merely because its extension is finite, but because its extension is closed. As Walters explains:

> The normal kind of restriction in universal statements is restriction to a specified finite space-time region; with certain other assumptions it is sufficient to say that the class denoted is closed, although it may not entail any particular number.[4]

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[1]Ayer, op. cit., p. 226.

[2]Nelson Goodman, Fact Fiction and Forecast, p. 78.

[3]Hempel, op. cit., p. 340.

[4]Walters, op. cit., p. 413.

K. Popper in his article "A Note On Natural Laws and So-Called 'Contrary-To-Fact Conditionals'"[1] criticizes an argument advanced by critics of the regularity view, particularly critics of the view's construal of law statements as material conditionals. Popper summarizes the argument he considers faulty as:

> Natural laws may be written simply as universal statements, such as "All planets move in ellipses." But if we formulate them in this form, then we do not give full expression to what is meant--we do not fully cover our use of natural laws. If we wish to give some expression to their logical peculiarities, we should rather write something like "All planets must move in ellipses" or "Planets necessarily move in ellipses" in any case, we should indicate that natural laws are logically stronger than ordinary universal statements; an ordinary universal statement always follows from the natural law, and it can replace the natural law for many purposes, but it is not equal in logical strength to the law and should be distinguished from it.[2]

Popper notes that the above argument is supported by the claim that subjective conditionals follow from law statements, but that "corresponding subjunctive conditionals do not follow from such universal statements which do not express natural laws."[3] In answer to this argument, Popper maintains that the fact that subjunctive conditional statements follow from law statements but corresponding ones do not follow from accidental generalizations is not due to a difference in the logical form of these two types of statements but rather to a vacillation concerning the extension of their respective terms. Using the example "All men are mortal," written as (3.0) "All A's are B's,"

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[1]Karl Popper, "A Note on Natural Laws and So-Called 'Contrary-To-Fact Conditionals,'" Mind, LVIII (1949), 62-66.

[2]Ibid., p. 62.

[3]Ibid.

Popper claims we can always deduce the indicative conditional "If x is one of the A's then x is one of the B's" and also the subjunctive conditional (3.1) "If x were one of the A's then x would be one of the B's." But we can never deduce (3.2) "If x were added to the A's then it would be one of the B's." By "added to," Popper claims to mean some operation corresponding to the class-addition {a} + A. Popper using another example-universal "All my friends speak French" claims that we cannot deduce "If Confucius were a friend of mine, then he would speak French" because 'this latter statement means: "If Confucius were added to the people I call my friends, then he would speak French."'[1] Popper goes on to say:

> Similarly, we can now see that, from "All planets move in ellipses," we can of course deduce "If the moon were a planet it would move in an ellipse." (For this means: "If the moon were one of the planets, or belonging to the class of planets, then. . . ." But we cannot deduce "If we extend the class of things covered by the name "planet" so as to include the moon, then she would move in an ellipse [sic]. . . .[2] We thus find that we make a mistake because we neglected the extensional or class-aspect of our terms; we did not see that in the case of type (3.1), we kept our terms extensionally constant while in the case of type (3.2) we assumed that the extension of our terms may vary (which is, of course, impermissible in extensional logic).[3]

It appears that the main thrust of Popper's answer to critics of the regularity view is that subjunctive conditionals of a certain sort are deducible from accidental generalizations just as subjunctive

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[1] Ibid., p. 64.

[2] Popper may be guilty of petitio principi in these lines.

[3] Ibid.

conditionals of this same sort are deducible from law statements. However, this is not the point at issue. As Ayer says:

> Thus one cannot say that generalizations of fact do not entail subjunctive conditionals, for they may very well contain dispositional predicates: indeed they are more likely to do so than not: but they will not entail the subjunctive conditionals which are entailed by the corresponding statements of law.[1]

The subjunctive conditional objection

The argument Popper intends to defeat can still be raised if one claims, as its advocates do, that there are, nevertheless, subjunctive conditionals which assert that the moon would move in an elliptical orbit not only if it were numerically identical with one of the planets, but also if it belonged to the class of planets intensionally.[2] Such subjunctives are not deducible from accidental generalizations simply because the intensional aspects of the terms in such accidental generalizations are not considered while their extensional aspects are. When I say "All my friends speak French" I can enumerate who my friends are but perhaps not what makes each of them my friend. There is no clue in such a statement as to whether or not speaking French is a requisite property that any x must have in order to be a friend of mine. On the other hand, this is precisely what is indicated by a natural law as Popper himself recognizes:

> Accordingly, the phrase "If x were an A . . ." can be interpreted (1) if "A" is a term in a strictly universal law, to mean "If x has the property A . . ." but it can also be interpreted in the way described under (2); and

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[1]Ayer, op. cit., p. 229.

[2]"Intensionally" here means defined according to property.

> (2), if "A" is a term in an "accidental" or numerically universal statement, it must be interpreted "If x is identical with one of the elements of A."[1]

Popper concludes:

> . . . there is no need to admit that the two types of statements are different in import or in logical form, except in the structure of their terms which, in the case of natural laws, may be called "strictly universal (or qualitative or perhaps intensional) terms," and, in case of numerically universal statements," numerically universal (or enumerative or individual or singular or particular or perhaps extensional) terms.[2]

Though Popper chooses to regard the difference between restricted and unrestricted universals as not one of logical form, but as one of the structure of their terms; his opponents might well fail to see how the differing structure of terms is not in some sense a difference in logical form.

Conclusion

The characterization of law statements in science as unrestricted universals seems to introduce possibility talk into the discussion and to thereby debilitate once again the regularity theory characterization of laws. As Ayer notes:

> If generalizations of law do cover possible as well as actual instances, their range must be infinite; for while the number of objects which do throughout the course of time possess a certain property may be finite, there can be no limit to the number of objects which might possibly possess it: for once we enter the realm of possibility we are not confined even to such objects as actually exist. And this shows how far removed these generalizations are

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[1]Popper, op. cit., p. 65.

[2]Ibid.

> from being conjunctions: not simply because their range is infinite which might be true even if it were confined to actual instances but because there is something absurd about trying to list all the possible instances.[1]

Popper says as much himself elsewhere in his article "A Note on Natural Laws," for he claims that a strict universal "can never be defined by enumeration of the elements which belong to them."[2] If laws are considered as strict (unrestricted) universals, it is difficult to see how they can be subject to the basic tenet of the regularity view. However, it may be the case that advocates of the regularity theory would accept the qualification that laws of science are unrestricted universals, as Popper seems to, but not that laws are logically necessary. Such an advocate might argue, as Walters suggests, that statements about possible instances stand in the same relation to unrestricted universal law statements as do statements about actual unobserved instances. Kneale claims that regularity theorists who take this route consider laws as expressive of two conditions: "Either it is a law of nature that every A thing is B, or there has been or will be somewhere at some time an A thing that was not or is not B."[3] In short, they are committed to the view that every natural possibility, i.e., every state of affairs not excluded by a law of nature, must be realized somewhere at sometime.[4] Indeed to avoid such a commitment Popper made

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[1]Ayer, op. cit., p. 227.

[2]Popper, op. cit., p. 65.

[3]William Kneale, "Universality and Necessity," British Journal for the Philosophy of Science, XII (1960-1962), 98.

[4]Ibid.

the following suggestion in the appendix to his Logic of Scientific Discovery of 1959. Kneale quotes from Popper:

> Popper concedes that something more must be done to distinguish laws from accidental generalities and produces the following definition of natural necessity:
>
> A statement may be said to be naturally or physically necessary if, and only if, it is deducible from a statement function which is satisfied in all worlds that differ from our world, if at all, only with respect to initial conditions.[1]

Supposedly natural necessity is different than logical necessity in that the former avoids talk of possibility while the latter does not. However, as Kneale points out:

> For to say that a statement function is satisfied in all worlds that differ from the actual world, if at all, only with respect to initial conditions is to say in effect that it holds for all possible worlds that contain instances of the same attributes and relations as are exemplified in the actual world and of these only; and what holds for all possible worlds is obviously necessary.[2]

Apparently the regularity theorist is inevitably forced to introduce intensional aspects such as necessity into his analysis of law statements. From considerations of the above objections to the regularity theory and their attempted answers, it is easy to see that the main intent of such a view is to avoid characterizing the law statements of science as logically necessary. The chief reason for avoiding this identification is the belief that the laws of science are a posteriori or empirical statements which are always subject to

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[1] Ibid.

[2] Ibid.

refutation. Laws are deemed contingent and based on observation (directly or indirectly). Since contingency and necessity are traditionally thought of as contradictory concepts, laws if contingent cannot be necessary. As prelude to our analysis of the law statements of science, we will briefly consider some necessity characterizations of law statements and the objections that they have elicited. Among those objections, we shall no doubt find the beliefs mentioned above which have motivated expositions of the regularity view.

Necessity Views and Objections

Necessity view of Ewing

Unlike the regularity theorists, A. C. Ewing claims that "besides regularity we must introduce the notion of determination and necessity" into discussion of causality[1] such that "the effect not merely does but must follow the cause, and this depends on the specific nature of the cause as such."[2] He claims that this necessity is analogous to that "underlying valid inference." In elaboration, Ewing says:

> Where a conclusion follows logically from a premise, this must be because the fact expressed by the premise is so connected with the fact expressed by the conclusion that the former could not possibly occur without the latter occurring. This is logical necessity. The theory according to which the connection between cause and effect is the same as or very like that of logical necessity may be called the rationalist or the entailment theory of causation.[3]

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[1]A. C. Ewing, Fundamental Questions of Philosophy, p. 162.

[2]Ewing directs his discussion toward Humean thought and he therefore speaks about causality instead of law statements.

[3]Ibid., p. 162.

The above passage, though vague, is the most detailed explanation of the entailment theory that Ewing gives. He maintains in his writings on the subject that causation is not just entailment,[1] and he recognizes, as well, that "entailment" is a word more properly used in reference to a relationship between sentences yet he says "we can after all make legitimate inferences from cause to effect. How could we do this if the cause did not in a very important sense entail the effect? The relation need not be exactly the same as the entailment which occurs in formal logical reasoning, but it must at least be analogous to it in the important respect that it justifies the conclusion."[2] The precise characterization of this analogous entailment is left unformulated. Ewing at best proposes only the germ of an entailment theory about causation, and one which promises confusions between claims of necessary connection in nature and necessary connections between statements which describe nature. Ewing himself was aware of the likelihood of such confusion, for, as he emphasized:

> It does not indeed follow that the relation of causality is simply identical with or a species of the relation of logical entailment, indeed this seems to me certainly false; but it does follow that this is one of the relations which together make up the complex relation of causality.[3]

Another necessity theorist N. Maxwell endeavors to give a more explicit account of this entailment by saying:

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[1] Ibid., p. 163.

[2] Ibid.

[3] A. C. Ewing, Idealism: A Critical Survey, p. 168.

> At the time of the occurrence of event E_1, there exists that which can only be completely described by propositions P_1 [sic], which logically imply propositions P_2 [sic], that state that E_2 occurs subsequently. This says that there exists a logically necessary connection between E_1, and E_2. The logical connection is between propositions not events [sic].[1]

This last passage betrays the confusion Ewing warns against. Maxwell's use of "the" and "a" logical connection implies, as his passage suggests, but one logical connection--between propositions not between events. But he arbitrarily asserts mid-paragraph that the logical connection which he believes to hold between propositions holds also between events. Surely it does not seem that the same (numerical) connection can hold between two sets of relata at the same time.[2] A more compelling rationalist, or necessity, view is expressed by Mr. H. W. B. Joseph who speaks only about objects in nature and not about sentences describing those objects. However, the clarity and detail of his view permit easy translation into "sentence about object talk"; and Ayer raises objections to Joseph's theory on the level of talk about sentences.

The rationalist position of Joseph

In his book The Foundations of Empirical Knowledge A. J. Ayer summarizes, in direct quotation, the view of Mr. H. W. B. Joseph which Ayer takes to be representative of the kind of view we are here proposing. He quotes from Joseph's An Introduction to Logic:

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[1]Nicholas Maxwell, "Can There Be Necessary Connections Between Successive Events?" British Journal for Philosophy of Science, XIX (1967), p. 2.

[2]This is the least that can be said by way of objection.

> . . . if a thing (a) under conditions (c) produces a change (x) in a subject (s), the way in which it acts must be regarded as a partial expression of what it is. It could only act differently if it were different. As long therefore as it is (a) and it stands related under conditions (c) to a subject that is (s), no other effect than x can be produced; and to say that the same thing acting on the same thing under the same conditions may yet produce a different effect is to say that a thing need not be what it is. . . . But this is in flat conflict with the Law of Identity. A thing, to be at all, must be something and can only be what it is. To assert a causal connexion between (a) and (x) implies that (a) acts as it does because it is what it is; because in fact it is (a). So long therefore as it is (a), it must act thus, and to assert that it may act otherwise on a subsequent occasion is to assert that what is (a) is something other than the (a) which it is declared to be.[1]

Ayer objects first that Joseph is treating all general propositions of law as if they were logically necessary. Hence, the evidence which was formerly taken to establish the existential proposition that this is an instance of A[2] will not be sufficient to establish it once the connotation of A is widened by making it logically necessary that every instance of A should, in the relevant conditions, be conjoined with an instance of X. Unless one has reason to believe that every instance of A is not logically but factually conjoined in conditions such as these with an instance of X, there can be no reason to believe that this really is an event of the kind A in the revised sense.

Ayer is misguided in that it does not appear to be Joseph's claim that the statements of law which are, in some not yet fully

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[1]A. J. Ayer, Foundations of Empirical Knowledge, p. 208.

[2]Note Ayer's change of 'a' in the quoted passage to 'A' as he talks not of a thing 'a' but of a predicate A.

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explained sense, definitional are logically necessary. Only further statements based upon these laws such as "if this is an instance of A, X must occur" are logically necessary; and we know instances of X to be instances of A on the basis of laws which contingently claim a connection between A and X. As Hospers writes:

> When we say, "Water must boil at 212°F, we do not have a statement which is necessary in and of itself, such as "A is either a rose or not a rose." Rather, the "must" is spoken only by way of logical inference from some statement of law in which boiling at 212°F is taken to be a defining characteristic of water.[1]

Ayer goes on to argue that if Joseph's argument is accepted it would not be possible for us, as it is at present, to abandon a "causal law without making a change in our usage of words."[2] It is more inconvenient, he claims, to be constantly altering the meaning of words than merely to discard a series of empirical hypotheses. Ayer continues that it would not be profitable to adopt the practice of making all causal expressions definitional unless we had very good reason to believe that the concepts that were yielded by these definitions would continue to be applicable to the empirical facts. But this is exactly the case, is it not, when we formulate not empirical hypotheses but laws? We do so only after very good inductive evidence and the weighing of pragmatic reasons. Perhaps by accident, Ayer uses the phrase "empirical hypotheses" interchangeably with "causal laws" when in fact the two are not interchangeable. Empirical hypotheses are

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[1]John Hospers, An Introduction to Philosophical Analysis, p. 282. We shall present a theory re: this necessity in Chapter III.

[2]A. J. Ayer, The Foundations, p. 202.

not definitional and can always be discarded with no change in the meaning of their predicates, even when their predicates are used in new hypotheses. On the other hand, there are terms such as "mass" which occasionally do undergo a change in meaning as new laws replace old ones in which this term occurs.

While these last statements of Joseph and Hospers indicate a plausible avenue of analysis, there is still need for a detailed explicit necessity theory which will characterize law statements and explain nomic necessity. But before we propose the details of our necessity theory, it will be well first to examine some general objections to necessity theories which have been raised by empiricists in the past. As the name of our theory suggests, we intend to formulate a characterization of law statements which analyzes their necessary aspect in a manner consistent with the fundamental empiricist belief that the law statements of science express contingent non-self-evident truths.

Empiricist objections to rationalist necessity theories

The following are some of the main empiricist criticisms of rationalist necessity views such as that of A. C. Ewing:

1. We cannot prove any such law (causal) a priori but only establish it as an empirical generalization.
2. In cases of a priori reasoning we attain certainty, but in cases of causal reasoning only probability.
3. We cannot prove any logical connection between cause and effect . . . as regards the physical world at least.[1]

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[1]Ewing, Fundamental, pp. 164-166.

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Arguments in support of the three objections above can be found in the writing of David Hume, the father of modern empiricism. Objection (1) is supported by arguments in Hume's writing which we shall refer to as Hume's a priori argument and his conceivability argument. Objection (2) is supported by Hume's induction argument, as we shall call it, and objection (3) by his impressions argument. We shall now present the details of these four arguments and examine each critically. During the course of our examination we shall seek to establish the following claims concerning Hume's arguments:

Re: the a priori argument.

a. The cause of an effect and the effect of a cause can, in some cases, be known independently of any observation of their constant conjunction or of even one single conjunction as one might accomplish in the case of a totally novel object. We shall call this our novel object objection.
b. The cause of an effect and the effect of a cause can, in some cases, be known or discovered via the observation of just a single conjunction of that cause and effect. We shall call this the single case objection.
c. There are constant conjunctions of events which are not directly pronounced to be causal sequences. We shall call this our mere correlation objection.
d. There are causal laws which are not confirmed by the observance of the constant conjunction of the cause and effect to which they pertain but by one single crucial conjunction. This we shall call the crucial experiment objection.

Re: the conceivability argument:

a. Hume's conceivability criterion is psychological. Appropriately we shall call this our psychology objection.
b. If matters of fact are known via empirical observation, hypothetical empirical claims cannot be based on the use of a non-empirical criterion such as the conceivability criterion. This we shall call our imaginary facts.

Re: Hume's induction argument:

a. Belief in the uniformity of nature is, in fact, not derived by inductive empirical observation but is presupposed. This is our presupposition objection.
b. The belief in the uniformity of nature may not be a probable belief if it is not based on empirical observation. This objection shall be discussed as the historical certainty status objection.
c. Hume suggests that in some cases of causal reasoning we attain certainty. He also talks of proofs about matters of fact. This is our certainty proof objection.

Re: Hume's impressions argument:

a. Hume's assertion that all simple ideas are directly derived from simple impressions is an unproved assumption. This will be our arbitrary assumption hypothesis.
b. There are those who claim that causal connections are known primitively by observation. We do not necessarily agree with this claim nor are we interested in talking about causal connections in nature. But for sake of full treatment, we shall discuss this causal perceptibility objection.

After discussion of the above rejoinders to Hume's four arguments: the a priori argument, the conceivability argument, the inductive argument and the impressions argument; we will begin reconstructions of the terms "analytic," "a priori," and "necessity." We will argue in Chapters III and IV not only that logical relations may hold between statements concerning matters of fact but that due to these logical relations, some empirical statements entailed by others may be known true with the necessity typical of deductive inference. We shall argue in Chapter V that the law statements of science, though contingent assertions about the empirical world, nevertheless give rise to corresponding definitional statements; and these definitional statements are much like axioms one might find in a mathematical axiomatic

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system. As such these factual definition statements[1] can entail other empirical statements with deductive certainty within a given scientific paradigm.[2]

Hume's Arguments and Rejoinders

The Humean view of causal connections

As we have seen earlier in our discussion of the regularity view, Hume implicitly reduced causal law statements to generalizations of fact when he gave the following definition of "cause" in the Enquiry Concerning Human Understanding:

> . . . we may define a cause to be an object followed by another and where all the objects, similar to the first are followed by objects similar to the second.[3]

It is this definition which gives the crux historically of the regularity view that laws express the constant conjunction of events. As we look about us, we notice that C is regularly followed by E and we say that C is the cause of E. But we notice only invariable sequences and we do not perceive any necessary connection between C and E such that the one should always follow the other.

Hume based his above claim on a thoroughly empiricist epistemological theory which today strikes us as exceedingly simplistic, but

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[1]In Chapter III we shall explain these quasi-reportive legislative statements in full.

[2]See The Structure of Scientific Revolutions by Thomas S. Kuhn for discussions of scientific paradigms.

[3]Hume, op. cit., p. 100.

let us closely examine each point of Hume's claim with regard to his definition of cause.

Hume's a priori argument

Hume first explains what he means by a priori by discussing two kinds of statements, i.e., those that express relations of ideas and those that express matters of fact. He says:

> All the objects of human reason or enquiry may naturally be divided into two kinds, to wit, Relations of Ideas and Matters of Fact . . . that the square of the hypothenuse is equal to the square of the two sides is a proposition, which expresses a relation between these figures. . . . Propositions of this kind are discoverable by the mere operation of thought without dependence on what is any where existent in the universe. . . . Matters of fact . . . are not ascertained in the same manner; nor is our evidence of their truth however great of a like nature with the foregoing. The contrary of every matter of fact is still possible; because it can never imply a contradiction and is conceived by the mind with the same facility and distinctness as if ever so conformable to reality. That the sun will not rise tomorrow is no less intelligible a proposition and implies no more contradiction than the affirmation, that it will rise.[1]

It is, of course, only reasonings about the relation of ideas which can be discovered a priori. Reasonings concerning matters of fact seemed to Hume to be founded on the relation of cause and effect which is the only relation by which we can go beyond the evidence of our memory and senses. But Hume goes on to claim that:

> The knowledge of this relation is not in any instance attained by reasonings a priori; but arises entirely from experience, when we find, that any particular objects are constantly conjoined with each other. Let an object be presented to a man of ever so strong

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[1] Ibid., p. 62.

> natural reason and abilities; if that object be entirely new to him, he will not be able, by the most accurate examination of its sensible qualities, to discover any of its causes or effects.[1]

In support of the above claim, Hume goes on to say that in pronouncing the effect of an object without benefit of past observation the mind can only invent or imagine some event which it ascribes to the object as its effect; and this invention must be entirely arbitrary. Thus, even with "the most accurate scrutiny and examination," the mind can never possibly find the effect in the supposed cause.[2]

The novel object objection to Hume's a priori argument

It has already been noted that Hume maintained that if a man is presented with an entirely new object, he cannot by the most accurate examination and scrutiny of its sensible qualities discover any of its causes or effects. Without the benefit of past observation, the mind can only invent possible candidates as the effects or the causes of effects and this is entirely arbitrary.

While Hume's language seems straightforward enough, one can yet only wonder what thoughts are really being conveyed within this great clarity of expression. Are not the words "examination" and "scrutiny" connotative of empirical observation? Is Hume saying that without past observation, present observation is useless in determining the causal properties of an object or the effects which it might issue; or is he

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[1] Ibid., p. 63.

[2] Ibid., p. 65.

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saying that accurate examination and scrutiny of an object are not instances of observation?

If we have never seen a bowling ball in all our life and suddenly, some Monday morning, one appears on our doorstep, is it not possible that by close examination and scrutiny we can tell that the ball will dent the top of our wooden dining table even though we should not toss this heavy, hard object upon it? Though we have had no previous experience with bowling balls, we have noted in the past that billiard balls dropped on thin glass crack the glass. We have also seen wrecking crews knock down buildings with a large ball suspended from a cable. Surely then Hume must mean, not only that a man must be devoid of any past experience of a particularly newly presented object, but also in this case that the man must be devoid of all experience of balls and wooden tables and sheets of thin glass. But is it not also the case that, after rising from a cushiony chair, one often notices a depression or imprint left in the cushion which looks in shape and design much like that portion of the body which was just in previous contact with the chair? The memory of this type of incident might lead one to the conclusion that the bowling ball will damage a wooden dining table. Are we then, on Hume's terms, to eliminate all past observations of ourselves sitting and for that matter lying down or standing as when we leave our footprints in mud, sand and for some special feet, cement? It must be then that Hume is asking that a given man, presented with a totally new object, be devoid of <u>all</u> past experience entirely if he is to be completely incapable of making any causal appraisal of a novel object.

Thus our novel object criticism of Hume's a priori argument is that the cause of an effect or the effect of a cause, even with respect to an object that is totally unfamiliar, can be known independently of the observation of their constant or single conjunction. There may be associations or logical connections between ideas (even between ideas which <u>are</u> copies of sense impressions) which are in the mind of observers though these logical connections are not themselves ideas which are copies of impressions of logical connections (rubber bands etc.) in the empirical world. It is often the case, even in science, that certain logically connected ideas are chosen as laws instead of other logically connected ideas because the former permit more deductions about the causes and effects of novel phenomena than the latter. Despite his a priori argument (the name of his argument, not the kind) seemingly to the contrary, Hume recognizes this possibility himself:

> T'will here be worth our observation, that the past experience, on which all our judgments concerning cause and effect depend, may operate on our mind in such an insensible manner[1] as never to be taken notice of, and may even in some measure be unknown to us. A person, who stops short in his journey upon meeting a river in his way, foresees the consequences of his proceeding forward, and his knowledge of these consequences is conveyed to him by past experience, which informs him of such certain conjunctions of causes and effects. But can we think, that on this occasion he reflects on any past experience, and calls to remembrance instances that he has seen or heard of, in order to discover the effects of water on animal bodies. No surely; this is not the method in which he proceeds in his reasoning. The <u>idea</u>[2] of sinking is so closely connected with that

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[1]It is not obvious whether psychological or logical.

[2]Italics mine.

> of water, and the idea of suffocating with that of sinking, that the mind makes the transition without the assistance of memory . . . experience may produce a belief and a judgment of causes and effects by a secret operation, and without being once thought of.[1]

Analogous with our bowling ball example, this river may be the first a man has ever seen. But while scrutinizing only its sensible qualities the man may presume the effect of the drowning of some animal bodies via past experience with pools or lakes as an effect that might issue from this novel object, the river. The man has not seen one single conjunction of the impression of a river and the impression of someone drowning in it. But he does have an idea of water which, in Hume's words, is insensibly connected with an idea of drowning as is the idea of heaviness and solidity with the idea of damage in our bowling ball example. Thus if by a priori reasoning Hume means reasoning done before any observation or experience whatsoever, his claim that one cannot discover the cause or effect of an object is rather trivial, for who would dispute it? But let us pursue this examination of his a priori argument.

Might not accurate examination and scrutiny consist of experimentation? Webster's Dictionary says of "scrutiny" that it is critical observation or minute inspection. "Examination" is defined as the act of examining or state of being examined; a search or investigation, or a testing by an appropriate method.[2] It would seem, thus, that it can be inferred from Hume's own choice of words that the effects or causes

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[1]David Hume, A Treatise of Human Nature, pp. 103-104.

[2]Webster's New Collegiate Dictionary, 13th ed., pp. 286, 761.

of an object cannot be acquired by experimentation with the object on a given occasion by the man in the street. But we are hard put to decide if this merely is an expression, on Hume's part, of a lack of trust in the wit of the ordinary man, or an underestimation of the breadth and scope of this man's past experience, or a stipulation that, when an ordinary man examines a novel object very accurately, he must only stare at it very, very hard and ignore any cues of size or solidity that he may notice.

One defense of Hume

It might be proposed in Hume's defense that he did not consider experimentation within the bounds of accurate examination and scrutiny at least in everyday life. Perhaps Hume recognized a strict distinction between the casual observations of everyday life and the experimental observations made by scientists in their laboratories. Such an interpretation would render Hume's words in the quotation on pages 30-31 of this paper more cogent, but unfortunately such an interpretation is not one derivable from Hume's writing either on the whole or in part.

In close reading of Hume, the absence of reference to experimental observation is striking. It is almost always the case that Hume's examples of observation instances are of the observations of everyday life, e.g., we observe constant conjunctions of heat and flame, snow and cold, day and night. As commentator A. P. Cavendish notes, Hume's idea of experimentation in his own inquiries is not one of scientific experimentation as moderns think of it:

> Hume tells us he is going to study "the Science of Man" and that the object of this science is "to explain the principles of human nature." The method he proposes is "the experimental method," and this involves the performance of careful and exact experiments. These experiments may include either introspective observation of mental phenomena, or the objective observation of human behavior. Hume is very cautious about introspection because, he says, "reflection and premeditation would so disturb the operation of my natural principles, as must render it impossible to form any just conclusion from the phenomenon." He concludes that "we must therefore glean up our experiments in this science from a cautious observation of human life . . . by men's behavior in company, in affairs, and in their pleasure." All this makes it look just as if he is going to do what we should now call experimental psychology. But if we read Hume's works, we do not find any accounts of "careful and exact experiments," nor do we find any "cautious observations of men's behavior." There is something that Hume calls an "experiment," but this is a procedure all his own and it is invariably introspective in character. There are observations of human behavior but they are not accounts of a particular man's behavior in carefully specified circumstances. They are accounts of certain general features of human behavior, which are in fact obvious to everybody.[1]

It might be objected that the above passage indicates only that in the study of human behavior Hume fell short on an experimental ideal that theoretically was not ready for implementation in his time. However, the passage indicates more than this; for it shows Hume's willingness to use the term 'experiment' in reference to everyday observations. In fact it is the all inclusive term "experience," not "experiment," which Hume consistently uses to refer to that which is the great guide of causal inference.

There are some commentators who seem to disagree with Cavindish's appraisal of Hume's use of "experiment." Laird claims

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[1]A. P. Cavendish, David Hume, pp. 19-20.

that, in the Treatise (p. 332ff), Hume "conducted psychological experiments with great precision according to the formal rules of natural philosophy."[1] However, if one but turns to pp. 332ff of the Treatise, one finds, as Cavendish describes, only introspective a priori reasonings about human behavior which Hume refers to as experiments. In the section entitled "Experiments to confirm this system," Hume presents in his second experiment the following:

> Thus suppose, I regard a stone or any common object, that belongs either to me or my companion, and by that means acquires a relation of ideas to the object of the passions; 'Tis plain, that to consider the matter of a priori, no emotion of any kind can reasonably be expected. For besides, that a relation of ideas operates secretly and calmly on the mind, it bestows an equal impulse towards the opposite passions of pride and humility, love and hatred, according as the object belongs to ourselves or others; which opposition of the passions must destroy both, and leave the mind perfectly free from any affection or emotion. This reasoning a priori is confirmed by experience. No trivial or vulgar object, that causes not a pain or pleasure, independent of the passion, will ever, by its property or other relations, either to ourselves or others be able to produce the affections of pride or humility, love or hatred.[2]

Further support of the Cavendish claim and the one expressed herein that Hume used the word 'experiment' (where he did use it at all) in an everyday observation sense can be found in a quotation from Hume that Laird himself selects to discuss elsewhere in his book Hume's Philosophy of Human Nature. In the quotation Hume refers to historical events as experiments!

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[1]John Laird, Hume's Philosophy of Human Nature, p. 142.

[2]David Hume, Treatise, p. 332.

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> Its chief use (history) is only to discover the constant and universal principles of human nature by showing men in all varieties of circumstances and situations, and furnishing us with materials from which we may form from our observations, and become acquainted with the regular springs of human action and behavior. These records of wars, intrigues, factions and revolutions, are so many collections of experiments, by which the politician or moral philosopher fixes the principles of his science, in the same manner as the physician or natural philosopher becomes acquainted with the nature of plants, minerals and other external objects, by the experiments which he forms concerning them.[1]

It is obvious in light of his own usage of the term "experiment" that Hume, more often than not, regards "experimentation" as equivalent not only with "observation" but with the observation of the facts of everyday life. However, while this conclusion undercuts the first line of defense that might be offered in Hume's support, there is a second line of defense which must still be considered.

A second possible defense of Hume

It might be conjectured that if "scrutiny" and "accurate examination" in Hume's work include operations that life within the realm of even everyday kinds of observation, some types of scrutiny are only of sensible qualities while others (which reveal causes and effects) are observations of motion, solidity, extension, and other primary qualities. Therefore, Hume is really maintaining that scrutiny of only the sensible qualities of a novel object, such as the bowling ball in our example, cannot result in knowledge of its effects; but scrutiny of the motion of the bowling ball as it is dropped on a dining

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[1]Laird, op. cit., p. 264.

table together with scrutiny of the impenetrability of each object, ball and table, on contact can result in knowledge of one of the effects of the bowling ball, a dent. In other words Hume is stating that observation of the mere sensible or secondary qualities of an object is not enough to enable anyone to make a determination of possible effects.

While the second defense of Hume above seems to be a very plausible interpretation of Hume, nothing could be further from the truth.

In Hume's theory of knowledge the traditional secondary qualities such as color and taste, which Hume calls "sensible qualities," are not mere sensible qualities at all. Rather they are on the same footing, if not a better one, as the traditional primary qualities of solidity and extension to name a few.

Unlike his predecessors,[1] Hume denies that the distinction between primary and secondary qualities is disclosed by the senses. As Ralph Church says in Hume's Theory of The Understanding:

> Thus he (Hume) proceeds to urge that the primary qualities may not be known in separation from the seondary.
> Since motion must be that of a body, motion is not imaginable apart from extension and solidity. Extension is not found apart from colour. Hence extension may not be known apart from that quality. . . . Apart from both color and hardness, no one of "the primary qualities chiefly insisted on" may be so much as imagined. The distinction in question, therefore would put beyond the possible content of belief the very qualities whose independent and permanent existence it was designed to explain.[2]

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[1]With the notable exception of Berkeley.

[2]Ralph Church, Hume's Theory of The Understanding, p. 99.

Laird too states Hume's words:

> When we reason from cause and effect, we exclude that neither colour, sound, taste, nor smell have a continu'd and independent existence. When we exclude these sensible qualities there remains nothing in the universe, which has such an existence.[1]

In the Treatise, Hume's discussion of sensible qualities is one which aims to challenge the representative theory of perception. He says:

> First, 'Tis easy to observe, that tho' bodies are felt by means of their solidity, yet the feeling is a quite different thing from the solidity; and that they have not the least resemblance to each other.[2]

Hume can be understood to be arguing in connection with sensible qualities that if one establishes external entities by saying that perceptions must be caused by something, the non-permanent character of our perceptions suggests an external world of discrete non-enduring objects which causes them. Therefore, advocates of the causal representative theory of perception cannot thereby establish a belief in the continued and independent existence of body. But Hume's argument (pp. 230-231) seems self refuting since Hume has declared that a sensible quality cannot automatically be thought to be like the hidden external cause of it and thus an advocate of the representative theory of perception can claim that discontinuous perceptions are caused by permanent independent external objects.

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[1]Laird, op. cit., p. 154.

[2]Hume, Treatise, pp. 230-231.

But this view of sensible qualities has nothing to do with Hume's discussion of particular causes and effects within the realm of perceptions. Hume says this himself:

> As to those impressions, which arise from the senses, their ultimate cause is, in my opinion, perfectly inexplicable by human reason, and twill always be impossible to decide with certainty, whether they arise immediately from the object, or are produced by the creative power of the mind, or are derived from the author of our being. Nor is such a question anyway material to our present purpose. We may draw inferences from the coherence of our perceptions, whether they be true or false; whether they represent nature justly, or be mere illusions of the senses (p. 84, Treatise).

When Hume does speak about sensible qualities in his discussion of particular causes as in the passage quoted on page 7 of this chapter, Hume's words inescapably lead to the conclusion that if causes and effects are discoverable at all it must be via observation of only sensible qualities whether in an experimental or non-experimental situation.

Cavendish again discusses the doctrine of hidden powers which Hume was arguing against. It was held by some thinkers still in Hume's day that in order to know that bread will nourish us we need only know as certain that it possesses a certain hidden power in the same way as the whiteness of the bread. It was thought that we might come to see the power in the same way as the whiteness of the bread. This power was regarded as a quality of bread just as its whiteness. Cavendish continues:

> Hume's objection is simply that it is a false account. Suppose we consider the statement that salt is soluble in water. It is agreed that we can know this only by experience. But what exactly is the experience? We

> see the salt immersed in water, and then we see it dissolve. We do not see anything about the salt that necessitates its dissolving; all we see is that it does in fact dissolve. And even if we perform the experiment a large number of times, we never see anything more. We never see in addition the power that makes the salt dissolve.[1]

Cavendish explains that philosophers of Hume's period were preoccupied with epistemological problems rather than explanatory theories except for the explanatory theory of hidden powers.[2] Hume was interested in the question of "how do we know bread will nourish us," and not in the question "why bread will nourish us." We observe only a constant conjunction of people eating bread and people being nourished. However, each conjunct is a collection of sensible qualities. Only sensible qualities of bread and people are observed and the effect of bread--nourishment (a healthy looking moving body) and the cause of nourishment--bread can be known via this constant conjunction of sensible qualities. It is this interpretation, not that of the second proposed defense, which is consistent with Hume's philosophical views. James Wilber's words seem to sum up this compatibility of our interpretation of Hume's words and Hume's actual words. Wilber writes:

> When thinking in a Newtonian analytic view such as in his preliminary analysis of the idea of cause and effect, Hume has regarded experience as a collection of impressions. Though the collection contains an order within it, an order arising from both temporal sequence and association of various kinds of impressions with others, this order is not regarded as anything beyond the collection itself. Coupled with his empiricism, it is this view of experience that has given rise to the Pyrrhonist difficulties Hume has already encountered. To speak of

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[1]Cavendish, op. cit., p. 70.

[2]Ibid., p. 67.

> experimental reasoning, on the other hand, is to speak of something involving reason as well as experience and suggests that the "man of experience," in order to fulfill his capacity for experimental reasoning must have acquired certain beliefs and habits.[1]

In view of all of the above, it is quite unclear what it is that Hume is really asserting or means to assert about a priori reasoning from mere observation of the sensible qualities of a novel object. The answer may lie in pinpointing some possible confusion in Hume's writing.

The single case objection

Without giving Hume any benefit of doubt, his words with respect to the discovery of a cause or effect are, if intelligible at all, sheer nonsense. However, with the benefit of a doubt, it is possible that Hume is guilty of a subtle confusion between the discovery of particular causes and effects on particular occasions with the discovery of causal laws. We can discover, on a particular occasion, that the dent in our table is being caused by the dropping of a bowling ball upon it. But, that does not mean that one can confirm from the one instance a causal law, which expresses the fact that bowling balls dropped on wooden tables of certain specifications, will always dent the tops of the tables.

Hume's possible confusion of the discovery of a particular everyday cause with the confirmation of a causal law could easily stem from an on-going vagary of meaning surrounding the term "cause." Since

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[1]James Wilber and Harold Allen, The Worlds of Hume and Kant, p. 66.

the advent and development of science, the chief concern about causality has had to do with the causal relations expressed in general laws. But not all the law statements in science are causal law statements, and not all causal statements are lawlike causal statements. If these two distinctions are kept in mind, the confusion over the terms "cause," "causal," and "causality" should soon dissipate.

Now when a given cause is to be discovered, one can often determine the cause of an event even when it occurs for the very first time. In terms of Hume's discussion, the effects of an object can be determined after close examination even if the object is totally new. In the example of the bowling ball, we can probably tell just by looking at it that this object will no doubt dent a dining table if dropped upon it. Should a doubt exist as to this effect, we have merely, within the bounds of close and accurate examination and scrutiny,[1] to drop the ball on the table. If a dent appears immediately thereafter in the table top, almost anyone present can conclude that dropping the ball on the table has caused the dent. This judgment is made even by those persons who have never before observed a bowling ball or its being dropped on a dining table top. By what ratiocination is this discernment of the cause of the dent possible? Ducasse offers a very plausible answer. He states:

> . . . the causality relation is one that obtains between three terms of a perfect experiment--the relation, namely, between a given state of affairs S and two changes in it;

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[1]Here we mean scrutiny of experimental sensible qualities in the manner of experimentation that Hume's use of "experiment" implies.

> one of them a change C at a time T_1 and the other a change E at an immediately sequent time T_2. To say that this triadic relation obtains between S, C and E is to say that C in S is etiologically both sufficient and necessary to E in S (i.e., both cause of and condition of E in S) and conversely, that E in S is etiologically both necessitated by and contingent upon C in S (i.e., both effect of and resultant of C in S). This definition of causality, being framed in terms of but one occurrence of the sequence in S of C and E, does not require the supposition that it ever occurred before or ever will again.[1]

Ducasse is of course pointing out something that is so obvious it is usually overlooked in discussions of causality. In the everyday situation of driving a car, it is easily noticed that occasionally, in the course of normal driving, the car sometimes turns to the left and at other times to the right. If the cause of this turning of the car is unknown, the driver may compare the situation at time t_1, before the car starts to turn, with the situation S at time t_2 of the car, as the car starts to turn. The conditions necessary for the car's operation at both times seem to be the same. The ignition is on, the engine is turning over, the gas pedal is depressed. But in S at t_2, there is one change or difference of condition. In S at t_2, the driver's hands are turning the steering wheel left or right, i.e., C occurs. Since this condition can be narrowed as the only new element in the situation by which we may in fact distinguish S at t_1, from S at t_2, it is concluded that commencing to turn the steering wheel with my hands to the right or the left in S at t_1, thereby initiating S at t_2, is the cause of the car turning to the right and left, respectively, of its own power. The

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[1]Curt John Ducasse, Causation and the Types of Necessity, p. 138.

turning of the car, E, occurs only after S at t_2, and not S at t_1, but since there is no difference between S at t_1, and S at t_2, except C (turning the steering wheel), E must be due to C in S at t_2.

On the view of Ducasse then, all the conditions of S at t_1 are necessary for the car to turn, but they are not sufficient. One must also turn the wheel. Hence, turning the wheel is also necessary and sufficient together with the conditions of S at t_1, to E. Of course C by itself, i.e., not in S, though necessary, would not be sufficient for the car to turn of its own power, for if the steering wheel is turned while the engine is off, the car will not turn to either the right or the left.

Practically there are some problems in applying this method in the determination of causes, for it is sometimes not clearly known whether the only change observed is in fact the only change that really occurred in the situation. But this is precisely what one should be looking for when close examination or experimentation is made. It is both the ideal goal of experimental science and common sense to control all possible variables, with the exception of one, in the search for a particular cause. If the uncontrolled variables reduce to more than one, then we must conclude only that E was caused by one or several of the changing variables.

Arthur Pap has criticized the above definition of causality, proposed by Ducasse since it supposedly makes the words "cause" and "effect" applicable to only concrete events. Ducasse vindicates his theory with the gentle reminder that the instances of given kinds of

events always consist first of concrete events. As every state of affairs that exists and every change in it that occurs is fully concrete, the initial application of "cause" to the concrete situation is a requirement which any correct analysis of causality would have to satisfy. Statements of causal laws can be interpreted with no difficulty in terms of the concrete analysis here presented.

> . . . the rough causal generalization: "Throwing bricks at windows ordinarily causes them to break" would be explicated as: "Any concrete change that is an instance of the kind "throwing a brick at a window" does under concrete circumstances that are an instance of the "ordinary" kind, cause a concrete change that is an instance of the kind "breakage of the window."[1]

It is at this point, the transition of particular cause talk to causal law talk, that we may easily return to the words of Hume. Hume has already said, it may be remembered, that knowledge of cause or effect in an object cannot be obtained through close inspection or examination when past experience of the object is lacking. It has just been shown that such a claim on one interpretation is simply untrue and on a second interpretation trivial to the point of being nonsensical. However, it may be that we can construe Hume to be really arguing that one cannot confirm[2] a causal law concerning an object without the aid of past experience. In other words, as he himself says, knowledge of cause and effect (in the sense now of causal law not concrete particular causes and effects) cannot be attained by a priori reasonings but only

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[1] Ibid., p. 141.

[2] Hume speaks of the discovery of causes. We are giving his words a loose interpretation to include the confirmation of a lawlike causal connection in a last attempt to salvage his argument.

from experience when we find that any particular objects are constantly conjoined with each other. Thus only in the light of the experience of events constantly conjoined experimentally do we confirm a causal law concerning them. He describes this step as one, from the notice of a constant conjunction of an object and its effect to the belief such that other objects which are similar in appearance will be attended with similar effects. However, Hume uses elementary sense data examples of the constant conjunctions which presumably are the inductive basis for confirming causal laws. More than once, does he refer to heat and flame or snow and cold, when referring to the constant conjunctions of objects and their effects. It is difficult to talk of such mundane conjunctions in discussing the topic of causality especially causal laws in science at all; but for the sake of argument, let us discuss a low level constant conjunction of past experience which presumably is the basis for the confirmation of a particular causal law.

Correlation of events objection to Hume's a priori argument

Many philosophers including Hume discuss the constant conjunction of day and night. If Hume is to be taken at his word, one concludes on the basis of this constant conjunction in all previous experience, that night will be the effect of day, or day will be the effect of night or night will be the cause of day or day will be the cause of night. To handle this rather circular situation, let us assume that the first people to observe this constant conjunction began experiencing the world in the early daylight of morning. On a popular

assumption that causes precede effects, it would be quite correct on Hume's view for these people to formulate the causal law that day causes night, since Hume claims repeatedly that we are determined just by custom to expect one appearance, i.e., flame from the appearance of another, heat, after recurrent observations of the constant conjunction of the two objects. But surely there is no law that day causes night nor could there be. Rather, on noticing this regular sequence, we find a question, not an answer as Hume supposes. Why does light come and go?

The layman, operating in the Ducasse theory fashion, might look for a change in the daylight situation which could possibly account for the disappearance of sunlight. He notices that in autumn, the trees lose their leaves gradually and the days lose their light gradually sooner and sooner. Here, then, is another invariable sequence--trees losing leaves, days becoming shorter. But still we are not disposed to generalize this sequence into causal law for not all trees shed their leaves. Though perhaps, this is why we always have some daylight.[1] Is there a predicament in this last discernment? Probably not. The only constant conjunction of tree with light phenomena ever noticed so far, is that shady trees block the presence of light beneath them. On this account we must conclude that the more leaves trees have, the less light our days have. But exactly the converse is true with respect to shortening days and deciduous trees. Thus, there must be some other change C in S which causes E. Alas, as we now know, the change C has been found

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[1]The evergreen trees cause the winter days to be as short as they are.

to be a variance in distance between the earth and the sun and the angle of the earth's axis in the situation S of the earth revolving around the sun, that causes the days to shorten. It is the change C', the rotation of the earth, in the situation S', the earth revolving around the sun which causes night and day.

Obviously there were many constant conjunctions experienced before a causal law was confirmed in this example. Indeed, it is doubtful that there is actually a causal law which states the cause of day and night for it is the common man, rather than the scientist, who would ask this particular causal question.[1] The scientist is interested more in asking what is the pattern of movement of the earth around the sun expressed quantitatively and his equation for this, though a physical law, would not be a causal law. Bertrand Russell was so impressed by this last point, that in Mysticism and Logic, he takes the extreme position that there are no longer any causal laws in science; and therefore, that it is a waste of time to still try to analyze what is meant by "cause" and related terms.[2] That all laws are not causal has already been mentioned, but it seems doubtful that there are absolutely no causal laws in science or even formulas which can be rewritten in causal form. Whatever the case, we must begin our discussion with causal laws in order to discuss any other kind since most historical discussions, such as Hume's, which still influence present views, including Russell's, dwell on causality.

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[1]Scientists today are asking some other interesting questions concerning this phenomenon.

[2]Bertrand Russell, Mysticism and Logic, pp. 180-208.

The foregoing example of the conjunction of day and night, turned to causal law, should indicate that if Hume was talking about the observance of causal conjunctions directly leading to the confirmation of laws, he was wrong. As a matter of fact, the observance of constant conjunctions in the past often tell us nothing but merely raise questions as to causes. It is usually only observations of constant conjunctions occurring during experimentation that provide the basis for the confirmation of causal and non-causal laws alike. In this experimental sense, Hume is almost right in saying that men will not infer from one case of a constant conjunction or more properly one conjunction what they will from a thousand, though the one be in no way different from them. Though most of Hume's discussion never refers to experimentation, it is true that experiments are usually[1] repeated many times before a hypothesis is confirmed and changed in status to a law. But there are cases, it is generally allowed, of crucial experiments where the singular conjunction of events decides the case within the realm of lawlike statements.

The crucial experiment objection

It will be remembered that we have already noted that Hume in at least one instance concedes the point of the crucial experimental objection Hume claims in the Treatise (pp. 104, 105) that, "we may attain the knowledge of a particular case merely by one experiment, provided it be made with judgment, and after a careful removal of all

[1]Here "usually" means somewhat less than almost always.

foreign and superfluous circumstances." However, Ducasse suggests that while Hume's "Rules by which to judge of causes and effects" (p. 173), may seem to be Hume's guide for isolating "foreign and superfluous circumstances" in a crucial experiment they are not, since these principles "as he (Hume) states them assume knowledge of single facts of causation."[1]

When Hume claims by the first three principles, which are really definitions, that the cause and effect must be contiguous, the cause must proceed the effect, and that there must be constant union betwixt the cause and effect; he presumes already that the cause is already known. For how can one judge if the cause is contiguous, precedent, and constantly united with the effect unless one knows what the cause is before judging if it, the cause, satisfies these conditions. Yet throughout his writing Hume maintains that causal inference (knowledge of a cause) arises from experience of constant conjunctions.

Laird, in his book, makes the further criticism that by Hume's own view, he has no right to advance any rules for use in an affair which is "sensitive" and "alogical."[2] Laird contrasts the rules with that which is alogical for "Hume said (p. 175) that they (the rules) supplied all the 'logic' he intended to use" in this matter.[3]

Thus it appears that our crucial experiment objection to Hume's a priori argument is relevant since Hume does not really seem to allow

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[1]Ducasse, op. cit., p. 13.

[2]Laird, op. cit., p. 140.

[3]Ibid.

for this possibility or recognize its destructive import for his constant conjunction view of the confirmation of causal laws. It also seems that the crucial experiment objection to Hume's a priori argument, together with our other three objections, indicate that the first objection[1] empiricists raise to necessity views of causal laws is ambiguous if not utterly ill-taken.

It will be remembered that the first empiricist criticism of a necessity view of law statements was that we cannot prove any law (causal) a priori but only establish it as an empirical generalization. This is essentially the claim of Hume's a priori argument that causes or causal laws can only be discovered or perhaps justified by the constant repeated conjunction of similar events. Yet our four objections indicate that whether Hume was talking about particular causes, causal laws, their discovery or justification his claim is unsupported. Sometimes we can know that some particular event will follow another without the previous experience of the two events constantly conjoined (our novel object objection). Sometimes too a cause can be discovered via experience of just a single conjunction of it and its antecedent (our single cases objection). Conversely there are oft repeated constant conjunctions of events in our experience which we never come to consider lawful relationships (our mere correlation objection). It is also the case that even causal laws can be confirmed by a single conjunction of events (our crucial experiment objection). We thus conclude that if

[1]See page 26.

anything is wrong with a necessity theory of laws it is not the first empiricist criticism that laws are empirical and therefore in no way a priori. However Hume does offer another argument in support of this empiricist criticism which we shall now consider.

Hume's conceivability argument

Hume's conceivability argument is best expressed in the following question which he asks. Even if motion in a billiard ball A, in direct line of a moving billiard ball B, should be suggested to me as the result of their contact or impulse; may I not conceive that a hundred different events might also follow from that cause? In sum, he concluded that every cause and effect are totally distinct from one another and that neither can be inferred from the other without observation and experience.

The psychology objection to Hume's conceivability criterion

It must be apparent by now that Hume is talking about cause in a most confused way. Where it appears that he is speaking of the common man's usage of the term, Hume is wrong and superfluous since it is no man's option to consider objects without any benefit at all of past experience that might be helpful. But where it appears that Hume may be discussing the epistemological basis of causal laws, he is talking about the practice of some science that does not use any experimentation as we think of experimentation and confirms sense data type laws such as heat is always followed by flame and perception of snow is

followed by perception of cold.[1] If anything, Hume is describing the scientific practices of cave men. With nothing to work with but the observations of such sense data conjunctions as snow is followed by cold, it must indeed be quite easy for Hume to imagine or conceive that heat or other unexpected effects might follow snow in their perceptions. On the other hand, if custom were as strong a factor in men's thinking as Hume claims it is, how is it so easily conceivable that effects not bolstered by constant conjunction, or even a single conjunction, e.g., the sun will not rise tomorrow, are possible? Either custom impels us or it does not. Zabeeh indicates that Hume's conceivability criterion employed a notion of contradiction which was based on associations of custom and was therefore a psychological, not a logical, type of contradiction. As Zabeeh says:

> The criterion of conceivability itself was explained in terms of the law of contradiction, and the notion of contradiction was explained in terms of psychology and not syntax. In Hume's system, the substitution of psychology for logic is inescapable since there is no place for formal relations in the world of contingent facts, viz., in the world consisting only of loose and separable sense-data connected together in our mind by psychological links of association . . . his criterion, namely, customs or habits, cannot perform its important function, if it is only psychological and not a linguistic criterion. Unless we register the customary association of ideas with words in forms of definition or rules, we cannot properly use general words in language.[2]

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[1]"Sensation" seems a more appropriate word than "perception."

[2]Farhang Zabeeh, Hume Precursor of Modern Empiricism, pp. 112,

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William Kneale criticizes the kind of associations to which the conceivability criterion is applied, i.e., the psychological association of sense impressions. As Kneale says:

> It is clear, however, that, except in certain parts of psychology, the laws of nature formulated by plain men and scientists are not about sense and image, but about sticks and stones, pieces of metal, elephants, and stars, all of which can be perceived but certainly not sensed. The most plausible example which might be offered to illustrate Hume's account of natural laws would be the proposition that lightning causes thunder. But even here reflection shows that Hume's account is inadequate. When I speak of lightning, I do not mean a vivid visual impression occurring as an element in my experience, but rather a public event which can be perceived by other people or photographed. Similarly, when I speak of thunder, I do not mean the noise impression which sometimes, though not invariable, follows a bright flash in my experience, but rather a public event which can be perceived by other people or recorded by machine. My imagination of a bright visual sensum not followed by a loud auditory sensum does, indeed, enable me to know that I might experience the one without the other. For while imagining this course of experience I can recognize its possibility. But imagination is powerless to prove a lack of connexion between lightning and thunder.[1]*

The imaginary facts objection to the conceivability argument

Psychological connections between sense data and ideas aside, it does not seem that the imagination holds sway over logical connections that might obtain between ideas, and Zabeeh notes that Hume himself warns against the flights of imagination when one deals with philosophy and science. As Zabeeh quotes again from Hume:

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[1]Kneale, Probability, p. 79.

*Imagination can only tell us what is psychologically possible not logically possible.

> We must pardon children, because of their age; poets of their fancy; But what excuse shall we find to justify our philosophers in so signal a weakness? (flights of the imagination) (Treatise, p. 226).[1]

One reason for warning against the flights of the imagination is, as Laird suggests, "we have no right to assert that chimeras or centaurs could exist in nature simply because we can dreamily fabricate such monsters."[2] As Laird continues:

> Hume concluded incontinently that "the idea of existence is the very same with the idea of what we conceive to be existent. To reflect on anything simply and to reflect on it as existent, are nothing different from each other. That idea, when conjoin'd with the idea of any object, makes no addition to it. Whatever we conceive, we conceive to be existent. Any idea we please to form is the idea of a being and the idea of a being is any idea we please to form" (Treatise, p. 66).[3]

Despite the above passage, Hume makes it very clear that he does not think that any knowledge of causes and effects whatsoever, can be derived by a priori reasoning (such as using a conceivability criterion we suggest). Yet very quickly does he follow with a pronouncement about causes and effects by means of his a priori conceivability criterion. The effect, the sun will not rise tomorrow, will not occur. Thus either of these effects may be actual in the future. But is this not a claim about a particular empirical event, which is made not on the basis of experience (since the sun has never failed to rise), but on Hume's a priori judgments that the sun's not rising is a possible event? What

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[1]Zabeeh, op. cit., p. 58.

[2]Laird, op. cit., p. 80.

[3]Ibid.

right has Hume, on his own principles of strict empiricism, to be making claims about possible future empirical matters which arise from the a priori conceivability machinations of his mind! It might be conjectured in defense of Hume that in considering matters of fact as only the subject of probable belief the lack of certainty always permits a counter possibility if probability and possibility are considered opposite ends on a continuum of belief. However, we shall illustrate in the next section, on induction, that in fact Hume considered some matters of fact the subject of certain not probable belief. This certainly is not demonstrative certainty, but one to which Hume nevertheless applies the term "proof." As Laird says precisely, "intuitive or demonstrative certainty implied that the opposite was inconceivable."[1] In the cases of belief in matters of fact to which Hume is willing to apply a non-demonstrative sense of "certain" it is not clear whether one can believe in the possibility of opposite matters of fact or not.

Nevertheless as our psychology and imaginary facts objections indicate Hume's conceivability argument offers neither a logical nor empirical standard for judging the possible. Thus Hume's conceivability argument lends no support to the first empiricist criticism of a necessity view of laws, i.e., that laws are in no way a priori. We shall therefore next consider Hume's induction argument, the basis for the second empiricist criticism of necessity views of law statements that in cases of a priori reasoning we attain certainty, but in cases of causal reasoning only probability.

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[1] Ibid., p. 85.

Hume's induction argument

Hume next makes perhaps his most important point which gave rise to the traditional problem of induction. He notes that all men make the following inference, and he asks by what process of reasoning it could possibly be made:

> At least it must be acknowledged that there is here a consequence drawn by the mind; that there is a certain step taken; a process of thought, and an inference, which wants to be explained. These two propositions are far from being the same, "I have found that such an object has always been attended with such an effect and I foresee, that other objects, which are, in appearance, similar, will be attended with similar effects. . . . The connexion between these propositions is not intuitive. There is required a medium, which may enable the mind to draw such an inference, if indeed it be drawn by reasoning and argument. What that medium is, I must confess, passes my comprehension; and it is incumbent on those to produce it, who assert, that it really exists and is the origin of all our conclusions concerning matters of fact.[1]

The inference described in Hume's discussion above is not to be found, he claims, in the arguments of demonstrative reasoning. But if this inference is based on experience, we are involved in a circular argument, for the uniformity of nature is then at once derived from arguments of matters of fact and supportive of arguments of matters of fact.[2] All inferences from experience suppose that the future will resemble the past and that similar powers will be conjoined with similar sensible qualities. Thus, no arguments from experience can prove this resemblance of the past to the future since all these arguments are

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[1]Hume, Enquiry, pp. 68-69.

[2]This has come to be known as the old problem of induction.

founded on the supposition of that resemblance. Hume stresses that nature may change such that the future will not resemble the past in this next passage:

> In vain do you pretend to have learned the nature of bodies from your past experience. Their secret nature and consequently all their effects and influence, may change without any change in their sensible qualities. This happens sometimes, and with regard to some objects. Why may not it happen always and with regard to all objects?[1]

Induction and the idea of causal connection based on custom

Hume concludes finally that the principle on which the inference from similar sequences in the past to similar sequences in the future is based is custom or habit. After recurrent observations of the constant conjunction of two objects, i.e., heat and flame, we are determined just by custom to expect the one from the appearance of the other. Hume claims that it is for this reason that we draw an inference from a thousand instances which we are not able to draw from one instance that is in no respect different from the thousand. No man can infer that every body will move when impelled by another if he has only seen one body move after being impelled by another. When one has found in many instances that two objects,[2] i.e., heat and flame, have always been conjoined together; if heat is again presented to the senses, custom carries the mind to expect the second concomitant, flame.

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[1]Hume, Enquiry, p. 72.

[2]It is Hume who calls heat and flame, objects.

Belief and probability

Hume characterizes belief as a more intense and steady conception than that which attends the mere fictions of the imagination.[1] This steady manner of conception, called belief, arises from a customary conjunction of the object with something present to the memory and senses. Causation is but one of the principles of connection among three, the other two being Resemblance and Contiguity; and beliefs arising from the relation of causation are at some times probable, claims Hume.[2] Where the past has been regular and uniform without exception, we expect and believe that the event will occur with the greatest assurance; but where different effects have been found to follow from causes which are to appearance exactly similar, we determine the probability of the event, for all the various effects occur to the mind and enter into its determinations.[3]

The presupposition objection to Hume's induction argument

Hume's chief contribution with respect to the discussion of causes is perhaps the curiosity he expresses about the inference that men make from the statement that such a cause has always been followed by such an effect in the past to the generalization that all similar causes will be succeeded by similar effects in the future. If objects hurled into the air today fall to earth, nature will not change such

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[1] Ibid., p. 80.

[2] Ibid., P. 81.

[3] Ibid., p. 87.

that tomorrow a similar object hurled into the air will fly upward even higher instead of falling back to earth. Hume defines this uniformity of nature principle as 'instances of which we have nad no experience resemble those of which we have had experience' (Treatise, pp. 89, 104ff).[1] But problematically, while this presupposition of nature's uniformity supports inductive inferences, the presupposition itself according to Hume is derived from experience. Hume wrote in the Treatise (p. 105) that the general uniformity of nature 'has established itself by a sufficient custom' in 'millions of experiments.'[2] As Laird notes:

> For, in accordance with the relational theory of generalization he (Hume) had set forth regarding abstract ideas, he held that what is general is always derived from what is specific, and is only a way in which the specific is considered to represent and summarize a multitude like to itself. General uniformity, therefore, was, like specific uniformities, only an instance of associative transition, "inference" or expectation.[3]

The Humean view described above, however, gives rise to what is usually called the traditional or old problem of induction which is that specific inductive arguments about causes and effects cannot be justified by a belief in the uniformity of nature if such a belief is itself justified by specific inductive arguments about causes and effects even in 'many million' of experiments. The charge posed by the traditional problem of induction is thus one of circularity. However, this circularity criticism does not arise unless it is agreed with Hume that the

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[1] Ibid., p. 106.

[2] Ibid., p. 107.

[3] Ibid., p. 106.

principle of the uniformity of nature is a conclusion based on experience. If the uniformity of nature is a conclusion of deductive reasoning it may well serve as justification for specific inductive inferences about causes and effects. Applying his conceivability criterion Hume ruled out the possibility that the uniformity of nature is a conclusion of deductive reasoning, for he maintained that a sudden change in nature's habits was perfectly conceivable.

Oddly enough, however, Hume regards the principle of the uniformity of nature to be a presupposition as well as being a belief established by experience. Flew says in quoting from Hume, Abstract 15:

> All probable arguments are built on the supposition that there is this conformity betwixt the future and the past, and therefore can never prove it.[1]

The appearance in the above quotation of "supposition," a common synonym for "presupposition," suggests that Hume in fact thought belief in the uniformity of nature a presupposition of causal inferences. But it would seem that such a belief or any belief[2] must be either presupposed or derived inductively from experience but not both.[3] We counted that the uniformity of nature principle is presupposed and not derived via associations through custom or habit from experience as Hume suggests in the former passage of his view on page 62.

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[1]A. Flew, Hume's Philosophy of Belief, p. 64.

[2]We mean specifically any belief about matters of fact in a Humean context. See below.

[3]In Chapter IV we shall explicate "presupposition" and show how presuppositions are deductively established though they may very well be about matters of fact.

Hume talks of constant conjunctions of similar causes followed by similar effects in the past which give rise to the belief that nature is uniform. But as Laird notes:

> Strictly, however (he admitted) since all impressions were distinct existences, he should have spoken of impressions of kind x, and should have also said that in most of our causal inferences we proceeded by analogy rather than by exact resemblance, dealing with x' followed by y', and with x" followed by y" rather than simply with x followed by y. Again, the resemblance or analogy "admits of many different degrees" Treatise 142, and scientific gentlemen might need much insight, and more faith, to assert that there was any analogy at all.[1]

Contrary to the above claim, it might be premised that men are so structured by nature that they have an affinity to see particular similarities in the empirical world. Such an affinity might be considered a natural instinct of some sort. But clearly if the above quotation from Laird is correct, such a natural instinct view is not one that Hume himself held. In agreement with Hume's view, there are those who say that there are no exactly similar events and indeed the non-exact resemblances or analogies with which scientists work "admit of many different degrees."[2] If it is true, as Hume suggests, that scientists may need more faith than insight to assert that there is any analogy at all, part of this faith might well be a presupposition that nature is uniform. We presuppose the uniformity of nature when we take an event E_2 to be like a previous event E_1 due to some sort of resemblance that we think we find between them by analogy. The finding of

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[1]Laird, op. cit., p. 91.

[2]Ibid.

such an analogy, however, testifies to our faith that things or events have not changed and that there is some analogy to be found. Once it is admitted that events are not exactly similar but only somewhat similar, perhaps similar in certain respects, it may be that these respects themselves are not exactly similar but somewhat similar; and the door is open wide for as much insight and faith as men can muster for the observational occasion of finding analogous similarities between events past, present, and future. Perhaps right from the first, the uniformity of nature had to be assumed to be true, in order that criteria for decisions of similarity between events could be made, i.e., so that some constant conjunctions of similar events could even be perceived as constant conjunctions at all. It is, therefore, our surmise that the uniformity of nature is an assumption which may be made or thought true before any selection among various sequences of events can be made on the basis of some event similarity. If one does not suppose that there are any similar events one would not look for similar aspects in non-exactly similar events in order to determine which events are the same ("same" here means "exactly similar for our purposes").[1] The view that the uniformity of nature is presupposed precludes the circularity that arises when it is held that belief in the uniformity of nature is itself based on the past experience of uniformities. Circularity is avoided not because as a presupposed belief the uniformity of nature is arbitrarily assumed to be true but because it may be a presupposition which

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[1]The use of quotation marks for the definiens phrase is in keeping with the theory of meaning which we propose in Chapter III.

is deductively entailed by premises known to be true.[1] An example of such an argument is discussed at length in Chapter II where we treat Kant's proof that the universality of causality is a necessary presupposition of talk about events. In Chapter IV we explicate in full our theory of presuppositions and show how they can be considered statements true necessarily, i.e., deductively proved. Such statements are thus legitimate justifying premises for other arguments. However, before moving on to these considerations, let us still consider evidence which supports our claim that belief in the uniformity of nature is presupposed and not based upon particular inferences of similarity among events.

The historical certainty status objection

Assuming nature is uniform, there is yet the possibility that the predictions from past to future may be unfulfilled. An expected effect may not come about or some event may occur when its usual antecedent is absent. It is now widely held that the laws of science, causal and non-causal alike, are only inductively probable rather than deductively certain. Hume states the reason for this inductive creditability gap when he claims that it is only in vain that anyone pretends to have learned the nature of bodies from past experience. "Their secret nature and consequently all their effects and influence may change without any change in their sensible qualities."[2]

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[1]In Chapter IV we will propose a theory of presuppositions which will clarify this claim.

[2]See p. 60.

This passage is particularly strange in the context of modern science which is theoretically elaborate and has much to say about the nature of things which is beyond the realm of sensible qualities. Talk of all beyond sensible qualities being secret from our knowledge seems to be a description once again of only a very young science. On the other hand, it must be remembered that Hume is an empiricist, indeed a phenomenalist at times, and thus via his impressions argument all that is not sensible is for him hidden from us forever even though we may speculate and theorize continually about the reality that lurks beyond our sense perceptions. It is therefore the case that we can think we know the nature of an object but be wrong somewhere in our theorizing if there is some change among sensible qualities such that those sensible qualities which were predicted by our theory fail to materialize.

Hume's statement that the hidden nature of things may change while all their sensible qualities appear the same appears paradoxical. Certainly the changing of nature's physical structure, as Hume describes it, poses no problem to the scientist or ordinary man, for they have no way of knowing that this hidden nature has in fact changed since the change is hidden and what is not hidden according to Hume, the sensible qualities, have not changed.

There are times of course, when the sensible qualities of things do change. We observe unexpected meter readings, or colors in chemical mixtures, etc.; and this is when our laws have, as it were, run amuck. Does Hume's strange passage (p. 60) refer perhaps to this situation of the failure of an established law? If in the passage he is describing

this kind of scientific setback, we notice behavior counter to what Hume indicates. In the famous cases of the failure of particular laws, scientists have said not that nature had changed but that the law was wrong. Their previous calculations and data which suggested and/or confirmed the law were in error. None of them say that the law was right, but that it failed to predict accurately because in fact nature had changed! Hume stresses that all men, scientist and ordinary man alike, can conceive of the situation in which nature actually changes and certain effects that are expected fail to occur. But if this is so conceivable, why do none of us ever suppose that all our laws and calculations are or were correct when confirmed and that nature has violated them by changing physically. Why did Kepler say that Tycho Brahe had had inadequate instruments with which to observe the crucial parallax needed to indicate that Copernicus had been right--the earth revolved around the sun. Kepler must have had able powers of imagining and conceiving and could have said just as well that Brahe was correct in concluding that the earth was the center of the universe; but that sometime after Brahe's true conclusion, the earth actually changed places with the sun; and when he, Kepler, investigated nature later, he found that it had changed. This brings us to a decisive point, which is, that the uniformity of nature cannot be a belief based on experience; for scientists, even eminent ones, tenaciously hold on to their belief that nature does not change even when experience indicates either that nature changed or that our laws are wrong. This point is so important that it bears repeating. Every time a law of science is repudiated as

false or inaccurate, scientists have refrained from interpreting as a physical change an anomalous experience which is indicating just as strongly that all carefully formulated laws are correct and that nature every once in a while physically changes, showing herself quite clearly not to be uniform! We are thus led back to our previous claim that the uniformity of nature is presupposed and not based on conjunctions of similarities in experience. Scientists always assume nature to be uniform whenever they talk of similar or same events. In the face of falsifying evidence they do not regard this belief as falsified but rather a belief in some particular law.

The certainty and proof objection

Consider the following passages from Hume's writings:

> There are some causes, which are entirely uniform and constant in producing a particular effect; and no instance has ever yet been found of any failure or irregularity in their operation. Fire has always burned, and water suffocated every human creature; the production of motion by impulse and gravity is an universal law, which has hitherto admitted of no exception. But there are other causes, which have been found more irregular and uncertain; nor has rhubarb always proved a purge, or opium a soporific to everyone, who has taken these medicines. It is true, when any cause fails of producing its usual effect, philosophers ascribe not this to any irregularity in nature; but suppose that some secret causes, in the particular structure of parts have prevented the operation. . . .[1]

Note that in the last six lines, Hume describes a situation in which philosophers have given up neither their belief in the uniformity of nature nor their belief in particular laws when expected observations

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[1]Hume, Enquiry, p. 86.

fail to occur. Rather suppositions of initial conditions are made so that neither of the other beliefs will have to be abandoned. He goes on:

> Our reasonings however, and conclusions concerning the event are the same as if this principle had no place. Being determined by custom to transfer the past to the future, in all our inferences; where the past has been entirely regular and uniform, we expect the event with the greatest assurance, and leave no room for any contrary supposition. But where different effects have been found to follow from causes, which are to appearance exactly similar, all these various effects must occur to the mind in transferring the past to the future, and enter into our consideration, when we determined the probability of the event . . . we must assign to each of them a particular weight and authority, in proportion as we have found it to be more or less frequent.[1]

This is a most interesting passage; for it is clear that in this quote Hume does not realize just how problematic induction is as a method of inference. His words indicate that he does not believe that all inductive conclusions are at best only probable. He says that conjunctions that have exceptions result in laws that are only probable whereas those that are constant without exception result in laws that are certain. It is apparent that Hume as many men of his time, thought that some laws are certainly true. Hume, thus, could think of their failure to hold only in terms of an actual change in nature. Hume believed, at least in this passage above, that the belief in the uniformity of nature was only probable; but that laws based on constant conjunction without exception were believed to be certain. This

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[1]Ibid., p. 87.

exegesis of Hume's words makes an interpretation that he posed the traditional problem of induction a very confusing interpretation indeed since the old problem of induction does not arise unless one claims that both kinds of belief (in the uniformity of nature, and laws) are only probable. The probable but not certain aspect of both these types of belief is what gives rise to the circularity when one tries to base one belief with certitude on the other. On the other hand, Hume did not believe that all laws were certain; for some clearly had exceptions. Yet his words in this regard (see above) indicate that he is talking about probability more in keeping with the frequency theory of probability than with any inductive probability.

Laird notes that according to Hume the causal inference, even after experience of constant conjunction, could not be an affair of knowledge. It belonged to probability.[1] But Hume was also to use the term "probable" in confusing ways. Laird states:

> Hitherto, he said, he had, following Locke, used the term "probability" to designate any assent other than "knowledge" (p. 129). Common sense, however, would distinguish between what is only probable (i.e. conjectural and uncertain) from causal expectations (which were utterly convincing). Hume therefore proposed a threefold division into (rational) "knowledge," (causal or experimental) "proofs" and (conjectural probabilities). He had also to note that there was a mathematical calculus of the probabilities both of "causes" and of "chances."[2]

Further Laird maintains that Hume did distinguish a logical from an illogical kind of inference, from experience or between

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[1]Laird, op. cit., p. 87.

[2]Ibid., p. 90.

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prejudiced conviction to conviction based upon repeated experience. The former was unphilosophical or unreasonable "probability." This kind of distinction has a modern flavor and reminds us of work that might be done within the realm of inductive methodology. However, we cannot ignore the three-fold division and Hume's terminology described in the above passage. Laird describes the confusion in Hume quite well in the following words:

> As we have seen the causal problem according to Hume, was the problem of the extension beyond actual experience of a belief, which simulated but was not actual experience. In other words, there was a transition of the mind, felt to be necessary, but going beyond what had been observed. This transition Hume also called "inference" and he maintained, in the end, that the "transition" or "inference" was associative and not an affair of "reason."
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> Nevertheless he was quite prepared to speak of causal "reasonings," and even of causal "proofs." Such language, if not regarded either as a concession to common ways of speaking or as a plain inconsistency involved the consequence that there was a species of causal reasoning and even of causal logic, provided that such "proof," "logic" or "reasoning" was neither the intuitive nor the demonstrative "reason" of knowledge or scientia.
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> The word "proof" in this connexion was (as we have seen) used to indicate that the causal inference yielded certainty (in the sense of complete assurance or conviction) and so had to be distinguished from "probability" when the latter term was understood to mean what was only likely and was not completely assured.[1]

This last sentence above, together with remarks made by Ralph Church on the subject, suggest that our initial supposition that Hume regarded probability to be of a statistical type is correct. Church says:

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[1]Laird, op. cit., pp. 104-105.

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> The analysis given of belief in the probability of causes is so far the same as that already given of the probability of chances that Hume feels under no obligation to take the matter any deeper. In this connection, however, it is again to be noticed that the probability in question is not a property of any or all of the contents of a belief in the probability of causes. In all such cases the various ideas involved will be images not of impressions whose recurrence is uniform and constant, but rather of contrary impressions.[1]

This confusing use of "probability" by Hume seems to obscure if not contradict the insight he has when discussing what is typically called the old problem of induction.

It seems more so then that Hume was on the verge of actually describing the traditional problem of induction rather than actually describing it. Perhaps it was an insight that was unsteady, giving rise to passages that illustrated it and other passages that obscured it. Or it is possible that his successors, who were able to seize steady hold of this insight largely through the suggestive work of Hume, read a stronger discussion of the problem into Hume's writings than he actually presented. In the early stages of science, certain laws were regarded as correctly formulated and discovered for all time. It was only later, when many major laws, gravitation, etc. were thought to be possibly failing in various ways, that people began to think that laws, even those without any yet known exceptions, were at best only probable. Since Hume had already proposed that the uniformity of nature was a probable assumption based on experience alone, philosophers began to hold both views concomitantly, i.e., that the uniformity of nature, as

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[1]Church, op. cit., p. 199.

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well as laws were only probable truths; and the problem of induction was given explicit philosophical attention. Had philosophers noticed that as scientists began to suspect all their laws as only inductively probable and were ready to give them up on occasion, they nevertheless always held that nature was uniform no matter what; the old problem of induction might never have arisen. The inference made in particular inductive laws could be anchored to the certain presupposition that nature is uniform which is true for the scientist in spite of the anomalous experience of some unexpected non-similarity.

Thus the second empiricist objection to any necessity type view of law statements that in a priori reasoning we attain certainty but in causal reasoning only probability fails since its support, Hume's induction argument, is subject to serious objections. Our presupposition objection to Hume's induction argument as well as our historical certainty status objection indicate that the uniformity of nature is presupposed by scientists and as such it may provide a deductive rationale for inductive practice. Hence it is possible that inductive causal statements are well grounded and perhaps certain or necessary. Hume himself did not always write as if inductive practice was circular giving rise to only probable laws. This is clearly reflected in his usage of the words "certain," "probable" and "proof." On occasion Hume explicitly regards causal conjunctions without exceptions as certain.

It is also the case that if the uniformity principle is a presupposed truth about the empirical world it serves as an example of at least one particular empirical statement which is certain. If laws can

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Hume's impressions argument

Though Hume has already stated that effects are totally distinct from their causes and cannot be discovered through them a priori, he ends his discussion in the Enquiry with a further argument against the position that there is some necessary connexion between a cause and its effect. He bases his claim only on the assumption that all ideas are nothing but copies of our impressions and that it is impossible for us to think of anything which we have not antecedently felt either by our internal or external senses.[1] Since there is no external impression of necessary connexion on which to base the idea of necessary connexion, he concentrates his argumentation against the popular opinion of his time that there is an internal impression of necessary connection. Many of Hume's contemporaries thought that the idea of necessary connection could be traced to an internal impression which arises from reflecting on the operations of one's own mind and on the command which the will exercises over the organs of the body and the faculties of the soul. Hume presents three arguments against this thesis which are briefly:

1. We do not know the connection between body and soul and we do not know the power of the one over the other.

2. There are organs of the body which are not moved by any action of our will.

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[1]Hume, Enquiry, p. 89.

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[1] Ibid.,

[2] Ibid.,

[3] Ibid.,

[4] Ibid.,

> 3. The immediate object of power in voluntary motion is not the member itself of the body but certain nerves and animal spirits and it is impossible that this operation which is still so mysterious and unintelligible should be known by any inward sentiment.[1]

For very similar reasons, we cannot claim that any internal impression of necessary connections arises due to the voluntary action of our mind over itself, according to Hume. Thus, "the mind is carried only by habit upon the appearance of one event, to expect its usual attendant, and to believe that it will exist."[2] Necessary connection is only what we associate together in our mind. Therefore, an additional definition of cause, other than the one already cited, is "an object followed by another and whose appearance always conveys the thought to that other."[3]

Our arbitrary assumption objection to Hume's impressions argument

Hume based his definitions of cause on an interesting, epistemological theory. The cardinal principle of his pure empiricism was that knowledge consists of ideas and there is no simple idea which is not based on some previous sense impression.[4] But this principle was adopted by Hume as doctrine without proof. As Kemp Smith writes:

> Hume, who was sceptical--so it was about almost everything else, has yet been so uncritical as to erect the elaborate body of argument which constitutes the Treatise

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[1] Ibid., pp. 91-92.

[2] Ibid., p. 99.

[3] Ibid., p. 100.

[4] Ibid., p. 54.

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> on a foundation which he has not been concerned to examine, and to the unreliability of which he has himself though all unconsciously, been chief witness![1]

In the same vein Passmore says:

> Notoriously, his exposition of that theory is careless and confused; . . . because he felt that on this point he need expect no serious criticism.[2]

Ewing points out that Hume's principle that all ideas are copies of simple sense impressions was nothing but an arbitrary maxim for which Hume provides no proof. In attempted support for his assumption, Hume challenges anyone to produce a simple idea which is not based or did not come from a corresponding sense impression. The obvious candidate was the idea of necessary connection, which many people declared themselves to have; but Hume ruled this counter-instance out in a way that Ewing succinctly describes:

> To assert, as Hume does, the validity of the principle on the ground of failure to produce an idea that does not conform to it, and then, later in the argument when such an idea namely the idea of causality, is introduced, to deny that it is a real idea, because it does not conform to the principle is a breach of the most elementary rules of logic.[3]

It is now acknowledged, even by many Humeans, that the epistemological apparatus which led Hume to disavow the idea of necessary connection as based on anything but subjective feeling is a shaky foundation, indeed, on which to build one's theory.

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[1]Cited by J. A. Passmore, Hume's Intentions, p. 89.

[2]Ibid.

[3]A. C. Ewing, Kant's Treatment of Causality, p. 7.

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Ducasse notes that Hume himself speaks as though he has an idea of necessary connection when he gives his definition of "cause." After giving his definition (see p. 29) Hume adds, "Or in other words where if the first object had not been the second never had existed."[1] Talk of "if-ness" gives hint of an idea of necessary connection. However, Hume was not denying that we do have an idea of a necessary connection between causes and effects, which he himself could not totally obliterate; but that this idea is illegitimate since its origin is to be found in sentiment or feeling which is neither an external impression nor an internal impression of an admissible sort in his empiricist system.

It strikes one immediately, after reading Hume's three major reasons (see pp. 75-76) for concluding that no idea of causal necessity can be derived from reflection on one's own voluntary actions, that his conclusion is somewhat of a non-sequitur. Surely, it does not follow from the fact that the mind-body interaction is in detail unknown, that one can have no awareness of the action taking place, which would result in, e.g., the effect of a voluntary arm lift. In The Mind and Its Place In Nature, C. D. Broad proposes a variant of this objection to Hume's second and third points. He claims that Hume's objections are valid only against the contention that we know immediately that a volition to make a certain movement is the sufficient condition for the happening of that movement. Hume's arguments are irrelevant to the belief that one immediately knows that the volition is a necessary condition for the

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[1]Hume, Enquiry, p. 100.

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happening of just that movement at that particular time. That our nerves and muscles must also be in the right state indicates only that there are other necessary conditions for a particular event. We are thus not wrong in thinking that we know, without having to wait for the result, that the volition is a necessary condition of the movement. In connection with Hume's first point that we do not know the connection between body and mind, Broad maintains that there is a connection between cause and effect in cases of volition and voluntary movement, which is not present in other cases of causation. When it is said that a person has a volition to move his arm, there is involved in this saying that the person also has an idea of his arm and an idea of the position in which he wants his arm to be.[1] Broad concludes from this that:

> It is simply silly in view of this fact to say that there is no closer connexion between the desire to move my arm and the movement of my arm than there is between this desire and the movement of my leg or my liver.[2]

It would seem from Broad's description that the necessary connection between cause and effect in voluntary actions is somehow in the mind, perhaps an internal impression. One thinks of moving his arm and at the same time, he thinks of the position in which his arm is to be. It is difficult, however, to describe in what way this thinking constitutes evidence of a necessary connection between the two events; but even if it could be outlined more precisely than it is by Broad,

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[1]C. D. Broad, The Mind and Its Place in Nature, p. 102.

[2]Ibid., p. 102.

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there remains another problem. Should the idea of necessary connection be given complete and adequate explanation in cases of voluntary actions, this explanation cannot be extended by analogy to cases of causality among inanimate objects. All that might be said by analogy is that if, when I move my arm, I become aware of some necessary connection between my volition and the following position of my arm, then a billiard ball, should it ever wiggle its number or perform whatever voluntary action a billiard ball could be capable of in a vivid imagination, the billiard ball would also notice a necessary connection between its volition and the wiggle of its number, that is, if the billiard ball had a will and an awareness of what it willed.

This whole line of thought is preposterous and bodes of absolutely no utility in solving the problem of explaining the origin of the idea of necessary connection which accompanies the idea of the cause and effect relations of inanimate objects. Let us then go on to consider the views of those who would take a more direct approach to the problem of inanimate cause.

The idea of necessity from external impressions reexamined

In his book entitled Symbolism, Alfred North Whitehead contends that both Hume and Kant regarded causal efficacy "to be the importation, into the data, of a way of thinking or judging about those data." But it is his own view that causal efficacy rather than sense data is the given in primitive experience. It is not the case that the world as it is given in sense presentation is "the aboriginal experience of the lower organisms, later to be sophisticated by the inference to causal

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efficacy."[1] On the contrary, it is first the causal side of experience which is dominating; and a phenomenalistic awareness of transient sense data is only the result of abstraction from the given. Our present perceptions are determined by the past in ordinary awareness when we are impressed by causal efficacy. On the other hand, vivid enjoyment of immediate sense data notoriously inhibits apprehension of the relevance of the future.[2] The former type of experience is, in Whitehead's words, vague, haunting, and unmanageable, while the latter is handy and easy to produce at will. This latter is the superficial product of complexity which halts at the present and is concerned only with the show of things. But the former is to again use a ready word of Whitehead, heavy with the contact of the things gone by which lay their grip on our immediate selves.[3] Present events are subject to the limitations laid upon them by the actual nature of the immediate past.

If Whitehead's account sounds in some way mystical or perhaps poetical, well it might, for he also has direct recourse to the poetic, "Pereunt et imputantur"--"The hours perish and are laid to account."[4] The "pereunt" refers to the world of passing presentations while the "imputantur" refers to the world of presentation as it is disclosed in its causal efficacy.

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[1]Alfred North Whitehead, Symbolism, p. 49.

[2]Ibid., p. 42.

[3]Ibid., p. 44.

[4]An inscription on old sundials in 'religious' houses.

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Interesting as this portrayal of causality may seem it is difficult to settle the controversy that rages around the cause and effect relation by maintaining that causal efficacy is primitive, unanalyzable, and directly known. This is especially the cause when one's characterization of the external impression of causal efficacy is in terms of words such as "heavy" and "haunting." Hume might well have agreed that we are aware of causal efficacy when we view the world, but that analysis reveals this awareness to be based merely on the psychological associations of the mind. It does not prove Hume wrong merely to say he is. If Hume does not concede Whitehead's point it indicates not that Hume is wrong but perhaps only less poetical.

Causal connection externally given--
Max Black

In his article "Making Something Happen" Max Black describes many ordinary actions of human subjects as perfectly clear cases of making something happen. These perfectly clear cases include actions such as bringing the glass nearer, closing a window, opening a drawer, turning a doorknob, or sharpening a pencil.[1] These events are such clear-cut cases of making something happen that Black contends it would be absurd to ask for any evidence that the man made the window close if in fact one actually saw him do it. Black seizes upon the above cases in order to establish preanalytically what constitutes a paradigm case of making something happen. By focusing on paradigm cases of

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Max Black, "Making Something Happen," Determinism and Freedom, ed. by Sydney Hook, p. 15.

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[1]Ibid.

making something happen, Black hopes to counter the claims of those philosophers who state that it is impossible for anything to be a cause since the notion of cause is self-contradictory. Black claims that we can pass from the homespun language of making something happen to the more sophisticated language of "cause" and "effect," for to make something happen is to cause something to happen. But in order to understand what we mean by "cause" and "effect," we must labor to understand first what we mean by the precausal language in which the more sophisticated vocabulary is embedded. Thus Black isolates the following criteria of application of "cause" in the paradigm case:

> The cause was a free act of a person, the effect was a motion of an inanimate object, the cause and effect were contemporal (operative through the same time interval) and the effect was a necessary consequence.[1]

In explaining later how it is that the effect is a necessary consequence of the cause, Black states that the cause is conditionally necessary for the occurrence of the effect such that if a person P had not undertaken his action A, of closing a window for example, the window never would have closed.

He adds of course that it is "untrue to say that a glass would not have moved as it did unless P had made it do so, for if P had not moved it, some other person might have done so. What we mean is that the window would not have moved by itself; that is if P had not performed action A, or some other action resulting in the glasses moving, the glass would have remained stationary. In other words, though all

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[1] Ibid., p. 21.

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[1]Ibid

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other features of the setting remained unchanged, if A does not occur, the glass will not move. To explicate the necessary aspect of the situation further, Black states that "we say that M had to happen when A happened, only if M would always ensue, given an unchanged setting and the same concomitant."[1] This last phrase is curious in comparison with Black's major contention. Elsewhere in the article he contends that his example of the use of "cause" is one of its applications to concrete, particular cases much as the analysis of Ducasse. In stressing this particularity, Black says:

> In this cursory examination of some features of a paradigm of making something happen, I have had little occasion to refer to any "constant conjunction" between producing action and induced motion. The omission has been deliberate . . . in order to be sure that P made O move, we need only look. The verifying situation is right before our eyes. To establish conclusively that P did do such and such and that O was moving thus-and-thus meanwhile . . . I do not say we should be right in maintaining that A made M happen whenever an action and a cotemporal motion are contiguous. In using the language of "making something happen" we take for granted that the episode in view has a special and appropriate character. Should we be challenged to specify these conditions in full detail, we should eventually have to talk about constant conjunctions; and in deciding in unusual, unfamiliar or abnormal settings whether the use of causal language is appropriate, prolonged inductive investigations might be needed.[2]

It is interesting to note that, in the above passage, Black makes it very clear that his paradigm cases of cause or making something happen are individual cases of particular causes working in particular

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[1] Ibid., p. 25.

[2] Ibid.

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situations that may never again be repeated, e.g., there was only one person in history who was ever murdered by someone, a causal agent, who dropped a dumbbell on the victim's head from the fortieth floor of a high rise building. However, in isolating the features of his paradigm example, Black includes the point that the effect necessarily follows the cause and clarifies the necessary relation not in particular terms but in terms of a repetition of instances. It will be recalled that he maintains that to say an effect has to happen when a certain cause happens is only appropriate if the effect would always ensue given an unchanged setting and the same concomitant. It appears then that in the paradigm case of a particular cause engendering a particular effect there is not an element of necessity such that one would say the person struck by a barbell falling from the fortieth floor must die. We may be able to determine what killed the man should he die after being so struck, but it does not appear that any necessity talk enters the picture with regard to cause-effect relations until general conditions of the particular occurrence are spelled out by repeated experiment.[1] Thus Black's paradigm perhaps bears all the criteria mentioned except that the effect necessarily follows the cause. An adequate explanation of the necessity which is involved in causal language is best described in terms other than in this basically Humean view of Black's.

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[1]By Black's own admission (see quotation on p. 84), we cannot say that P made O happen unless we have seen repeated conjunctions of O following an action of P. Though Hume might say "do not" instead of "cannot" Black is adopting a Humean type view.

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Chapter II.

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The foregoing objection to Hume's impressions argument expressed in the writing of Broad, Whitehead, and Black has been that somehow a necessary connection between events is perceived or sensed. Some primitive datum of a necessary connection lurks in the empirical world or within our own bodies which can be observed by us. Interesting as such speculation may be, it is not our concern in this writing to decide if there are observable or even unobservable connections between events in nature. We are concerned rather in providing a necessity theory of law statements which will clarify the use of the terms "nomic necessity" in scientific discourse with respect to these statements. We shall now begin the construction of our necessity theory as we discuss Kant's proof for the necessary truth of the general laws of causality in Chapter II.

We begin the exposition of our necessity theory of law statements with a treatment of Kant's argument for several reasons. We shall find in Chapter II that Kant provides a deductive proof, in the "Second Analogy," for the truth of the general law of causality (every event has a cause). Not only is GLC (the general law of causality) true but it is regarded by Kant as an a priori synthetic truth and a necessary presupposition of experience. However, this assessment of GLC poses a problem. It is a long-standing belief among empiricist philosophers that a priori truths are necessary, self-evident truths which are independent of observation and experience. It is also a long held belief that synthetic truths are contingent and in some sense (an ambiguous one as we shall see in Chapters III and IV) factual.

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We have already argued in this present chapter that knowledge of causes and effects, particularly on the every day level of observation, can be known independently of the experience of a particular novel object, its causes and its effects. Thus it is possible to gain or have factual knowledge in a particular situation without any specific and direct observation of what comes to be known, the particular effect of a novel object. There is then a sense in which some factual information can be known a priori. We think that this realization is particularly expressive of modern scientific practice in which scientists say that they can deduce true statements of fact, even factual laws, from theoretical statements far removed from direct observational evidence.

We wish then to examine in succeeding chapters whether "a prioricity" and "empirical facticity" are contradictory terms. Since "a prioricity" is used interchangeably with "necessity," we shall also examine whether "necessity" and "empirical facticity" may not be contradictory terms. If these two terms are not contradictory it may be the case that some factual claims are known not with probability but with certainty as when they are presupposed by premises known to be true. We suggest that this is true of a claim such as GLC (the general law of causality) and so it seems appropriate to begin now by discussing a necessary presupposition deductively proved by Kant which is considered a priori, synthetic and which makes a claim about the empirical world that every event has a cause.

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CHAPTER II

THE KANTIAN VIEW OF CAUSALITY

Historical note

It was Hume's view of the character of the causal nexus which awakened Kant from his "dogmatic slumber" sometime around 1772, but Kant himself subscribed to part of the Humean view, viz., that the causal connection was not a logical relation of ideas, prior to that year.[1]

Kant came to realize the synthetic character of the causal connection around 1763 when he wrote his treatise on Negative Quantity. Kant drew the distinction between logical and real opposition by noting that logical analysis reveals that the predicate "eternity," when applied to God, must exclude that of mortality, but that only experience can reveal that the movement of one body should prevent the movement of another. In real opposition, the conflicting tendencies both remain present in the object and only cancel each other's effects while in logical opposition the predicates cancel each other. Logical opposition is impossible in real existents, for nothing that exists can be self-

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[1]Lewis W. Beck, "Editor's Introduction," Prolegomena To Any Future Metaphysics, Immanuel Kant, p. XI.

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contradictory.[1] Similarly, Kant made a distinction between logical and real ground, for he says:

> I see very well how a consequent is deduced from its ground according to the law of identity namely because it is discovered through analysis of concepts to be contained in the ground. . . . I call the first kind of ground the logical ground, because its relation to the consequent is logical, i.e. can be clearly realised as following from the law of identity . . . how something can follow from something else otherwise . . . I call the actual ground, because while this relation belongs to my true concepts there is no judgment possible about its nature. . . . A relation of the logical ground and consequent always constitutes an affirmative judgment in which the predicate is the consequent and the subject the ground. In the actual relation of cause and effect this is never the case.[2]

In one of the "Reflexionen" published prior to 1762, Kant further remarks that we can only know the connection of cause and effect a posteriori, not a priori. There are two important historical points which need mentioning at this juncture since they may shed light on what will soon be seen by the reader as possible ambiguities in Kant's treatment of causality. These points are:

1. In Kant's Inaugural Dissertation of 1770 he still does not think it necessary to prove the general principle of causality, and. . . .

2. He applies this general principle without question to things - in - themselves.[3]

It is not until the writing of the Critique of Pure Reason that Kant finds causality to be valid only for experience in time, for

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[1]A. C. Ewing, Kant's Treatment, p. 32.

[2]Ibid., pp. 33-34. (Ewing quotes from Kant.)

[3]Ibid., p. 36.

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without it, such experience would be impossible. As A. C. Ewing succinctly summarizes in his book Kant's Treatment of Causality:

> In the Dissertation, the a priori concepts like cause are discovered by abstrating from all sensible experience but according to the Critique their a priority depends on the fact that they underlie and are implied in all sensible experience.[1]

From the writing of the Dissertation onward, Kant was to develop the idea that the categories presuppose perception for their application and that perception of objects presupposes the categories.

The change in Kant's view between the Dissertation and the Critique may well have been stirred by the work of Hume. With the realization that the causal law could be justified neither logically nor empirically, Kant knew that the foundation of natural science as well as metaphysics was in jeopardy; and Kant set himself to their defense. It is in pursuit of this defense that Kant departs from Hume. From the synthetic nature of causal laws, Hume concluded that the only necessity involved in the concept of causality was psychological. But Kant opposes Hume at B793-794 in the Critique when he says, "Hume was therefore in error in inferring from the contingency of our determinations in accordance with the law, the contingency of the law itself."[2] It is thus that Kant seeks to reply to Hume by demonstrating the necessary truth of the general law of causality itself which particular empirical laws presuppose. Graham Bird in his book Kant's Theory of

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[1]Ibid., p. 36.

[2]Graham Bird, Kant's Theory of Knowledge, p. 165. (Bird notes this reference.)

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Knowledge cites a description of the causal law given by Wittgenstein in the (Tractatus 6.32):

> It is the "form of a law" and does not itself express any causal relation between particular phenomena. It is rather a conceptual truth which determines the sense of the concepts "cause" and "event" and may be regarded as introducing the concept "cause" into our experience or as expressing its function in that experience, for without it the discrimination of an event and of an objective time order would not be possible.[1]

Kant's argument

Kant presents his view of causality in the "Second Analogy" in the Critique of Pure Reason. A. C. Ewing claims in his book Kant's Treatment of Causality that Kant gives six separate proofs of the category of causality. However, Ewing considers five of the proofs stated in the second edition to be essentially the same while the fifth proof in this edition is viewed as different from the other five, and Ewing treats it as a separate argument. Though close scrutiny suggests to this writer that Kant has really given only one main proof which he states in various ways, the passages which Ewing delineates as separate proofs are those most quoted and studied by students of Kant; and so, they will be presented here in order to familiarize the reader with the "Second Analogy" in some depth.

Ewing states that the five similar proofs of the category of cause turn on the connection between objectivity and necessity. Since Kant maintains that our representations can tell us nothing about

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[1]Ibid.

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things-in-themselves but only about phenomena, the question arises as to how it is that we distinguish between objective and subjective order in time. The answer is given by Kant in the following passage which Ewing designates as Kant's first proof.

> But as I also note, in an appearance which contains a happening (the preceding state of the perception we may entitle A, and the succeeding B) B can be apprehended only as following upon A; the perception A cannot follow upon B but only precede it. For instance, I see a ship move down stream. My perception of its lower position follows upon the perception of its position higher up the stream, and it is impossible that in the apprehension of this appearance the ship should first be perceived lower down in the stream and afterwards higher up. The order in which the perceptions succeed one another in apprehension is in this instance determined, and to this order apprehension is bound down. In the previous example of a house my perceptions could begin with the apprehension of the roof and end with the basement, or could begin from below and end above; and I could similarly apprehend the manifold of the empirical intuition either from right to left or from left to right. In the series of these perceptions there was thus no determinate order to connect the manifold empirically. But in the perception of an event there is always a rule that makes the order in which the perceptions (in the apprehension of this appearance) follow upon one another a necessary order.[1]

It is in this way that a distinction is made between apprehensions of objective succession and other apprehensions.

Ewing states that the second proof, which begins at B239-241, runs along the same lines with the additional reminder that causation cannot be proved by empirical induction because of its necessary character. Kant formulates the case a third time by saying:

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[1]Immanuel Kant, Critique of Pure Reason, trans. by Norman Kemp Smith, p. 221 (A192-B237).

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> Objective meaning cannot consist in the relation to another representation (of that which we desire to entitle object), for in that case the question again arises how this latter representation goes out beyond itself, acquiring objective meaning in addition to the subjective meaning which belongs to it as determination of the mental state. If we enquire what new character relation to an object confers upon our representations, what dignity they thereby acquire, we find that it results only in subjecting the representations to a rule, and so in necessitating us to connect them in some one specific manner; and conversely, that only in so far as our representations are necessitated in a certain order as regards their time-relations do they acquire objective meaning. . . . I apprehend an object to which I must ascribe a certain determinate position in time--a position which in view of the preceding state, cannot be otherwise assigned.[1]

The fifth proof in the first edition and the one added in the second edition are both discussed in terms of synthesis by Ewing, and they can both be understood via the following quotation which also is representative of the sixth argument in the second edition.

> I perceive that appearances follow one another, that is, that there is a state of things at one time the opposite of which was in the preceding time. Thus I am really connecting two perceptions in time. Now connection is not the work of mere sense and intuition, but is here the product of a synthetic faculty of imagination, which determines inner sense in respect of the time-relation. But imagination can connect these two states in two ways, so that either the one or the other precedes in time. For time cannot be perceived in itself, and what precedes and what follows cannot, therefore, by relation to it, be empirically determined in the object. I am conscious only that my imagination sets the one state before and the other after, not that the one state precedes the other in the object. In other words, the objective relation of appearances that follow upon one another is not to be determined through mere perception. In order that this relation be known as determined, the relation between the two states must be so thought that it is thereby determined

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[1] Ibid., pp. 224-225.

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> as necessary which of them must be placed before, and which of them after, and that they cannot be placed in the reverse relation. But the concept which carries with it a necessity of synthetic unity can only be a pure concept that lies in the understanding, not in perception; and in this case it is the concept of the relation of cause and effect, the former of which determines the latter in time, as its consequence--not as in a sequence that may occur solely in the imagination (or that may not be perceived at all). Experience itself--in other words, empirical knowledge of appearances--is thus possible only insofar as we subject the succession of appearances, and therefore, all alteration, to the law of causality; and, as likewise follows, the appearances, as objects of experience, are themselves possible only in conformity with the law.[1]

The other proof for causality, which Ewing considers to be different from those presented so far by Kant, is the fourth, stated in the first edition, and the fifth in the second edition:

> If, then, it is a necessary law of our sensibility, and therefore a formal condition of all perceptions that the preceding time necessarily determines the succeeding (since I cannot advance to the succeeding time save through the preceding), it is also an indispensable law of empirical representation of the time-series that the appearances of past time determine all existences in the succeeding time, and that these latter, as events, can take place only insofar as the appearances of past time determine their existence in time, that is, determine them according to a rule. For only in appearances can we empirically apprehend this continuity in the connection of times.
>
> Understanding is required for all experience and for its possibility. Its primary contribution does not consist in making the representation of objects distinct, but in making the representation of an object possible at all. This it does by carrying the time-order over into the appearances and their existence. For to each of them, (viewed) as (a) consequent, it assigns through relation to the preceding appearances, a position determined a priori in time. Otherwise, they would not accord with

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[1] Ibid., pp. 218-219.

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> time itself, which (in) a priori (fashion) determines the position of all its parts. Now since this absolute time is not an object of perception, this determination of position cannot be derived from the relation of appearances to it. On the contrary, the appearances must determine for one another their position in time, and make their time-order a necessary order. In other words, that which follows or happens must follow in conformity with a universal rule upon that which was contained in the preceding state. A series of appearances thus arises which with the aid of the understanding, produces and makes necessary the same order and continuous connection in the series of possible perceptions as is met with a priori in time--the form of inner intuition wherein all perceptions must have a position.[1]

Kant's premises and conclusion

Ewing's speculation notwithstanding, these passages reveal but one central argument embodied in the following premises and conclusion.

I. "The apprehension of the manifold of appearance is always successive. The representations of the parts follow upon one another" (B234).

II. "How things may be in themselves apart from the representations through which they affect us is entirely outside our sphere of knowledge" (B235-A190).

III. In spite of I and II above, we have to show what sort of a connection in time belongs to the manifold in the appearances themselves,[2] for we are conscious of an objective sequence in time, i.e., events (paraphrase of B235-A190).

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[1] Ibid., pp. 225-226.

[2] These appearances would not be synthesized by the imagination yet.

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IV. "Every apprehension of an event is a perception that follows upon another perception" (B237-A192). This premise follows from:

a. "that something happens, i.e., that something or some state which did not previously exist comes to be, cannot be perceived unless it is preceded by an appearance which does not contain in itself this state" (B236-A191).

b. "For an event which should follow upon an empty time, that is a coming to be preceded by no state of things, is as little capable of being apprehended as empty time itself" (B237-A192).

V. "I also note in an appearance which contains a happening (the preceding state of the perception we may entitle A, and the succeeding B) B can be apprehended only as following upon A; the perception A cannot follow upon B but only precede it. The order in which the perceptions succeed one another in apprehension in this instance is determined and to this apprehension is bound" (B237-A192).

∴ "In the perception of an (event) there is always a rule that makes the order in which the perceptions in the apprehension of this appearance follow upon one another a necessary order. The objective succession will consist in that order of the manifold of appearance according to which in conformity with a rule the apprehension of that which happens follows upon the apprehension of that which precedes" (B238-A193).

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In judging this argument, one must of course judge both the truth or falsity of the premises and its deductive validity. Even if the premises are regarded as true, we may still conclude that they do not imply causal necessity;[1] for the matter of validity also needs to be settled; and this is not easily done since there are varying interpretations of the premises and conclusion which vary its meaning and, with it, the validity of the proof. Before considering the various interpretations that have inspired criticism, let us consider what might well be called "the minimal interpretation" since it is the interpretation which makes the narrowest claims and proves the least that Kant may have wanted to prove about causality. There is support for the minimal interpretation in the text and it does yield a conclusion that is implied by the premises. As a valid demonstration, it reveals an interesting argument which can perhaps be extended to prove a little more of what some critics claimed Kant tried to demonstrate about causality.

The minimal interpretation of Kant's argument

The first, second, and third premises state what Kant believes to be the dilemma of the perceiver. We have only perceptions to be the dilemma of the perceiver. We have only perceptions which are successive and tell us nothing about things-in-themselves. Yet we observe that, in fact, perceivers do discriminate among perceptions, i.e., that some

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[1]This last phrase 'causal necessity' is left purposely vague at this point since its clear meaning changes under the varying interpretations yet to be considered.

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perceptions constitute an event or objective succession in an object while others do not. In one case, we see the basement window of a house and then the roof and say that nothing is happening to the house though the perceptions are successive. No event is taking place. We are merely viewing the house parts. In another case, one sees a ship upstream and then the ship farther downstream. This boat is said to be moving downstream though these perceptions are also nothing more than successive. Kant's problem stated in premise III then, is how is this discrimination possible? What do perceivers do in order to call the latter successive sequence an event and the former successive sequence not an event? Premise IV is a partial description of that situation in which the term 'event' is applicable.[1] Faced with two successive state perceptions, they must differ if we are to allow that anything has happened or changed. If two state perceptions were the same, there would never be talk of a change or event taking place. But alas, there are sequences of successive but differing state perceptions which are said to be events, i.e., the case of the ship; and there are other sequences of successive but differing states which are said not to be events or cases of change in the object, i.e., the case of the house. In premise V, Kant gives the final criterion which makes the descrimination between the two successive sequences of differing state perceptions possible. In the first sequence, i.e., that of the ship moving downstream, the order of perceived states is determined while

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[1]If the linguistic bent of phraseology seems too modern an interpretation of Kant's thought, see B238-A193 on p. 222 of N. K. Smith trans.

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in the second sequence the order is not determined. If A precedes B and we cannot on our part perceive B to precede A, the sequence is termed an event. If B precedes A due to no perceptual actions on the perceiver's part, it is termed an event but not the same event as that in which A precedes B. Finally, the conclusion states the deduction that a determined order requires something that determines it which Kant calls a rule, the law of causality, or the rule of sufficient reason, since the subject perceiver has already been excluded as the determinant. It is not important that we know what the cause is which affects a moving ship but merely that there is some cause. It is not the case either that state A which precedes state B is the cause of state B. The state of being upstream is not the cause of the ship moving downstream. Thus premise V must be understood to be making a determined order claim for events even when all the possible constituent state perceptions are in fact not perceived by the perceiver. In the event of the ship moving downstream, constituent perceptions x, ship upstream, and y, ship downstream, are perceived; but possible perception z, oarsman paddling ship, is not so perceived. It also appears from the text that the perceiver need not know the specific cause obtaining in a given situation but only that if the order of perceived states cannot be changed by any action on the subject's part qua perceiver then it is determined from without and there must be a rule of necessity. This is reminiscent of Descarte's description of adventitious ideas. At any rate, Kant demonstrates that some causal factor is operative though not that it must be known in any particular case. He

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also concludes that events constitute objective succession, i.e., succession of states in the object of perception be it apparent (as in the case of my dreaming about the ship moving downstream) or real (as in the case of my wakefully seeing, under normal conditions, a ship moving downstream which is also seen by my comrades).

Assume that the above minimal interpretation is faithful to Kant's argument for the moment and consider the following objections which have been levelled against the truth of the various premises.

Criticism of premise I

Ewing claims that four out of the five statements of the argument, which he delineates, argue from objectivity to necessity and start with the assumption that all apprehension of the manifold is successive.[1] It seems that Kant is not only claiming that there is always a succession in time involved in our experience but that we can never immediately apprehend the co-existent or permanent. We can only immediately apprehend the successive, and thus all our representations are successive and never co-existent. But at B234 Kant says, "My representations of the co-existent are treated as always successive just like my representations of the objectively successive." Ewing concludes that Kant denies the possibility of distinguishing the co-existent and the sequent, in any single case, by simply having representations that co-exist, as opposed to representations that follow each other, on the ground that apprehension is always successive.

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[1]Ewing, Kant's Treatment, p. 218.

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In opposition, Ewing believes that the findings of modern psychology clearly indicate, in cases of introspection, that "what we are conscious of even as an object of explicit attention or cognition involves co-existent elements and is not a mere one dimensional succession."[1] The elements range from slight sensations, which, as he says, help to constitute the general feeling tone of a given attended situation; to objects of concentrated attention. Ewing goes on to claim that introspection, far from revealing the merely successive, never does so at all, for he characterizes the merely successive as the absolutely simple, a mere line without breadth.[2] Whether Kant or Ewing is right about the complexity of representations is not only a question of psychology but also quite beside the point.

Even if one could perceive the bottom of the house while attending to the roof, Kant could redesignate his example of a simple perception as a perception of the whole house A at one end of the block and construct his subjective sequence by comparing this perception to another perception of the whole house B at the other end of the block. Presumably the second perception of house B could not be had, even faintly from one's side vision, as house A is being attended to by the perceiver. It is this possibility that Ewing probably considers when he concedes that his objection does not seriously damage Kant's line of argument. The deduction that Kant makes is not dependent on his assumed premise of a merely successive manifold, and his argument is even stated

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[1] Ibid., p. 84.

[2] Ibid.

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Ewing recognizes that the second analogy is an attempt to show that the distinction between objective and subjective succession involves causality. There can be no doubt, Ewing thinks, that such a distinction is made and that it is not determined by the actual order of our perceptions even though not all perceptions in his belief are successive. At times, the co-existent can be given in a single perception, but there still are other times when the status of objective succession is denied to successive perceptions, as in the counter-example of viewing houses A and B. There are times too when the determination of objective co-existence is made about successive perceptions. Hence, premise I can be maintained and even slightly revised to harmonize with Ewing's insight without weakening Kant's argument. The revised premise is: The apprehension of the manifold is sometimes successive. The representations of the parts then follow upon one another.

Objections to premise III

Prichard makes the claim that co-existence or permanence and change can be directly perceived and that if the manifold is successive the succession is of event and non-event perceptions. He questions the truth of premise III by saying that Kant's problem of distinguishing objective sequences or events from merely subjective successions simply

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[1]Kant, op. cit., p. 218 (B233).

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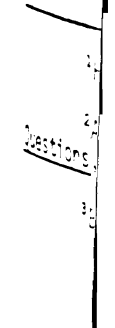

does not arise because we apprehend the time order of events immediately.[1] We perceive that Jones crosses the finish line first when Smith loses a race and Jones wins the race. This objection is also raised by Lovejoy and is similar to, but stronger than, the criticism just discussed in connection with premise I.[2]

Graham Bird, in his book Kant's Theory of Knowledge, points out that the difficulty with Prichard's objection is simply that, while Prichard is speaking about the order of events, Kant is speaking about the order of states or state perceptions that go to make up an event. We may distinguish events in terms of the orders of two states in the same object. In example, Bird suggests that the question of whether water was frozen or ice melted is settled by different orderings of the same states of fluidity in the water. Thus Kant has ground for choosing to consider the order of states rather than the order of events. The analysis of complex events, such as Jones winning the race from Smith, ultimately depends upon simpler events; and Kant has "naturally chosen to consider the simplest events on which the discrimination of more complex events depends."[3] The simple events depend of course not on any other events but only upon the order of states in an object. If Prichard argued further that when we do at least perceive directly the order of states, Kant's problem would become a problem also for him because the question of which sequence of perceived states is to be

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[1]H. A. Prichard, Kant's Theory of Knowledge, pp. 294-295.

[2]Arthur O. Lovejoy, "On Kant's Reply to Hume," Kant; Disputed Questions, ed. by Moltke S. Gram, p. 297.

[3]Bird, op. cit., p. 157.

termed an event, on occasion, would once again arise. Bird in addition stresses that it is not even a problem of apparent events being mistakenly supposed for a real event in premise III, but rather a problem of when it is appropriate to speak of an event at all, be it apparent or real. In support of his contention, Bird emphasizes premises IV and V. If a ship is first seen in one position and then in another downstream, we can describe what was perceived as the event of a ship's moving downstream whether the ship has actually moved or not. It would still be appropriate to call such a succession of perceptions an event. However, it would never be appropriate to call the successive perceptions of a house roof and a house basement an event. As Bird says it, Kant is interested only in the inference "I perceived A and then perceived B" to "I perceived the event A-B" and not in the inference from "The event A-B appeared to take place" to "The event A-B really took place." The premise of the former does not presuppose the vocabulary of events; for after all, that is the point at issue; and Kant's problem is genuine.

Bird suggests that Kant's talk of the transition from subjective to objective succession may have given rise to the belief among many critics that Kant is attempting to justify inferences from the way things appear to happen to the way in which they happen objectively. However, Kant is trying to indicate the difference between discernment and non-discernment of an event rather than between recognition and misrecognition of an event. As Bird points out, it is possible to misrecognize an event only if it is possible already to discriminate between events and other kinds of phenomena. To quote:

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> What distinguishes an actual event from a perceived succession of actual states in an object also distinguishes an apparent event from a perceived succession of apparent states in an object.[1]

The inference from state--descriptions to event--descriptions involves a question about the meaning of the term 'event' which is presupposed in questions of the criteria for distinguishing real from apparent events.

Bird does well to stress a close reading of premises IV and V in order to understand exactly what Kant's problem is in premise III, i.e., how to distinguish objective from subjective succession. However, Bird's remarks are not quite complete enough to adequately define Kant's problem and the ambiguity which his critics find in it.

Further defense of premises III, IV and V

In keeping with the Kantian spirit it must be remembered that Kant is talking always about ascriptions of objectivity within the manifold of appearance. He uses 'appearance' in the "Second Analogy" as he would the term 'phenomena,' i.e., to name the categorized content of empirical, sensuous intuition.[2] Had Kant been more precise, he would have called attention to the fact that ascriptions of objectivity are really two-levelled. First one must separate objective successions from subjective successions in order to correctly identify a change of state in the object of appearance, such as ice melting or a ship moving downstream, from merely changing perceptions of an object which is not said

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[1] Ibid., p. 158.

[2] This is not the way Kant typically uses 'appearance' elsewhere, when it is used to name the lowest level of representation, something akin to sense data.

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to be changing, such as the house of his example. Once this distinction is accomplished, one must further discern the criterion by which perceivers discriminate real events from imagined ones, as when one might dream of a ship moving downstream. As Bird suggested, the first objectivity distinction must be made before the second one can be attempted. But both distinctions are made all the time by people in determining what is objective in the usual sense of the term 'objective.' As a matter of fact, the first objectivity distinction is made so spontaneously that the question of objectivity as it is usually discussed in philosophy revolves almost exclusively around the second objectivity distinction. It was for this very reason that Prichard denied that Kant really had a problem in premise III, as just discussed. Thus, Kant has called attention to an interesting aspect of the usual problem of objectivity claims by showing that even imaginary events involve application of an objectivity criterion, i.e., a rule of necessary sequence in time, if they are to be known as imaginary events as opposed to imaginary non-events. To focus on this first aspect of objectivity, viz., this first distinction, is indeed Kant's aim in the "Second Analogy," as Bird concluded. Hence, it is this understanding of premise III, i.e., of Kant's problem, which has been incorporated into our minimal interpretation of the argument of the "Second Analogy." But in fairness to Kant's critics, let us explore the possibility that there is a broader interpretation which can be put on Kant's argument, which suggests that Kant is not only trying to solve the problem of how to make the first distinction with regard to objectivity but the second distinction as well.

Lovejoy, in his article "On Kant's Reply to Hume," interprets Kant to be arguing for causal necessity as the ground between objectivity and subjective dreams or hallucinations and accuses Kant of a non-sequitur.[1] Lovejoy notes that premises IV and V do not imply such a conclusion. The most that premises IV and V can imply, he claims, is that causal necessity is the criterion for distinguishing events from non-events be they in veridical perceptions or dreams. The latter, of course, is the current conclusion that we have already incorporated into the minimal interpretation of Kant. Supported by the admonition of Bird, it would seem that in this assumption there has been no mistake; and Lovejoy may be wrong to identify Kant's confusing terminology as a confusion in his argument. The matter is not so simple; however, for Lovejoy has reason to believe that Kant actually lifted (either intentionally or absent-mindedly) a different argument from the earlier work of the "dogmatic philosopher" Wolff, who attempted to supply a proof of the Principle of Sufficient Reason which was lacking in the work of Leibniz.[2] Lovejoy quotes Wolff as saying:

> . . . a sufficient proof will appear when we show that it is through this principle alone (Principle of Sufficient Reason) that the distinction between reality and dreams between the real world and Schlaraffenland arise. . . . Because everything has its sufficient reason for existing there must also always be a sufficient reason why changes in simple things succeed one another in one way and not

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[1]This objection could have been discussed with the other criticisms of non-sequitur which will follow later in this paper, but it also seems to follow naturally topics treated just prior to this section which challenge the truth of premises III, IV and V.

[2]This is only one side of a historical controversy. Ewing strongly disagrees, that Kant <u>did</u> totally divorce himself from Wolff--see pp. 23-24.

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> in another and also why their alterations follow each other in one way and not in another. . . . Now since an order of this kind is not found in a dream . . . one recognizes clearly from this that truth is separated from dreams by means of order . . . the order of the alteration of things.[1]

Lovejoy claims that while Kant sets out to produce the above Wolffian argument, he in fact confuses it with his own argument concerning the problem of distinguishing between perceptions of change and perceptions of permanence whether the perceptions be objective (in the sense of the second distinction) or purely illusory.

Unfortunately the strength of Lovejoy's claim that Kant was confusedly trying to present Wolff's argument as his own depends heavily on how Kant meant to use the terms 'objective' and 'subjective,' and this is of course the very point at issue. The text, however, does supply strong clues as to Kant's intentions. Throughout the "Second Analogy," Kant uses the phrase 'objective succession' in apposition with the term 'event'; and nowhere does he use the phrase 'objective event.' This clearly indicates that Bird's claim is correct and that the minimal interpretation of the argument given here while the least that can be said can at least be said to accurately represent Kant's thought. But given the dominant use of 'objective' in philosophy to describe the problem centering around the second objectivity distinction, it would be surprising if Kant, who was calling attention really to a different use of the term 'objective,' should not slip into the common or orthodox use of the term at isolated points. But careful

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[1]Lovejoy, op. cit., pp. 291-292.

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reading indicates that there is only one sentence in the text where Kant can be even possibly accused of making such a slip. It occurs at B247:

> Were it not so, were I to posit the antecedent and the event were not to follow necessarily thereupon, I should have to regard the succession as a merely subjective play of my fancy; and if I still represented it to myself as something objective, I should have to call it a mere dream.

Close inspection however of this passage reveals two things:

1. An accusation that Kant is confusing at B247 his own argument for objectivity distinction 1 and Wolff's argument for objectivity distinction 2 may be hasty.
2. Lovejoy's criticism that if Kant is trying to ground distinction 2 on his own premises for distinction 1, he is guilty of a non-sequitur may be ill-taken.

In considering the second point, it must be noted that Lovejoy bases his claim of a Kantian non-sequitur on the supposed fact that necessary sequence is neither the primary nor the only criterion by which objectivity distinction 2 is made. Certainly it seems plausible for us to agree with Kant at this point that necessary sequence is the only criterion by which objectivity distinction 1 is made. But even if Kant has confusedly used premises that imply distinction 1 for an implication of distinction 2, there may still be a non-non-sequitur (if you will) claim to be made against Lovejoy's contention.

Lovejoy states that:

> Practically the most important criterion of the objectivity of a perception, at the time that I am having it, is its agreement with the experience of other men about me. But

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> it is true that if the test of social currency cannot be applied, I am likely to test the perception by seeing whether it conforms to the rules of causal sequence uniformly exemplified in the phenomena of my past experience.[1]

Quite on the contrary, however, it seems that people rarely ask their fellows what they (their fellows) are seeing as they look at a ship moving downstream or a tower in the distance. Rather the primary criterion for objectivity in both its senses is the discernment of necessary sequence. Only when a perceiver cannot make such a discernment of necessary sequence is he likely to ask another observer what it is that he is seeing. On being asked, is this second fellow in Lovejoy's opinion to ask a third person in order to answer the first; or is not the second fellow's answer hopefully given in light of his own discernment of some necessary sequence? If the second perceiver must ask yet a third, somewhere at the end of the query line someone must come up with the answer on the basis of some necessary sequence of his own perceptions or the questioning will go on ad infinitum. Thus, if anything, Kant's criterion is the only criterion for ascribing objectivity in either sense of the word, whether immediately or ultimately. A case can be made then to deny that Kant is guilty of a non-sequitur even if necessary sequence is used by him as a criterion for objectivity distinction 2. But a careful look at the only passage in the "Second Analogy" which might suggest this use of the criterion reveals that Kant is fully aware that he is not arguing for a ground that will enable the distinction between apparent and real events to be made. As he says at

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[1] Ibid., p. 305.

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B247 when the criterion he is trying to establish cannot be applied, "I cannot conclude that an event has taken place and if I insist on still regarding it as an event or something objective I should have to regard the event as a dream." This positing of something objective as part of a dream reveals, perhaps better than any other passage, that Kant is mindful of the two levels of objectivity claims and that he is using the term 'objective' in an unusual manner to refer to the often overlooked first level objectivity claim. The "Second Analogy" is also consistent in this usage, and Kant does not appear to be guilty of any confusion in his argument but only of using unorthodox terminology. In this practice he is neither the first nor the last guilty philosopher.

Based on an understanding of the conclusion of Kant's argument, which is broader than that expressed in the present minimal interpretation, viz., that Kant has proved there are particular necessary rules rather than that there is one necessary rule, i.e., the general law of causality, Ewing considers another criticism of Kant made by Prichard. In doing so, Ewing reworks Kant's argument just enough to make it a valid proof of just the kind of objectivity Lovejoy said it could not prove. The hint of this has already been stated.

Ewing quotes Prichard as saying that:

> He (Kant) is anxious to show that in apprehending A-B, as a real or objective succession we presuppose that they are elements in a causal order of succession. Yet in support of his contention he points only to the quite different fact that where we apprehend a succession A-B, we think of the perception of A and the perception of B as elements in a necessary but subjective succession.[1]

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[1]Ewing, Kant's Treatment, p. 90.

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[1]Ibid.

With some bolstering of Kant, Ewing thinks that Kant's proof is still adequate enough to please a realist palate. If a realist retains a representative theory of perception, it can be logically demonstrated that the possibility of inferring a perceptum B1 (whether actual or possible) by causal reasoning from another perceptum A1 implies a necessary connection (a connection which enables us to infer one state from another) between the states of the physical objects which cause A1 and B1, respectively. Necessary succession in our percepta cannot be really separated from necessary succession in the object since any causal law which can be discovered connecting percepta implies a causal law connecting the states of the physical objects which determine the percepta or percipibilia.[1] A realist, Ewing insists must a fortiori admit some causal laws connecting our percepta if he deduces the existence of physical objects in order to account causally for our percepta, and any such law seems to imply a causal law connecting the states of the physical objects which determine the percepta. Even if the realist abandons the representative theory of perception and identifies the act of perceiving with the object perceived and so with something in the physical world, he must still distinguish between perception and imagination; and Ewing agrees with Kant that this distinction can only be made by the introduction of necessity.

On the other hand, if the realist takes the subjective idealist stance mentioned above, the realist objection fails its mark altogether;

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[1] Ibid., p. 92.

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Ewing here is extending the premises and conclusion of the present minimal interpretation to imply claims of objectivity in the orthodox sense of the term. But one could answer Prichard in view of the minimal interpretation that Kant was not trying to provide a criterion for objectivity level 2 so much as he was trying to provide deductive support for causal necessity with an argument about what we call events.

Ewing answers another objection posed by Prichard, i.e., that according to Kant the same representations are related both as physical

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[1]Ibid., p. 95.

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and as psychial events, that is as our apprehensions and as part of the object apprehended. While there is such talk in early formulations of the proof of causality, Kant can also be accused on the basis of other statements of an excessive dualism between act and content; and Ewing thinks it feasible to identify a physical object with the content of our experience and not with the act of perception or representation.[1] Kant's transcendental self is the act; and the empirical self, the content. A physical object constituted of a complex of acts of representation would be, in Kantian terms, a set of categories without content. Viewing representations in the sense of a mental image, i.e., content, it can only be said that they are private images, but public not private property. The identity of the same representations related both as private images and objects is qualitative not numerical.[2] On a subjectivist view, there is nothing real for any representation of mine to stand in a relation to but minds and their other representations although by a logical fiction it may be thought as an attribute of a physical object connected with other such objects. On the more objective view, physical objects have reality as a different class of being from private representations and are not composed of the latter. In neither case do private representations exist both as parts of real physical objects and as psychial events in the life-history of individuals.[3] Identifying the physical world with "representations" in

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[1] Ibid., p. 97.

[2] Ibid.

[3] Ibid., p. 98.

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the sense of being a "public object" of knowledge or experience means only that to us, it is nothing except as object of human experience. A physical object can only be conceived as an object represented so that we could not say what it would be apart from all representation of it, but this does not mean that the physical world is composed of private mental images.

Misunderstandings of premise V

Enough said about objectivity and subjectivity, consider the following argument raised by Jonathan Bennett against premise V. Taking the irreversible order of successive sequences which are said to be objective successions (premise V) as his starting point, Bennett confuses the positing of causal necessity with a predetermined sequence where certain initial conditions are necessary. He misunderstands V by thinking if A occurs B will always follow because those conditions are necessary whenever A occurs that are said to cause B. If one sees a ship upstream, one can expect to see the ship downstream next because wind must fill the sail of a ship upstream. He gives the following counter-example to this mistaken notion that he has about premise V.

> I saw a long boat being rowed out of the harbour; which if Kant's analysis is right entails not just (a) that my visual states did occur in a certain order but that (b) I could not have had them in any other order. But since the coxswain of the boat was under orders from me, I could have secured for myself the spectacle of the boat being back-paddled stern foremost into the harbour.[1]

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[1]Jonathan Bennett, Kant's Analytic, p. 222.

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This counter-example hardly rates comment for surely none, but Bennett perhaps, could possibly say that the coxswain's back paddling the boat would not result in the boat going back into the harbour pari pasu. Kant never suggested that we had to perceive any given representation after seeing a boat upstream other than what might follow from any particular causal influence. The only time we would expect the boat to follow downstream would be when the oarsmen paddled it there, or the wind filled its sail, or when appropriate causal conditions were present for its moving downstream. Surely if the ship caught fire upstream and our next perception was of a capsized ship upstream, we would never ask Kant why we did not instead see the ship downstream as he supposedly said we must.

In his article "Kant's Second Analogy of Experience," W. A. Suchting dismisses this criticism by saying that:

> Kant could hardly have claimed that I could not have had similar perceptions in any other order, for clearly similar perceptions in the reverse order would have corresponded to the event of the boat's being paddled into the harbour sternwards. But this would have been a different event. And the difference between my bringing this about by orders to the coxswain and my bringing about a different order of perceptions of the parts of the wall is that in the former case I can bring about a different order of perceptions only by causally influencing the state of affairs itself, whilst in the case of the wall I can bring about the difference by causally influencing myself alone.[1]

A similar objection raised by Schopenhauer against premise V is discussed by Ewing. Schopenhaure claimed, in opposition to premise V,

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[1]W. A. Suchting, "Kant's Second Analogy of Experience," Kant Studies Today, ed. by Lewis W. Beck, p. 330.

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that one event may succeed another without being caused by it. On Kant's description, night would have to be the cause of day, since Kant identifies objective and causal sequence. In answer to this objection, Ewing states that Kant has not proved or sought to prove that B must be causally determined by A if B succeeds A but rather that the sequence A-B "must necessarily be determined by some cause or causes"[1] and that any given event is causally determined by, in Kant's words, "some as yet indeterminate correlate."[2] Kant points out more than once that particular causal laws can only be discovered by induction from particular experiences, even though Ewing notes that at B234, Kant does speak as though all objective sequence were causal. However the actual proof of causality at B239, 243, and 244, would not lend itself to this interpretation. In addition, Ewing notes that the examples Kant uses, such as the ship going downstream are not given as examples of cause and effect even though they are given as examples of objective sequence. Against the similar objection that causality in Kantian terms is merely necessary sequence and that, therefore, to say that B necessarily succeeds A, is to say that A causes B, Ewing states that the Kantian view is more correctly, that under the given conditions, B necessarily succeeds A, i.e., that B necessarily succeeds A plus the sum total of other relevant conditions. Specifically he says:

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[1]This excluded perceiver qua perceiver causes.

[2]Ewing, Kant's Treatment, p. 85.

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> It is the task of science to suggest other conditions C, D, such that we can formulate a law to the effect that B necessarily succeeds A, C, D (or often quantitatively varies in a certain proportion to the variations of A, C, and D) . . . the Kanatian view is not, strictly that B necessarily succeeds A for that would imply that B must always succeed A.[1]

Further objections, of non-sequitur

In addition to the foregoing claims against the premises, which have been refuted, there are other criticisms which challenge the deductive validity of Kant's argument such as the following presented by W. A. Suchting. Suchting formulates premise V and the conclusion of Kant's argument as:

> Necessarily if A and B are the constituents of a certain event-perception, then the temporal order of perceptibility of A and B is what may be variously described as "determined," "determinate," in "conformity with a rule" "necessary."[2]

Suchting then adds an interpretation of premise V given by Graham Bird who elaborates that the above mentioned necessity is:

> . . . the logical necessity that to apprehend a certain event E is just to apprehend a certain fixed determinate sequence of states so that to apprehend any other sequence of these states would be by definition to apprehend an event other than E.

From premise V (its meaning explained by Bird) one concludes:

> . . . the idea of a determinate order between two states presupposes that of something which determines it and this idea of a determinate or reason for such an order is that of a cause.

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[1] Ibid., p. 88.

[2] Suchting, op. cit., p. 329.

[3] Bird, op. cit., p. 155.

Suchting argues that if the above faithfully reproduces Kant's train of thought then the argument rests on a pun. He asks:

> How could one get from the proposition that events are logically determinate in the sense that they are constituted by a determinately (i.e. definite specifically) ordered sequence of states to the conclusion that this sequence is causally determined, i.e., such that the determinate order in question is due to some causal relation . . . the fallacy may also be (i) "Necessarily if A and B are the constitutents of a certain event-perception then the temporal order of A and B is necessary" that (ii) "If A and B are the constituents of a certain event-perception then necessarily, if A, then B," the latter conclusions then being detached.[1]

In other words, Suchting asks how is what he calls the logical necessity as described by the underlined above (premise V as interpreted by Bird) linked to causal necessity. Suchting thinks that Kant has confused logical with causal necessity and that he is guilty of a non-sequitur. Suchting is correct to reject the quoted passages as a non-valid argument, but in light of the minimal interpretation, herein presented of Kant's argument, Suchting is wrong to accept Bird's elaboration of premise V as an adequate reflection of Kant's idea. The fallacy thus lies with Bird and not with Kant. Indeed Bird's sentence is an anomaly in his own article and does not reflect his own thoughts on Kant's argument. This sentence is inconsistent with the rest of Bird's discussion and can only speak of some temporary confusion on his part.

Surely A followed by perception B, if an event, is a different event than B followed by A. That is logically the case if one honors

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[1]Suchting, op. cit., p. 332.

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the law of identity.[1] Thus, it is logically necessary that A-B is a different event than B-A. But this is not Kant's point simply. It is because a sequence is in determinate order at all, that we identify it as an event whether A-B or B-A, or any other, as opposed to some non-event sequence. The ordered sequence whose order cannot be altered by perceivers qua perceiver is determined, it seems plausible to say, because of some agency which there is tradition to call causal. But while this causal determinacy or necessity separates the events from the non-event sequences it is also logically necessary as in any identity that one causal event cannot be itself and some other at the same time. It seems unlikely that Bird on a reassessment of his statement would accept it without the word 'fixed' inserted in the fourth line between 'other' and 'sequence' and the insertion 'as E' after 'E.' If it were written in this way the error would probably not arise. It then would read:

> Kant speaks of the logical necessity that to apprehend a certain event E, as E, is just to apprehend a certain fixed, determinate sequence of states so that to apprehend any other fixed sequence of these states would be, by definition, to apprehend an event other than E.

This statement more clearly reveals the operation of logical necessity when speaking of successive perceptions that are causally necessary. If Bird were to be consistent in his writing, he would embrace the following interpretation mentioned by Suchting later in his article: "that if A-B constitute an event, then the order of

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[1]I am indebted to Gerald Massey for the reminder that this claim is true unless of course time is circular.

apprehension is, given certain standard circumstances, independent of us. But Suchting will not even accept this corrected interpretation of V because it does not imply C[1] which (as luck would have it) is given the following erroneous interpretation by him at the end of his article. Suchting thinks that C claims that A and B are causally related, and even given V, it is possible that A should have occurred in a causally determined way, but that the later B should have been causally undetermined. Bird's erroneous interpretation of V did not together with the other premises imply the conclusion C, and now the corrected interpretation of V together with the other premises does not imply Suchting's erroneous interpretation of C. Suchting is of course wrong in his appraisal of C for the very reasons already stressed in this connection. Kant's chief example does not suggest that even if A and B are two perceptions whose order is determined the determinate or causal agent is A. Kant would claim A rarely is the cause of B since the cause in many cases is completely unknown. It is this insight that Suchting overlooks in both his criticisms. Kant's three claims: (1) that the past necessarily determines the present to be present; (2) that event A-B necessarily determines the order of A and B by identity not to be that of event B-A; and (3) that the order of A and B is necessarily A-B if the subject cannot perceive them in differing order in the present succession of perceptions, are distinct and independent claims which should not be confused with each other nor interpreted as dependent on one another.

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[1]"C" here stands for the words "the conclusion."

We come now to perhaps the biggest vagary of all in interpreting Kant's conclusion. It was hinted at earlier in the historical note, that at first, Kant did not think it necessary to prove the general law of causality, i.e., every event presupposes a cause.[1] When Kant speaks in the conclusion of "a rule that makes the order in which the perceptions follow upon one another a necessary order," what rule is he talking about? Is he arguing for the Rule of Sufficient Reason or for the specific laws of science, particular necessary rules? The former is the alternative chosen for our minimal interpretations but as already mentioned, Kant speaks sometimes in a manner which suggests that by necessary rule he means particular causal laws:

A191-B236:

> . . . appearance can be represented as an object distinct from them[2] only if it stands under a rule which distinguishes it from every other apprehension and necessitates some one particular mode of connection of the manifold.

Kant also speaks often as though he is only arguing for the Rule of Sufficient Reason or the general Law of Causality:

B246-A201:

> This rule, by which we determine something according to succession of time, is that the condition under which an event invariably and necessarily follows is to be found in what precedes the event. The principle of sufficient reason is thus the ground of possible experience.

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[1]Bird calls attention to this phrasing, by citing Kant at B240, 263 and 289.

[2]"Them" refers to the representations of apprehension.

B247-A202:

> The principle of the causal relation in the sequence of appearance is therefore also valid of all objects of experience . . . as being itself the ground of the possibility of such experience.

If one bases his interpretation of Kant's conclusion on the latter passages, the minimal interpretation presented herein will be adopted. Under this interpretation, Kant's argument is a deductively valid one since the premises imply the general law of causality. Events are irreversibly ordered sequences of perceptions, such that every happening (effect) presupposes a cause. This conclusion, however, is a much weaker claim than the claim which is based on the former passage above. To prove that a given happening must have some cause is not the same as proving* that a given happening will always have the same cause according to a particular necessary rule.[1] Lovejoy states the difference well:

> . . . a proof of the irreversibility of the sequence of my perceptions in a single instance of a phenomenon is not equivalent to a proof of the necessary uniformity of the sequence of my perceptions in repeated instances of a given kind of phenomenon. . . .
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> It is indeed true that the distinction just made, between the sequences of perceptions that are "determined by" or dependent upon the voluntary focusing of our attention and those that are determined by or independently given in the object already assumes the principle of causality. But . . . the point could not be used to prove what Kant desires to prove . . . that in that realm of externally caused or non-volitional changes, all phenomena must follow one another according to a rule of uniform and 'necessary' connection.[2]

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[1]Lovejoy, op. cit., p. 302.

[2]Ibid.

In agreement with Lovejoy, it must be concluded that Kant's premises are inadequate to demonstrate the latter,[1] which perhaps was in fact the conclusion Kant aimed to support. However, there may be a way, as Ewing discussed previously in connection with the realist criticisms, to do a little underpinning of Kant that will provide an argument for the claim that there are, at least in each specific present situation, particular laws or rules which obtain in some sequences of representations. Kant provides the first step by proving the general law of causality. To know that E is an event we must know that, as a happening, E involves a necessary sequence of states some of which may not be perceived, e.g., the room grows warm though the heating plant is out of view. But while perceivers make the distinction between event and non-event sequences of perceptions, it should be noted that perceivers also make the distinction between events that are similar or the same qualitatively, and different. When a room becomes warm on Tuesday just as it did on Monday, the two incidents or happenings are regarded as qualitatively similar events. In both cases, the effects may be perceived and compared for similarity. But it is unlikely that the determinant in each case, i.e., the heater tripping on, is perceived; yet the claim and the belief that the two cases are instances of the same qualitative event type is often held; and this indicates the presumption that the causes are the same since event identification is constitutive of discernment of its cause and effect as well as precedent

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[1]See * on preceding page.

perceptions which specify the surrounding circumstances of the event.[1] Whether this is an epistemologically wise assumption is a question that has often been raised; but nevertheless, as Kant might state, much of experience would be incoherent without it. Unlike Kant, we must stress that perceptions need not necessarily be related or constitute experience in only one particular way. But as long as such claims as the above are made, and experience is unified in this particular manner; a presupposition of necessary laws is required in the sense of being a prerequisite without which M (this particular unified manifold) would not be possible. With this extension of Kant's argument, the stronger claim for particular necessary rules can be partially supported. But there remains a problem. Though a particular necessary rule must be presupposed to obtain in each given situation, if a perceiver is to experience in that situation an event as the same event he experienced before in a previous situation,[2] this is still not the answer that Kant wished perhaps to give to Hume; for it is not the same statement as: "There are particular necessary rules which will always be presupposed past, present and future, if events are to be identified as qualitatively the same as previous ones." In other words, we have learned since Kant's mistake[3] that the manifold may be unified in the future

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[1]One might want to say that A-B on Friday is the same qualitative event as A'-B' on Saturday. But if D caused A on Friday and G caused A' on Saturday would we want to say that B and B' were the same happening even if they followed A and A', respectively?

[2]It will be remembered that we discussed this possibility in Chapter I.

[3]Kant believed for instance that Euclidean postulates would never be abandoned by physical theorists.

in a different manner or by a different means than it is now. Thus, with this drawback of the broader interpretation which argues for particular causal laws, let us confine ourselves to the minimal interpretation which will allow us to gleen an interesting and valid proof of the general law of causality from Kant's "Second Analogy."

Another objection of non-sequitur

Bennett accuses Kant of a non-sequitur in concluding that every objective process is totally governed by causal laws. To quote:

> "X and Y could not have occurred in the order Y - X" entails 'Given that X and Y happened non-synchronously, they had to happen in the order X - Y' but it does not entail "Given that X happened, Y had to follow." The rule which forbids a professor to precede the Vice-Chancellor in a procession does not forbid him to opt out of the procession altogether.[1]

Bennett's criticism can be construed as a plea for statistical laws and events covered by them. It is said that the exact position and momentum of electrons cannot be predicted in quantum theory; and therefore, not all events, in Bennett's words, are totally governed by causal laws. It is perhaps true that, since Kant's time, the term 'event' is applied, if not by the common man at least by quantum physicists, when weaker criteria than those specified in Kant's premises obtain. But it is by no means a foregone conclusion that this is the case. Looking at just the premises mentioned, an event would still be noticed only when a change of state occurs; and it would seem also that again the order of perceptions would not depend merely on conditions of

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[1]Bennett, op. cit., p. 221.

the subject such as eye movements. Perhaps an electron does not have a predictable position and momentum at all times; but surely when a certain phenomenon occurs, i.e., an event takes place or some change is observed, the quantum physicist like any other scientist seeks to explain it in terms of some necessary rule albeit a necessary statistical rule. Here the term 'necessary' is being used in the Kantian sense as applicable when the order of this observation in relation to other preceding observations or perhaps non-observable states was determined independently of the subject. It is this fact which prompts the scientist to formulate his statistical laws rather than merely to take a vacation or have his glasses changed when the unexpected is seen. This is not to confuse talk of necessity in the Kantian sense with talk of a determined universe where every state X which is causally connected with state Y must be followed by Y everytime it (X) occurs. Kant is not arguing for this claim as Bennett supposes he is; but rather he is saying that if and when state Y does occur and we as subjects cannot manipulate the order of its occurrence, then our perception is of an effect that has necessarily followed some cause X.[1] Thus most clearly Kant should have called his proof the proof of the general Law of Effectuality rather than the Law of Causality. If X is perceived 100 times and Y is perceived 50 of those times to follow X through no subject related perceptual efforts, then there are 50 events. In all 50 events, the presence of Y followed by X in a determined order.

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[1]In certain passages (B247) Kant does speak as though he is saying Y must follow X if X occurs, but his total argument does not yield such a claim.

This important objection will be discussed more fully in succeeding chapters; but for the present, consider the way Bella Milmed sums the matter up:

> If the objection is raised today that the phenomena of quantum mechanics have nevertheless nullified causality as a universal principle, it should be noted that they have also, in the same sense nullified continuity as a universal principle; so that the association between the two is strengthened rather than weakened. On the other hand, the subatomic phenomena of quantum mechanics are not part of our sensory experience, but are introduced conceptually in order to provide causes for some rather puzzling observations. Statistical laws and discontinuity are introduced on the conceptual level in order to maintain universal causality (and, in that sense, continuity) on the level of experience. Kant's concept of causality, it would seem, could be revised and expanded to include explanations of this sort which he could not have anticipated. . . .[1]*

In like manner, Gerd Buchdahl in "The Kantian Dynamic of Reason" stresses the point in the following manner:

> Confusion is for instance easily created by an expression like "nature is subject to law." Normally this denotes our belief in the universal prevalence of the realm of determinism; or less sweeping, of the possibility (at least in principle) of everything being subject to natural laws. It is however quite clear that the argument of the "Second Analogy" does not support such conclusions. For according to nature regarded as a collection of objective states of affairs, it only means that the possibility of each of these states presupposes the injection of the concept of an indeterminate causal nexus. However such a situation might be quite compatible with the absence of a network of empirical laws or any laws whatsoever. The argument has certainly nothing to contribute (by way of basic guarantees) to this latter possibility however much it may suggest it.[2]

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[1]Bella Milmed, Kant & Current Philosophical Issues, p. 54.
*Many would disagree with the strong words "in order to maintain universal causality."

[2]Gerd Buchdahl, "The Kantian 'Dynamic of Reason' with Special Reference to the Place of Causality in Kant's System," Kant Studies Today, ed. by Lewis W. Beck, pp. 356-357.

Other arguments in the "Second Analogy"

In addition to all the previous criticisms which have been considered, there are yet two remaining attempts to criticize Kant's conclusion on the basis of supposedly different arguments, which are taken to be representative of Kant's thought in the analogy by again: Jonathan Bennett and W. A. Suchting.

Jonathan Bennett contends that there is an underlying "ordering argument" in Kant which surfaces at a few obscure passage points. The ordering argument attempts to establish the category of cause by dealing with the way in which subjective data themselves are established, i.e., with how one knows in what order certain subjective data, including the occurrence of intuitions, have happened. The explicit "object-process" argument, which Bennett claims runs through at least the five proofs that Ewing finds similar, deals with only one aspect of the way in which subjective data--'I have had such and such intuitions, in such and such an order'--are brought under objectivity concepts."[1] Bennett bases his posit of a Kantian subliminal ordering argument on passages such as the following:

> In this case, therefore we must derive the subjective succession of apprehension from the objective succession of appearances. Otherwise the order of apprehension is entirely undetermined, and does not distinguish one appearance from another. Since the subjective succession by itself is altogether arbitrary, it does not prove anything as to the manner in which the manifold is connected in the objective realm.[2]

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[1]Ewing, Kant's Treatment, p. 223.

[2]Bennett, op. cit., p. 221.

Bennett thinks that Kant's use of 'arbitrary' indicates that there is some question as to what even the subjective succession actually is; and the first sentence of the passage indicates Kant's view that, to know in what order one's inner states do or did occur, one must have knowledge of an objective realm. As Bennett puts it:

> . . . the whole passage hints at a problem not about the relation between one's subjective and objective stories but about the establishment of one's subjective story and in particular its temporal ordering.[1]

In explanation, Bennett cites comments in Kant's "First Analogy" about time, viz., that 'time cannot be perceived in itself.' Bennett understands Kant to be saying that the date of an event, which is experienced is not a perceptible feature of it. Kant says, "I experience it at a particular time, but I do not perceive that it has the feature of occurring at that time."[2] Since the date is not perceptible, the date is not recollectable either. To recall when X event (the noon whistle) occurred, one must recall other surrounding events: the face of the clock, the state of one's stomach, etc. An event's date is thus a logical construct out of its temporal relations with other events, and this applies to subjective as well as objective events in the past.

Extending his theory from the recollection of the dates of past events to the ordering of past events, Bennett quotes the following passage from Kant:

> All empirical knowledge involves the synthesis of the manifold by the imagination. This synthesis is always successive, that is, the representations in it are always

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[1] Ibid., p. 225.

[2] Ibid.

> sequent upon one another. In the imagination this sequence is not in any way determined in its order, as to what must precede and what must follow, and the series of sequent representations can indifferently be taken either in backward or in forward order.[1]

When the imagination conjures up past episodes one by one, the question may well arise as to the order in which they actually occurred. To recall that X preceded Y, we must be able to appeal to objective considerations not just as a prerequisite for having any working concept of the past but in support of that particular recollection.

Bennett can think of three counterexamples to Kant's supposed suggestion. One involves simply recalling that X preceded Y because Y followed X very quickly at the time that they occurred. The other objection is that one may recall that X preceded Y if a continuous sequence of happenings beginning with X and terminating in Y took place, or one may recall that X preceded Y by recalling a time when one experienced Y while recalling one's experience of X. In conclusion, Bennett remarks that most orderings of the imagination do not occur in any of the three ways mentioned above and that the ordering argument does bring out one more way, a fourth, in which the appeal to objectivity is necessarily involved even in our talk about our own inner states.

It is not obvious that the recollection interpretation of past objective events subjectively can really be put on the passages quoted. When Kant speaks of the synthesis of the manifold wrought by the imagination, he is talking of the role of the imagination in producing

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[1] Ibid., p. 226.

images which permit the application of the concepts of the categories to appearances in order that anything at all can be given to the mind as a representation during present acts of sensation. Thus while Bennett's argument is interesting, it is doubtful that Kant ever intended to speak about the problem of recollection when he wrote the passages quoted above. Aside from this problem, the analysis runs the risk of confusing a rather simple argument that Kant gives to prove causality only to take the question beyond the point that is needed. It would certainly confuse matters if the subjective succession that Bennett orders consisted of recollections of previous subjective states of the kind that Kant chiefly talks about when he uses the phrase subjective succession. We would then be trying to recall if at first we saw the roof of the house or if our eyes were first affixed to the basement windows. On the other hand, if the proofs of the analogy are to show that reference to other objective appearances actually enable us to order recollections of objective or subjective perceptions in a present subjective sequence, these proofs must still and firstly enable us to distinguish between those sequences of appearances which are objective and those which are not. This is, after all, the primary issue of the "Second Analogy": to demonstrate that only by reference to necessary rules can we discern those appearances which constitute an objective sequence. If this can be done, then Bennett's analysis of how past events can be ordered in a subjective sequence can be carried through. But this is merely a by-product of a Kantian victory for the general Law of Causality which must be won before this secondary gain can even be attempted.

The bulk of passages intriguing to Bennett comprise what Ewing catalogs as the sixth argument in the second edition. The sixth argument, however, is one of the main-line Kantian arguments for causality and it is perhaps the argument right before it, the fifth in the second edition and the fourth in the first edition, which has seemed the most puzzling and unique to critics. It is this argument which has appeared to be singular to them and unrelated to Kant's main proof of causality which runs through all the other arguments.

After challenging the main Kantian thesis on causality, W. A. Suchting discusses the anomalous fifth argument in the second edition in Kant's "Second Analogy of Experience." The lines of this argument have already been quoted; and therefore, only Suchting's comments need be mentioned at this point. Suchting argues that the passage (A199-200, B244-245, p. 225) may be interpreted along the following lines.

a. Necessarily if A and B are the constituents of an event perception, then A and B occupy successive places in objective pure time.

b. Necessarily, the relation between A and B reproduces empirically the relation between the successive places in pure time that they occupy.

c. Necessarily, successive parts of pure time are necessarily connected.

d. Therefore, necessarily the relation between A and B is the relation of necessary succession in time. But the latter is just the causal relation. Therefore necessarily, if A and B are the constituents of an event-perception, then A and B are causally connected.[1]

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[1]Suchting, op. cit., pp. 333-334.

Suchting claims, as Ewing does in his writing, that Kant has only demonstrated a truism to the effect that "successive periods of time constitute a series in which no term can bear the same relation to that which precedes it as to that which follows it," circular time aside "and the relation between predecessor and successor is never reciprocal." But obviously this determination of subsequent periods by precedent periods of time is quite different from causal determination. If the above premises are taken to be an accurate rendition of Kant's argument, it must be agreed, with Ewing and Suchting, that Kant is at least guilty of a non-sequitur in this aberrant fifth argument. However, it is very doubtful that Kant should be interpreted this way when one but looks carefully at this argument. Kant only begins by talking of perceptions in general, that the preceding are indeed before the latter. Then he moves on quickly, still in the first sentence of the quoted passage, that perceptions as events can take place also only insofar as the appearances of past time determine all existences in time, i.e., "determine them according to a rule." It is the phrase 'as events' which is crucial. In light of the first four arguments of the analogy, it should be remembered that Kant has described events in a technical way and that Suchting's first interpretative premise should read:

a. Necessarily, if A and B are the constituents of an event-perception, then A and B occupy successive <u>determinate</u> places in objective pure time.

Likewise premise (c) should read:

c. Necessarily, successive parts of pure time are necessarily connected <u>in determined and undetermined sequences</u>.

It is only the very first few words of the passage that speak about perceptions in general, i.e., those successive representations that are synthesized into the unified manifold. The rest of the passage speaks about the subclass of perceptions which are thought to be events or objective successive sequences. When the imagination has synthesized the manifold, events are known to be events and as such they constitute a network of successive relations among themselves in time; the succeeding naturally determined to follow the preceding. There is then a twofold discussion of determination in this argument: the trivial one whereby the past, present, and future are determined in respect to each other to be what they are, viz., past, present, or future, and the causal determination which a priori gives the condition needed by the imagination to synthesize all the representations, both non-determined sequences and determined sequences, into a larger successive and time-determined manifold of representations. This is much of what Bennett discussed with regard to his recollection hypothesis, and Ewing sees this possibility also when he says at the end of his criticism of this argument that "Continuity as usually understood involves the coherence of innumerable shorter times in one and the same time, and it is difficult to see how this continuity could be realised in phenomena without a causal connection between past and present."[1] It is exactly this simple point, it appears, that Kant decided to mention in this passage as he did in (A210-211, B256). It is not that he spoke of mere successions of past to present and then thought they represented by their

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[1]Bennett, op. cit., p. 75.

trivial sequence determinate nature a causal necessity. But rather that a continuity of past to present sequence, determinate as it is, is only possible if we are capable of sizing up perceptions as events or non-events. This is not an unusual interpretation of Kant if it be thought of as in some way a causal theory of the nature of time, for Suchting himself notes that many philosophers including H. Mehlberg, H. Scholz, G. J. Whitrow, and A. Grunbaum, to name a few, have claimed that Kant offered exactly this kind of theory in the tradition of Leibniz.[1]

There is one other important reason to think that Ewing's and Suchting's interpretation of Kant, were it correct, indicates that Kant is not only wrong but also seriously inconsistent. If A is said to precede B in time; it is a truism in some sense that A determines B to succeed it. However it seems very unlikely that Kant would claim on this basis that A causally determines B to occur and succeed it because, as has been stated previously, Kant never claimed that it was even usually representation A which can be known to be the cause of representation B. On the contrary, Kant thinks that most causes are simultaneous with their effects; and thus after the occurrence of perception A, it is likely that a cause C, if you will occurs which may or may not be perceived along with perception B. Kant's oft-repeated example of the ship upstream which is thought to have moved downstream is an event

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[1]Suchting gives the references for these philosophers, respectively, as: "Essai sur la theorie causale du temps," Studia Philosophica, 1 (1935), 135; "Eine Topologie der Zeit im Kantischen Sinne," Dialectica, 9 (1955), 73; The Natural Philosophy of Time (London, 1961), p. 273; and Philosophical Problems of Space and Time (London, 1963), p. 179.

with percepts A and B. But Kant is not claiming that A caused B, i.e., that the ship's being upstream caused the ship to next be downstream. Rather the cause, perhaps a hidden oarsman, may not be seen at all; or the cause may be completely unknown. It was merely Kant's contention that since the representations A and B were not determined in order by the subject they must have been by something else, viz., a cause. Thus it is unlikely that Kant would pin causal necessity merely on the necessity of a past perception A necessarily followed by another, B, in virtue of A's preceding B in time since Kant never thought that every or even many preceding perceptions in an event caused the succeeding perceptions in the event. It would appear likely, in view of all that has been said presently about the fifth argument of the second edition, that far from being anomalous it is much like all the other arguments of the analogy except that it makes one additional point about the contribution of events or causal sequences to the continuity of time.

Summary

After careful study of the "Second Analogy," we maintain that Kant poses but one central argument concerning the necessary aspect of causality, which is embodied in the following premises and conclusion:

I. "The apprehension of the manifold of appearance is always successive. The representations of the parts follow upon one another" (B234). (Corrected version changes 'always' to 'sometimes'.) See page 101.

II. "How things may be in themselves apart from the representations through which they affect us is entirely outside our sphere of knowledge" (B235-A190).

III. In spite of I and II above, I have to show what sort of a connection in time belongs to the manifold in the appearances themselves, for we are conscious of an objective sequence in time, i.e., events (paraphrase of B235-A190).

IV. "Every apprehension of an event is a perception that follows upon another perception" (B237-A192).

This premise above follows from:

a. "That something happens, i.e. that something or some state which did not previously exist comes to be, cannot be perceived unless it is preceded by an appearance which does not contain in itself this state" (B236-A191).

b. "For an event which should follow upon an empty time, that is a coming to be preceded by no state of things, is as little capable of being apprehended as empty time itself" (B237-A192).

V. "I also note in an appearance which contains a happening (the preceding state of the perception we may entitle A, and the succeeding B) B can be apprehended only as following upon A; the perception A cannot follow upon B but only precede it. The order in which the perceptions succeed one another in apprehension in this instance is determined and to this apprehension is bound" (B237-A192). "In the perception of an (event) there is always a rule that makes the order in which the perceptions in the apprehension of this appearance follow upon one another a necessary order. The objective succession will consist in that order of the manifold of appearance according to which in conformity with a rule the apprehension of that which happens follows upon the apprehension of that which precedes" (B238-A193).

The meaning of the above statements varies with the acceptance of any of three major interpretations: the "minimal interpretation" presented herein and the two broader interpretations posed by Arthur O. Lovejoy. The minimal interpretation maintains that Kant argues for the general Law of Causality, i.e., "Every event presupposes a cause," by demonstrating that the Law of Causality is a necessary presupposition

of perceivers if the distinction between subjective perception-successions and objective perception-successions (events) is to be made. Under this minimal interpretation, the argument contends that perceivers employ the concept of cause in their organization of the manifold of appearance.

The first broadening of this minimal interpretation is effected by the view of Lovejoy, who states that Kant confusedly seeks to make the distinction between imaginary and real events via the presupposition of causal determination. However, close inspection of the "Second Analogy" reveals only that Kant consistently uses the term 'objective' in an unorthodox manner to speak of the distinction between event and non-event successive sequences of perceptions and we have labelled this distinction, distinction 1. Nowhere does Kant speak of objectivity in the usual sense of distinguishing between real and apparent events which we have called distinction 2. However, Ewing's discussion of the realist criticisms of Prichard support the contention that, if Kant had attempted to argue for distinction 2, his premises could be elaborated to accommodate this aim. The present writer also suggested that the presupposition of causal connection is the primary criterion for judging perceptions to be objective in sense 2 as well as sense 1. Only when this criterion cannot be applied does the puzzled perceiver turn to his fellows for their assessment--the criterion thought to be first and foremost by Lovejoy. At any rate, Lovejoy's first broad interpretation is not acceptable since it does not concur with Kant's text. The second broad interpretation which Lovejoy discusses is that Kant's conclusion

is a statement not merely about the general Law of Causality but of particular necessary rules which hold uniformly and universally in nature. This interpretation which is supported by various passages of the "Second Analogy" involves Kant in a non-sequitur. For this reason, the second broad interpretation is rejected in favor of the minimal one, which finds support in the text but does not produce a non-sequitur.

An informal argument was presented further to show how the minimal interpretation of the conclusion could be slightly extended to cover particular necessary rules as they are employed in specific situations when perceivers identify events as qualitatively the same. Still this additional argument does not support a conclusive reply to Hume, that there are necessary rules which apply in every situation, past, present, and future. There may be situations such as those in quantum theory where we would not be able or willing to say that certain present events are the same as some others past because we have not been able to predict their occurrence except probabilistically.

We see thus far then that there is a true claim GLC (every event has a cause) which is deductively entailed jointly by five premises. This claim, though about the empirical world, was not established by observation of constant uniformities as Hume maintained but by true empirical premises of a different sort which entailed it. In that GLC conveys empirical information, it is contingent. In that it is established deductively and not inductively, it is not probably true but certainly true. Some might say it is necessarily true. Is it

analytic? Is it a priori? Is it contingent and factual? Is it synthetic? Kant said that GLC was both a priori and synthetic just as our claims concerning it might suggest. But in view of a long held empiricist tradition in philosophy, we are with Kant guilty of a contradiction in terms. Thus we shall begin now in Chapter III to explicate some of these terms. We shall examine what may be meant by true necessarily. Hopefully our exposition will enable us to decide if synthetic analytic truths can be necessary and if they can also express facts about the empirical world.

CHAPTER III

THE ANALYTIC AND SYNTHETIC DISTINCTION

A Classical Distinction and Objections

Historical note

Prior to Kant's writing in the eighteenth century, there was present in the philosophical works of both the rationalists and empiricists a division of truths into logical truths and contingent truths.[1] The former, called "truths of reason" by the rationalist Leibniz and "relations of ideas" by the empiricist Hume, expressed necessary and universal truths which could be established by the law of contradiction. Both Hume and Leibniz thought that all mathematical truths were of this kind. Contrasted with these a priori truths were contingent truths which Hume and Leibniz, respectively, called "truths of fact" and "matters of fact."[2] These contingent truths were learned from experience and as such were a posteriori.

Not until Kant did anyone challenge the exhaustiveness of this classification of truths. It was his belief that mathematics, natural science and metaphysics contained judgments that were a priori and at the same time not truths of reason based on non-contradiction. These

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[1]Lewis W. Beck, "Editor's Introduction," Prolegomena, p. xiv.

[2]Ibid., p. xv.

were truths which Kant called a priori and synthetic. It was Kant's task in the Critique of Pure Reason to discover how synthetic a priori truths were possible. As was mentioned at the end of Chapter II, the principle of causation which Kant sought to establish by his argument in the "Second Analogy" was considered by Kant to be a prime example of an a priori synthetic truth. As such, the law of causality is only one of the laws given by the understanding which is necessary if there is to be any objective experience.[1] These laws of the understanding are not derived from experience but are a priori principles of the understanding which apply to all our experience. It is thus an a priori law that all changes of phenomena occur according to the rule of necessary connection of cause and effect. But while we know a priori that every event in experience does have a cause, knowledge of what particular cause is operating can be gotten only by experience.[2]

Kant sought to establish synthetic a priori judgments by showing that some purely rational judgments, i.e., a priori truths, could be regarded as synthetic. He found his first examples in mathematics which he claimed produced its concepts by intuition.[3] However, Kant faced a dilemma in his last precritical treatise, for while he saw that space, the foundation of all geometrical forms, must be itself a primitive intuition he also declared that space had a "reality proper to itself."

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[1]Ibid., p. xvi.

[2]Ibid., p. xvii.

[3]Kuno Fischer, A Commentary on Kant's Critique of the Pure Reason, p. 30.

If space had a reality proper to itself it must be given to the mind from without and thus geomatry as well as mathematics generally must be empirically given and therefore not a priori.[1] In his advance from 1768 to 1770 Kant was moved to regard space as a pure intuition, a form of the pure reason, and this gave Kant the hithertofore missing reason needed to explain how mathematical truths could at once be both synthetic and a priori.[2] This was the development whereby Kant broke with the position of Hume and began his Critique.

Kant's analytic-synthetic distinction

In his Critique of Pure Reason, Kant describes the distinction between analytic and synthetic judgments in several ways. In the first characterization which he gives of his distinction at (B10) it appears that Kant is discussing only judgments of a subject-predicate form. He says:

> Either the predicate B belongs to the subject A, as something which is (covertly) contained in this concept A; or B lies outside the concept A, although it does indeed stand in connection with it. In the one case I entitle the judgment analytic, in the other synthetic.

At the line beginning at A7 in the first edition Kant gives a second characterization of analytic truths by saying that analytic judgments (affirmative) are "those in which the connection of the predicate with the subject is thought through identity" while synthetic judgments are not. Kant suggests a third characterization in the second

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[1] Ibid.

[2] Ibid., p. 31.

edition by saying that synthetic statements can be thought of as ampliative since the subject concept does not yield the predicate by any extraction of analysis. Analytic statements add nothing to the subject through the predicate but merely break the predicate up into constituent concepts that have all along been thought in it. Thus analytic judgments can be considered explicative.

Seemingly unsatisfied that he has clarified his distinction, Kant discusses it yet in three more ways. At B11 of the second edition Kant reflects on the connection between analytic and synthetic judgments and experience. He says:

> Judgments of experience as such are one and all synthetic. For it would be absurd to found an analytic judgment on experience. Since in framing the judgment, I must not go outside my concept, there is no need to appeal to the testimony of experience in its support. For, before appealing to experience, I have already in the concept of body all the conditions required for my judgment[1] (the judgment that bodies are extended).

There is no need to appeal to experience in the case of analytic statements for as Kant goes on to say "I have only to extract from it (a subject concept like body) in accordance with the principle of contradiction the required predicate and in so doing can at the same time become conscious of the necessity (necessary truth) of the judgment."[2] The necessity of these judgments is thus a fourth characterization of of analytic judgments. Analytic judgments are necessary in that they

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[1]Immanuel Kant, Critique, p. 49.

[2]Ibid.

accord[1] with the principle of non-contradiction, i.e., the denial of analytic judgments yields a contradiction and this resulting contradiction might be considered yet a fifth characterization of analytic judgments.

The sixth and last description which Kant gives of these judgments is that they are useful for obtaining "that clearness in the concepts which is requisite for such a sure and wide synthesis as will lead to a genuinely new addition to all previous knowledge" while synthetic statements are the ampliative judgments which actually extend knowledge (B11, 14).

The number of Kantian criteria

We have just mentioned six possible criteria given by Kant to bifurcate the class of S-P judgments into those that are analytic and those that are synthetic. However, the sixth explicative description already appears very similar to the third non-ampliative and it may well be that Kant's discussion of the analytic-synthetic distinction (referred to from now on as the A-S distinction) presents just one or two criteria which Kant attempts to clarify in several differing ways.

In his article "Analyticity and Grammar," Newton Garver also lists these six basic formulations in Kant of the A-S distinction. Garver claims that while there is no indication that Kant regards these formulations as alternatives no one can accept Kant's apparent view that

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[1]At B189-191 Kant says that the principle of contradiction is "the highest principle of all analytic judgments."

all six formulations are equivalent without careful study.[1] Rather as Beck notes in his article in Kantstudien, "we can discern two criteria for analytic judgment" and that "Kant, in apparent disregard of their difference, uses first one and then the other as it suits his purpose."[2] Garver agrees with Beck's assessment and states that the first, second and fifth of Kant's formulations seem to be based on the logical form of a judgment, while the third, fourth and sixth formulations seem to be based on the way in which the judgment is related to the human beings who make the judgment. In an attempt to clarify which formulations may actually be criteria in Kant's discussion let us consider each of Kant's six descriptions of the analytic and the synthetic in greater depth.

Kant's containment criterion

The first formulation of Kant's analytic-synthetic distinction which we have presented has been commonly called Kant's containment criterion for the A-S distinction. There are three chief objections which have been raised in opposition to the containment criterion as Kant presented it. The first objection which we shall call the vagueness objection, is that Kant's containment criterion is vague to the point of being almost metaphorical. The second form objection is that Kant's containment criterion applies only to judgments of S-P form and the third objection, the variability objection is a criticism of the

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[1]Newton Garver, "Analyticity and Grammar," Kant Studies Today, ed. by Lewis Beck White, p. 258.

[2]P. 171 cited by Garver, ibid.

fact that Kant's distinction applies to judgments rather than statements or sentences.

The vagueness objection to Kant's containment criterion

Newton Garver in his discussion of the vagueness objection dwells on the following words of Kant--"the predicate B belongs to the subject A, as something which is (covertly)[1] contained in this subject A" (B10). Garver notes that either a judgment is analytic in this manner or "B lies outside the concept A, although it does indeed stand in connection with it" (B10).[2] But as Garver says:

> We are all perfectly familiar with the idea that something may be contained in something else, where the alternative is that the first thing lies outside the second. . . . The difficulty which we have in understanding Kant's first explanation of analyticity is the difficulty of applying this familiar concept of containment in an unfamiliar context.[3]

Garver elaborates on the above by stating that concepts cannot be literally contained in one another in the same sense in which paper balls may be contained in or lie outside of a basket. Thus Kant's use of "contain" must have been a metaphorical one.

Another discussion of the vagueness objection can be found in an article entitled "On the Distinction Between the Analytic and the Synthetic" by John Wild and J. L. Cobitz. Lewis White Beck in comment upon the discussion of these authors cites what they give as a rendition

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[1]These parentheses are Kant's as translated by K. Smith.

[2]Ibid., p. 249.

[3]Ibid.

of Kant's logical definition of "analytic," viz., "A proposition is analytic if the subject in some sense includes the predicate" or "the predicate B belongs to the subject A as something that is contained covertly in the concept A."[1] Beck objects that the adoption of a spatial connotation for the word "includes" by Wild and Cobitz enables them unjustifiably to reduce Kant's account to nonsense. Beck contends:

> Take the proposition, "S includes P," which is ex hypothesi analytic. In Euler circles, S must be the larger, for the whole is greater than the part. But when Kant says, "S includes P," he means that P is included in the concept of S and not that all the members of P are included among the members of S. Kant is using the word "includes" in an intensional sense. He means that P is the genus of S, its intension is less than the intension of S, and its intension can be found by the analysis of the intension of S.[2]

Beck is quick to point out that Kant has offered in addition to his containment criterion, the law of non-contradiction in the manner of Leibniz as the chief underpinning of claims that judgments are analytical. Once the analyticity of a statement is judged on the basis of whether its contradictory is self-contradictory the intensional sense of the "includes" in Kant's containment criterion is clear, for as Beck points out "there is no contradiction in saying "S does not include P," even if it is true that S does include P, provided that the relation of inclusion is extensional.[3] Self-contradiction arises only if P is included in the concept of S, as when P is the genus of S.

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[1]Lewis White Beck, Studies in the Philosophy of Kant, pp. 99-100.

[2]Ibid., p. 100.

[3]Ibid.

P's intension would be less than that of S but diagrammed by use of Euler circles the P circle would be larger.[1] It is in this way that the spatial analogy of writers such as Cobitz and Wild makes the smaller seem to include the larger and thus makes the Kantian usage appear paradoxical.

However, even if Kant meant "contain" in the intensional sense of the meaning of a concept, as Beck suggests, there is still another problem for the containment criterion. It is one that Garver mentions in his article. Generalizing from a physical interpretation of "contain," Garver states that if a crumbled piece of paper thrown toward a waste basket gets hooked on the top edge of the basket and we are in a quandry as to whether we can correctly say that the paper is contained in the basket it follows that "Kant must have assumed that concepts all have sharp boundaries," so that one can always say definitively whether one concept is "contained in" another or not, if containment is to serve as a definitive criterion of analyticity.[2]

> In general the concept of containment loses its clear dichotomous character whenever the putative container either lacks sharp boundaries or has boundaries that an object can straddle.[3]

Quite correctly Garver has pointed out a well known problem of natural language terms, viz., the vague boundaries of the intensional

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[1]As Gerald Massey has pointed out the P circle and the S circle may be the same circle and thus the P circle would naturally be at least as large.

[2]Garver, op. cit., p. 249.

[3]Ibid.

scope of their terms. Any reconstruction of the Kantian A-S distinction will have to deal with the meaning of terms (if not Kantian concepts) in such a way as to avoid if possible this notorious problem of the vagueness of intensions.

The form objection

The form objection is discussed extensively by Richard Robinson. Robinson believes that the restriction of Kant's containment criterion to judgments of S-P form was a restriction deliberately adopted by Kant. Robinson bases his belief on the authority of two German scholars who have assured him that the German text must mean this. In addition Warnock has indicated to Robinson that Kant's assertion that "exists" is not a predicate is proof of Kant's awareness that not every judgment is of the S-P form.

Garver discusses Robinson's opinion and concludes that if Robinson is correct about Kant's intent in drawing the lines of his A-S distinction then it may be that "the theorems of logic, relational propositions, and simple existential propositions were not intended by Kant to be considered within the scope of this distinction."[1] However, Garver does go on to state that such a suggestion, broadly conceived, has little to recommend it and is rebutted easily. Existential statements such as "God exists" or "There are aardvarks," can be regarded as having a logical predicate even though Garver recognizes that Kant claimed that "'being' is obviously not a real predicate" (B626). More

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[1]Ibid., p. 246.

explicitly even, Kant himself argues that existential judgments are all synthetic (B625-626). With regard to relational judgments and the theorems of logic Garver adds:

> Similarly, a relational judgment can be looked upon as having a subject and a predicate, even though such an analysis of it is not final and may not be wholly satisfactory. Theorems of logic are perhaps more difficult to fit into the subject-predicate mold, but it is in any case implausible to regard them as judgments in the Kantian sense.[1]

On the other hand Garver believes that Kant's explanation of analyticity is tailored to fit only one species of judgment within the classification of judgments that Kant gives elsewhere. At (B95), Kant divides judgments into categorical, hypothetical and disjunctive. The first type of judgment deals only with two concepts, the second with two judgments and the third with several judgments in their relation to each other (B98). The containment criterion only applies to the first type of judgment and thus many of the tautologies commonly thought to be paradigm cases of analyticity by moderns would not be so regarded by Kant. By way of example Garver mentions "If the Mekong is longer than the Danube and the Yangtze is longer than the Mekong, then the Yangtze is longer than the Danube" which would fall into the Kantian class of hypothetical judgments. He goes on to note also that the valid formulae of modern symbolic logic which probably cannot be regarded as expressing judgments at all would be excluded anyway from the range of Kant's distinction between the analytic and the synthetic.

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[1] Ibid., p. 247.

This last point brings us well into the variability objection but before discussing it we must recognize as Robinson ably points out that had Kant merely proposed Leibniz' distinction between statements whose denial is self-contradictory and those whose denial is not, he would have given a criterion "which correctly and usefully divides the whole class of judgments."[1] Robinson states:

> He (Kant) would then have said: "Leibniz' distinction between those statements whose denial is self-contradictory and the others is clear and good; but Leibniz was mistaken in supposing it to be the distinction between necessary and contingent statements; it is really a distinction of its own . . . the distinction between analytic and synthetic statements; and it is not the case that all necessary statements are analytic; on the contrary, some of them are synthetic.[2]

Using only the Leibniz criterion, Kant could have made all the important points of the Critique of Pure Reason while avoiding the disadvantages expressed in at least the vagueness and form objections claims Robinson. It is interesting to note that once again some of the important objections to Kant's containment criterion can be defeated by the introduction of Leibniz' criterion of the law of contradiction into the containment criterion formulation. Previously, Beck introduced Leibniz' criterion into the discussion of formulation I (the containment criterion) in order to clarify Kant's use of the term "contain" and now Robinson resorts to the Leibnizian formulation to broaden the scope of the containment criterion so that it will extend over the class of all judgments rather than just those of an S-P form. It may be fair to say

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[1]Richard Robinson, "Necessary Propositions," Mind, LXVII, No. 267 (July 1958), 297.

[2]Ibid.

just in light of our discussion so far that Kant has not presented six criteria for his A-S distinction or even two as Beck suggests but really only one criterion which he states in several ways, each formulation sharpening the cutting edge of his criterion a little bit more. This view will be adopted presently as a working hypothesis until enough ground is broken for our proposed reconstruction of Kant's A-S distinction.

The variability objection

Kant's A-S distinction is a division of judgments and not of propositions, statements or sentences. However, a given judgment may be considered at one time analytic and at another synthetic depending on which statement is being scrutinized in cases where several sentences express the same judgment. To express the judgment that a given day is cloudy, we might say "This day is cloudy" or "This cloudy day is cloudy." The first statement indicates a synthetic judgment while the second indicates an analytic judgment. The meaning of terms in natural languages also change and an analytic sentence today may again not be analytic tomorrow. Another aspect of variability is rightly noted by Jonathan Bennett. As he says one and the same sentence may express more than one judgment. By way of example he mentions the sentence, "the judgment that what a man voluntarily does is always what he wants to do" does not uniquely refer to a single judgment."[1] One of the judgments to

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[1]Bennett, op. cit., p. 6.

which it refers can be said to be true by means of the meanings attached to the words in it and the other judgment can be said equally properly to say something which is simply false. As Bennett notes:

> Kant would no doubt reply that what he calls "analytic" are not sentences but judgments, and that a judgment is indeed either always analytic or always synthetic. . . . But . . . if "judgment" is to be used like that, then expressions of the form "The judgment that . . ." will refer unambiguously to a single judgment only if the sentence in the blank admits of only one normal construction.[1]

It would seem in light of the variability objection that the A-S distinction as proposed by Kant will fail its purpose as long as it is thought to be applicable to judgments instead of the class of individual statements which express judgments. This then is another point that we shall consider in framing our reconstructed A-S distinction.

In addition to the above objection, Bennett discusses what we call the oversight objection. Analytic judgments are understood as those which are true by virtue of concepts or whatever. Bennett asks then if on Kant's account self-contradictory judgments are to be considered synthetic. In answer he claims:

> If we take Kant literally, they are: in its normal meaning, the sentence "All squares are circular" is taken to "add to the concept of the subject a predicate which has not been in any wise thought in it, and which no analysis could possibly extract from it," which is Kant's formula for a synthetic judgment.[2]

Bennett suggests that while this Kantian oversight is a minor one, which can be easily remedied, it indicates the strong leaning of

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[1] Ibid., p. 5.

[2] Ibid., p. 6.

Kant to state his analytic-synthetic distinction in psychological terms. He believes that Kant wanted a classification of judgments which might be judged or thought to be true and Kant tends to 'assume that no one could think to be true something which was in fact false, by virtue of the concepts involved.'

Kant's second formulation of his A-S distinction

According to Kant's second identity criterion of his A-S distinction, "analytic judgments (affirmative) are therefore those in which the connection of the predicate with the subject is thought through identity" (B10). Garver once again concentrates on Kant's odd language. While there is no ordinary idiom according to which we speak of thinking something through something else, Garver thinks that Kant's odd phrase "makes it clear that an analytic proposition is not the same as an identical proposition, although there is a very intimate connection between the two."[1] Garver quotes from Kant's essay on the progress of metaphysics since the time of Leibniz and Wolff in order to clarify Kant's position:

> For example, that every body is extended. If one wished to call such a judgment "identical," one would invite confusion; for judgments of that sort contribute nothing to the elucidation of concepts, which must be the aim of all judgments and hence are said to be empty. For example, that every body is a bodily (in another word, material) substance. Analytic judgments are indeed based on identity and can be resolved into it; but they cannot be identical since they require analysis and thereby contribute to the

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[1]Garver, op. cit., p. 250.

> clarification of concepts which would not be done at all if they were identical idem per idem.[1]

Despite the above quotation, Garver still puzzles as to exactly how analytical judgments are to be resolved into identical propositions. He suggests, as Parkinson[2] and Beck[3] before him, that Kant may mean that an analytical judgment is one which depends upon our "acknowledging that the concept of a body is identical with the conceptual combination of a number of elements, one of which is the concept of being extended.[4] In the symbolic form proposed by Beck and Parkinson the form of an analytic judgment would be--All A = BX are B where X is a concept or a set of concepts which joins with B in a conceptual complex identical with A. Garver thinks that the foregoing symbolic representation of analytical judgments is interesting in that it illustrates how analytic judgments depend upon being thought through identiy since in the symbolic formulation "the subject concept must be conceived as identical with a conceptual complex of which the predicate is one component."[5] The second point of interest to Garver is that the symbolic formulation makes explicit the connection between the first containment criterion

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[1]Immanual Kant, "Preisschrift uber die Fortschritte der Metaphysik," Kant's gesammelts Schriften, XX, 253-332, cited by Garver, p. 250.

[2]G. H. R. Parkinson, "Necessary Propositions," Mind, LXIX (1960), cited by Garver, p. 251.

[3]L. W. Beck, Studies, pp. 74ff, cited by Garver, p. 251.

[4]Garver, op. cit., p. 251.

[5]Ibid.

and the second identity formulation. The view that these two formulations go hand in hand is held also by Parkinson and it serves to confirm our working hypothesis that Kant really presented only one criterion for his A-S distinction. However, there is still an objection to this second formulation which bears discussion. We will call it the epistemological objection.

The epistemological objection to Kant's identity criterion

Garver raises the epistemological objection in the following manner:

> If I conceive A as identical with BX, the judgment that all A and B is analytic. But how am I to know whether I rightly conceive A as identical with BX - that is, whether A is identical with BX?[1]

The above passage which constitutes the epistemological objection is the same concern again that terms (concepts) have vague meanings that was expressed in the vagueness objection with one major difference. The epistemological objection has more bite than the vagueness objection for it raises a difficulty even for concepts which are clear cut and for terms whose meaning may be completely unambiguous. A concept A may be clearly understood to be identical with a conceptual complex BX by everyone but Kant or in this case Garver or whoever might be assessing a given judgment in order to determine its analyticity. This objection thus points out an epistemological consideration which may enter discussion of Kant's second formulation.

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[1] Ibid., p. 252.

Kant's third formulation the non-ampliative criterion

According to Kant's third formulation, a judgment is analytic depending on how we think it. In analytic judgments the subject is divided into constituent concepts which are always conceived (thought) as existing within it, although confusedly (B11). It follows from this phrasing, as Garver also notes, that the analyticity of a judgment may vary from person to person depending upon their perhaps unique intentions or perspective. The perspective objection then which might be raised against this third Kantian formulation is the same as the epistemological objection. Again any reconstruction of Kant's A-S distinction must be one which will avoid the psychological trappings of Kant's third formulation which beclouds any discussion of analyticity almost before it starts.

Kant's fourth formulation the empirical independence criterion

Garver finds the same psychological overtones in Kant's fourth formulation which we call the "empirical independence" criterion or formulation. Garver understands Kant to be saying that in a synthetic judgment such as 'all bodies have weight' one must go beyond the subject concept, body, and resort to empirical evidence "to the effect that there is a constant connection between the cases where the concept 'body' is applicable and the applicability of the concept weight or of some scale of weights."[1] But it is difficult to determine the

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[1] Ibid., p. 254.

difference that there is in the way of knowing the proposition that "all bodies have weight" and the analytical judgment that "all bodies are extended." Garver notes that the common view of both British idealists and contemporary American philosophers is that there is no difference. "Weight" might be part of one person's concept of 'body' and 'weight' might not be part of another person's concept of "body." As Garver says, "Nothing that Kant says makes it clear why these alternative perspectives are not legitimate." Analyticity is again relative to varying personal perspectives as maintained by both the epistemological and perspective objections.

Aside from this last objection there is one which applies perhaps more sweepingly against the empirical independence criterion which we shall call the ambiguity objection.

The ambiguity objection

Already in the first three explanations of the A-S distinction Kant's language is at best vague but his fourth formulation provides almost no clue as to what point he is trying to make. There are two possible interpretations applicable to his words but on close examination neither of these interpretations (1) or (2) is acceptable.

When Kant says in his fourth characterization that it is "absurd to found an analytic judgment on experience," does he mean (1), that it is absurd that the source of an analytical statement be empirical, i.e., that an analytical judgment cannot come to mind through experience, or does Kant mean that though experience may inspire or provide occasion for one to think of an analytic judgment, one cannot know

that such a judgment once it is entertained is true by looking to experience or empirical fact. Surely it is difficult to adopt interpretation (2) for it would seem from Kant's words "there is no need to appeal to the testimony of experience in its support," that 'cannot' is too strong a word to use in connection with establishing the truth of an analytic statement on empirical testimony. Rather Kant's words lead one to conclude not that one cannot check the truth of analytic statements by referring to experience but rather that one need not resort to experience to do so. It would seem that one could always check these statements by referring to experience but why bother when, as already noted, Kant says "I have only to extract from it" (a concept like body) "in accordance with the principle of contradiction the required predicate" (having extension . . .) to become aware of the necessary truth of the judgment" (B12).

On the other hand it seems equally unlikely that interpretation (1) correctly applies to Kant's words for in discussing his usual example of an analytic statement "A body is extended" he says:

> I can apprehend the concept of body analytically through the characters of extension, impenetrability, figure, etc. all of which are thought in the concept. Now, however, looking back on the experience from which I have derived this concept of body. . . .[1]

In view of the above passage it is doubtful that Kant could have meant that analytic judgments could not originate or be derived from experience even though at other places he talks of not going outside

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[1]Kant, op. cit., p. 50. (Edited by Smith.)

one's concept in framing, i.e., originating or forming, an analytic judgment. If a judgment is framed from a concept and the concept is derived from experience it surely seems that analytic statements such as "a body is extended" can be said to originate at least indirectly in experience. This of course is not to say that analytic judgments must originate or be formed from experience, for this would not be true of some analytic judgments in the area of mathematics.

Objection to Kant's fifth Leibnizean formulation

We have already noted that several writers, Beck, Robinson, and Garver, have had recourse to Kant's fifth formulation or description when defending his first (the containment) criterion against criticisms and thus it appears that the fifth formulation would be an integral aspect of any reconstruction of Kant's A-S distinction. However, there is a problem[1] reconciling the Leibniz non-contradiction criterion, as interpreted by moderns, with its interpretation by Kant. Garver notes what Beck points out in his article "Kant's Theory of Definition," viz., that Kant regards analytic judgments as more basic than definitions and prior to them. Rather than the formal contradiction which arises logically from definitions and general logical laws in the Fregean interpretation of Leibniz' criterion, Kant seems to be thinking of a psychological conceptual contradiction of some sort. It may be, however, as Garver suggests, that Kant's empirical independence criterion

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[1]We shall refer to this problem in the future as the psychologistic objection.

can be encompassed by Frege's interpretation. Though logical proof is a matter of form, it is also a way of knowing, i.e., of ascertaining the cognitive acceptability of a meaningful string of symbols. As Frege says:

> If, however, it is impossible to give the proof without making use of truths which are not of a general logical nature, but belong to the sphere of some special, science, then the proposition is a synthetic one.[1]

The Fregean interpretation, if acceptable, actually assimilates Kant's first, second, fourth and fifth formulations, though Frege's criterion violates the spirit of Kant's second identity formulation which was detrimentally psychological. Aside from this, it cannot be expected that a rational reconstruction should capture every characteristic of Kant's A-S distinction. This is especially true if the ommission of some characteristics such as those of Kant's identity formulation increase the intelligibility of the distinction. Nevertheless Garver admonishes that to adopt Frege's criterion is to abandon more of Kant's intent than merely formulation two. The Fregean analysis would require the acceptance of definition as basic. It also applies paradigmatically to logical formulae and tautologies while Kant sought to disregard tautologies as examples of analytic truths.[2] Frege's account also precludes any assessment of arithmetical expressions as synthetic a priori and such an assessment was an important part of Kant's view.

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[1]G. Frege, The Foundations of Arithmetic, p. 4.

[2]Garver, op. cit., p. 261.

Kant's last formulation of the A-S distinction the explication criterion

It is difficult to regard Kant's last discussion of the A-S distinction as any kind of formulation or near criterion at all. Rather Kant's discussion at (B13) seems more a description of the role of analytic judgments. It would seem that Kant's discussion of the role that these judgments play is only an elaborative postscript to his criterion for determining which judgments are analytic. Once "analytic" is defined or a criterion is given for deciding which judgments are analytic then a description of the role these judgments play in discourse or thought is useful. However, before we dismiss this sixth formulation which is similar to the third and subject therefore to similar objections, it is important to consider another objection[1] raised by Garver. Attending to Kant's words at (A8) "the concept which I already have is . . . made intelligible to me," Garver asks the obvious question, "How can a concept which Kant already has be made intelligible to him?" As Garver says:

> If I have a firm grasp on the concept body--that is, if I know all the rules of language pertaining to the word 'body'--, then I am in a position to know that the judgment all bodies are extended is analytic. . . . If I have the concept, it must already be intelligible to me, and cannot be made intelligible by the analytic judgment . . . if I have such a vague and uncertain understanding of the concept, I can hardly be in a position to warrant the proffered judgment as truly analytic.[2]

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[1]We shall call this objection the definition objection in later parts of this chapter.

[2]Garver, op. cit., p. 260.

Garver surmises that Kant may have seen the absurdity of his explication claim when he dropped the (A8) passage from his second edition. This definition objection is important, for it indicates that Kant's view that analyticity is prior to definitions may be untenable. Having a concept already can only sensibly be interpreted to mean that the person P who has the concept must have a definition (public or private/implicit or explicit) for the concept before he can assert that judgment J_1 in which the concept serves as a subject is analytic. If the definition is a public one then J_1 will be analytic for others as well as person P. If the definition is private then J_1 may be analytic only for person P. If the definition is implicit, person P may be assessing J_1 as analytic without attending to the definition which he has given to the subject concept of J_1. If the definition is explicit then person P will assess J_1 as analytic by consciously referring to his definition of the subject concept. If the definition objection points to the above as it does appear to, then a Frege type explication of analyticity may be as faithful to Kant's criterion for the A-S distinction as any consistent and correct formulation can be.

Garver goes on to maintain that the definition objection can be avoided if the explicative function of analytic judgments is pertinent not to any person P who might know that J_1 is analytic but rather to a listener who, unlike the speaker P, does not "have the subject concept already," i.e., does not know the definition of the subject term. The speaker P might utter an analytic statement in order to clarify for the

listener the subject concept of J_1. In this way analytic judgments would serve an explicative function. Garver supposes that when Kant spoke of analytical judgments as explicative, he must have had a scientific context in mind. Garver points out that "analytic propositions are important and necessary in such contexts because they enable scientists to explain to one another how they understand the concepts and terms which they use."[1] In this chapter we are chiefly concerned with analytic statements in the context of science and the role of analytic statements described by Kant's sixth formulation as interpreted by Garver is especially plausible in this context. Therefore, in our reconstruction of Kant's A-S distinction we shall endeavor to formulate a criterion for analyticity which will be compatible with the explicative function of analytical statements especially within scientific discourse.

Directions of a reconstruction

Review of the foregoing major objections to Kant's distinction between analytic and synthetic judgments reveals much about the direction that any proposed explication of the distinction must take. First it is clear from the variability objection that the distinction must be one made among sentences when they are used as statements in various contexts and the distinction cannot be one which divides judgments. In discussion from this point forward we shall not speak of analytic or synthetic propositions as many writers do since the term 'proposition'

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[1] Ibid., p. 265.

is a catchall word which sometimes can mean things as diverse as states of affairs and the statements made by speakers in describing states of affairs. Rather this paper will discuss analyticity as a property of certain statements and by statements we shall mean declarative sentences not considered as sign types but as spoken or written sign tokens which are always bound to a particular context of liguistic activity.[1]

By considering analyticity to be a property of individual concrete linguistic sign tokens,[2] i.e., particular statements, there can be no problem of one judgment being both analytic and synthetic on differing occasions depending on the particular sentence that is chosen to express it by way of declarative statement on varying occasions. No particular statement or sentence token will ever be said to be sometimes analytic and sometimes synthetic when used in varying contexts because sentence tokens cannot even be used in varying contexts. A particular statement qua sentence token can be written or spoken only once. Thus the sentence type "A planet is a heavenly body" will yield a different particular statement (token) every time it is uttered or written. It is possible, therefore, that the sentence type "A planet is a heavenly body" is at one time analytic and at another time synthetic but no particular statement or sentence token ST_1 "A planet is a heavenly body" spoken or written on a given occasion is sometimes analytic or synthetic for this statement ST_1 only occurs once. If the exact same string of

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[1]For discussion of this distinction see Henry S. Leonard Principles of Right Reason, pp. 151-171.

[2]Leonard considers these as statement occurrences, but statement occurrences are defined by him similarly to sign tokens.

symbols as in ST_1 is spoken or written on another occasion it will not constitute a case of repeating sentence token ST_1 but rather it will constitute a different unique sentence token ST_1. Our first point then is that analyticity as a property of a statement token will be one which always excludes syntheticity as a property of a given sentence token, e.g., statement ST_1. The domain of discourse then for our proposed explication will be the class of particular statements or sentence tokens, written or spoken.

A Distinction Reconstructed

The meaning criterion--our proposed reconstruction

The objections to Kant's view already discussed were chiefly aimed at his seemingly metaphorical containment criterion of analyticity. On the assumption that Kant gave more than one criterion for analyticity, it might seem reasonable prima facie to just discard the containment criterion as Richard Robinson has suggested and adopt the Leibniz' criterion that statements are analytic when their denial involves self-contradiction. However the previous discussion of the interdependence of formulations I and II reveals an interesting and important aspect of Kant's analytic-synthetic distinction which must be reflected in any adequate reconstruction of his distinction.

Beck offered reply to the containment criterion objections of Wild and Cobitz by proposing an intelligible interpretation of "includes" as this term is found in Kant's statement of the containment criterion. Beck suggested that Kant wished to take account of the intensional meaning of terms (concepts in Kantian terminology). This Kantian intention

may have been noted also by some of the many writers who have adopted a modern criterion of analyticity not to be found explicitly anywhere in Kant. It is, however, implicitly suggested by Kant's containment criterion. This revised criterion which we shall refer to as the meaning criterion allows that a statement is analytic iff it is true or false by reference to the meanings of the terms within it.[1]

The containment criterion, a precursor of the meaning criterion

If we look more closely at Kant's statement and use of his containment criterion of analyticity it will become clear not only that Kant's intention in drawing the distinction the way he does is accurately reflected in the more modern meaning criterion but also that the modern meaning criterion can avoid the pitfalls of psychologism which so thoroughly pervade Kant's discussion of his containment criterion.

By recourse to his containment criterion, Kant claimed that the statements of mathematics such as "7 + 5 = 12" are synthetic. Many modern authors, in particular Ayer, have held just the opposite view that such mathematical statements are analytic.

These writers notwithstanding, there can be some understanding of why or how Kant could claim such statements to be synthetic if one notes the role of the containment criterion as Kant used it. This role

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[1]Previous meaning criteria have been proposed which are usually formulated as--A statement is analytic iff it is true in virtue of the meanings of its terms. Our criterion is a revision of these previous ones.

is illustrated in Beck's answer to the critical question of Wild and Cobitz "In what sense is the subject term '7 + 5' in the proposition 7 + 5 = 12 logically wider than the predicate term?"

> The answer is, in no sense. The judgment is, according to Kant, synthetical though necessary. . . . Its intension (that of the predicate term) is different from that of the subject, as they (Wild and Cobitz) admit, though 12 is not (as might be expected from my foregoing argument) the genus of which 7 + 5 is a species. To define a synthetic judgment it is not necessary to stipulate that P shall include S; it suffices merely to stipulate that S does not include P. Extensionally, 7 + 5 and 12 are equivalent, but the intensions of the two terms are different, and that of one is not included in that of the other.[1]

If it was Kant's aim via his containment criterion to make the point which Beck describes then it would seem that adoption of the modern meaning criterion which we will advocate herein will compel one to agree with Kant that mathematical statements such as "7 + 5 = 12" are synthetic. This follows from the previous assessment of the meaning criterion, that it reflects Kant's aim in suggesting his containment criterion. However it seemed very much the case that when Frege argued that such statements in mathematics are analytical he may have been using a meaning-type criterion to argue for this conclusion. It is not obvious, though Beck may think so, that the intensions of "7 + 5" and "12" are different if for no other reason than that the complete meanings of the symbols "7," "+," "5," "=" (which Beck omits) and "12" can be given by definitions within a mathematical system such that the truth of the statements "7 + 5 = 12" could be determined completely by recourse

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[1]Beck, op. cit., p. 101.

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to the meaning of "7," "+." "5," "=," and "12" as given in the system. Does this conclusion then indicate a difference of purpose between the containment and the meaning criteria? We think not, at least not any undesirable difference. It seems that Kant, if Beck is correct, was arguing that the meanings of the subject and predicate terms are such that the former include the latter and that by "meaning" Kant did not mean only the extensional brand of meaning employed by some logicians but rather a concept of intensional meaning. However, Kant also meant something more. We suspect that Kant, still influenced somewhat by a self-evidence view of necessity, embraced the containment criterion in an effort to claim that a judgment (statement) was analytic if a person actually thought of the predicate concept as included in the subject concept. Thus it would seem that in Kant's view a judgment might be analytic to one person but not to another depending on what each was thinking about the concepts involved. This brings Kant from a public epistemological endeavor to a private psychological one for which he has been greatly criticized. Robinson notes much the same emphasis in Kant's adoption of the containment criterion:

> I have sometimes thought that perhaps Kant changed from the contradiction-criterion to the containment-criterion because he felt unequal to the task of showing that mathematical statements are synthetic by the contradiction-criterion, but able to show that they are synthetic by the other criterion . . . (he quotes from Kant) "At first one would think that the statement '7 + 5 = 12' was a merely analytic statement, following from the concept of a sum of seven and five in accordance with the Law of Contradiction. But when one looks more closely one finds that the concept of the sum of 7 + 5 contains nothing more than the union of the two numbers into one, without its being in any way thought which this number is that includes the two" (B15). This passage has suggested to me the guess that Kant

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> adopted the containment-criterion because he could not show in detail by Leibniz' criterion that mathematics is synthetic.[1]

The above quotation from Robinson indicates how it could be that the mathematical statement "7 + 5 = 12" might be analytic to every ex-school boy who had memorized his addition table but how it might not be that "79 + 95 = 174" was analytic to the same ex-school boy unless he had gone to a school which used very long additional tables! To avoid the inconsistency of stating that the simple addition statements are analytic but that the more complex are not, Kant may have decided to conclude that all mathematical statements are synthetic. The number of statements whose answers are memorized in early childhood are so minute relative to all the possible addition statements whose answers we could not possibly have in our mind but would have to compute that there was hardly any point for expecting them as a special class of analytic statements. Frege surmises the same in saying:

> Kant, obviously, was thinking only of small numbers. So that for large numbers the formulae would be provable though for small numbers they are immediately self-evident through intuition. Yet it is awkward to make a fundamental distinction between small and large numbers, especially as it would scarcely be possible to draw any sharp boundary between them. If the numerical formulae were provable from say, 10 on, we should ask with justice "Why not from 5 on? or from 2 on? or from 1 on?[2]

The meaning criterion proposed herein differs from the containment criterion by eliminating its psychological overtones when

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[1]Robinson, op. cit., p. 298.

[2]Frege, op. cit., pp. 6-7.

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stated with insertion of the phrase "by reference to the meaning of the terms" which shall be unpacked soon in our discussion.

The meaning criterion avoids the form, epistemology and perspective objections

Several phrases in this proposed meaning criterion are crucial. By the insertion of the phrase "by reference," we intend to eliminate the need for a person to know or have in his mind the meaning of the terms constitutive of a particular statement in order for him ever to claim that the statement is analytic. It is only required that the person who hears or reads such a statement be able to determine not only in principle but pragmatically that the statement is true or false by reference to a dictionary (in the case of a natural language such as English) or by reference to the definitions of an axiomatic or arithmetical system. Therefore, it is not required that a person know immediately or in some self-evident way that a sentence is analytically true or false but only that it is pragmatically possible for him to find out that it is so even through involved demonstration as might be the case in mathematics or logic. Our proposed meaning criterion states pragmatically when any statement has the property of being analytically true or false. Our new meaning criterion is an epistemological one which when applied serves as the epistemological justification for any person P to assert that a statement is or is not analytically true or false, i.e., has or has not the property of being analytical. This point has been a critical one in some work on analyticity in logic.

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During his earlier period of purely syntactical work, Rudolf Carnap sought to characterize analyticity in the context of an uninterpreted calculus or language. But as Professor Bohnert describes in his article "Carnap on Definition and Analyticity":

> It was natural in this context to take provability as the essential trait of an analytic sentence. While self-evidence was to be discarded it seemed that an analytic sentence ought to be provable by means available to human minds. . . . Gödel showed that languages with formation and transformation rules adequate to the construction of number theory contained "purely logical" sentences which were neither provable or refutable by finite processes. This meant that there would be sentences true but unprovable if one maintained the law of excluded middle for the sentences of such a language.[1]

Bohnert goes on to describe historically that Carnap attempted to meet this difficulty in his work Logical Syntax of Language by an extension of the concept of provability which would admit transfinite processes.[2] However, this "gave rise to doubts among intuitionists whether this provability concept does not go beyond what can be honestly accepted as humanly provable."[3] This aspect of provability or as some would call it the pragmatics[4] of an analyticity criterion is provided for by our criterion as already stated and we shall find this to be the case with writers other than Carnap, e.g., Frege and Max Black.

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[1]Herbert Bohnert, "Carnap on Definition and Analyticity," The Philosophy of Rudolf Carnap, ed. by Schilpp, p. 412.

[2]Allowing deductions based on infinite classes of premises.

[3]Ibid., p. 413.

[4]By "pragmatics" we mean the employment of a criterion, be the criterion semantic, syntactic or in another sense pragmatic.

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The meaning criterion and the Leibniz criterion

There are some writers such as Hospers who have maintained that while a meaning criterion for analyticity is a pragmatic one, the Leibniz criterion of non-contradiction is a criterion which states only a semantical property which analytic statements have, i.e., that their negation involves self-contradiction. However, even this Leibniz criterion is regarded by some philosophers such as Hamlyn as the pragmatic statement of a semantical decision procedure. He says:

> This criterion can scarcely be said to suffice as a definition of an analytic statement, although it may provide grounds for saying whether a judgment is analytic or not.[1]

Whether one considers the denial of a statement resulting in contradiction a semantical property or a pragmatic decision procedure is really a moot point in this present discussion since Liebniz' criterion of analyticity is not the one being directly presented herein. As Frege clearly pointed out in the field of mathematics, an analytic truth is one in whose proof one finds only "general logical laws and definition." Frege showed that proofs in arithmetic were not possible when only the law of non-contradiction was adopted as a criterion for analyticity. One also had to refer, as our criterion states, to the meanings of the terms composing the statement. By the same token, however, it would not seem that one could justify the claim "Statement St is analytic" if one's criterion is not a combination of a meaning

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[1]D. W. Hamlyn, "Analytic and Synthetic Statements," Encyclopedia of Philosophy, I, p. 106.

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criterion and a non-contradiction criterion.[1] This is just what we supposed to be Kant's criterion--a combination of the containment and contradiction criterion rather than two separate criteria. We also noted that Beck was able to give an intelligible interpretation to Kant's containment criterion, thereby countering its opponents, by introduction of the law of non-contradiction.

Our meaning criterion does not explicitly mention the law of non-contradiction or for that matter the law of identity which is also involved in discussions of analyticity but the meaning criterion does actually have incorporated within it the Leibniz criterion. However, our omission of explicit mention of Leibniz proposed characteristic of analytic statements was purposeful. The meaning criterion here proposed should pertain not only to natural languages and the axiomatic systems of mathematics, traditional logic and science, but also to systems of many-valued logic where the law of non-contradiction is not adopted as a thesis of the system. In such systems, if analyticity can be ascribed to any statements at all, it will have to be exclusive of recourse to the law of non-contradiction. In such a many-valued system if we can find analytic statements we will probably be able to do so by reference to the meanings of the terms within these statements.

On the other hand, in all the other fields of systematic statement (in a very loose sense, natural language is included here) where the law of non-contradiction does hold or is adopted as true, it can

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[1]See page 149 of this chapter.

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be regarded as another definition within the system that gives terms[1] part of their meaning,[2] e.g., non-contradiction = df - (A • - A) and therefore the meaning criterion captures the effect of reference to this law of non-contradiction, for it is incorporated within the criterion phrase "by reference to the meaning of the terms of statement STn." Since the Leibniz criterion is implicitly included in our meaning criterion, we avoid the form objection that Kant's distinction pertains only to judgments (statements) of S-P form. We shall present our own theory of meaning which we shall call the metalinguistic theory of meaning which we shall call the metalinguistic theory of meaning in an attempt to avoid several other objections to Kant's presentation already discussed.

The meaning of "meaning" that is meant

It may be well at this point to clarify exactly what is meant by the phrase "by reference to the meaning of the terms of the statement Stn," which has been under discussion thus far. It is necessary that this clarification should be made since there is much controversy about the term "meaning" itself.

Many theories have been advanced in efforts to explicate exactly what is meant by "meaning" and few if any thus far have generally been accepted by the majority of philosophers. In keeping with the aims of this paper we shall be interested only in discussing the term "meaning"

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[1]We use "term" here as we would "word" and thus we consider words such as "and," "is" etc. to be terms.

[2]Frege, op. cit., p. 7.

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as it is applied to terms and not as it is sometimes applied to sentences. We have reason to suspect that "meaning" is not a term which ever should be applied to sentences, "meaningful" being a much better choice of words in reference to sentences but for sake of brevity we shall not present reasons for this view in the present paper. However, it will of course be important to remember that our theory of meaning does presuppose that the above view is correct.

It has been widely held that terms or words have meaning in either a denotative sense, a connotative sense, or both. Extensional and intensional meaning are respective synonyms of the former pair. If one adopts the view that the meaning of a term consists of the objects to which the term may be applied then he is considering meaning in the denotative or extensional sense. Such a view has been called the referential theory of meaning. The serious problems related to this theory are now so well known that it is needless to review them here. It will suffice to recall only the most obvious objection to this theory of meaning, viz., that there are many words such as "centaur" or "unicorn" or "is" which have no denotation but which do have meaning. A further limitation of any extensional theory of meaning pointed out clearly by Irving Copi is that it is not extension which determines intension but rather intension which determines extension. In the words of Copi:

> Any given object has many, many properties and is therefore included in the extensions of many, many different terms. Hence the example mentioned in the denotative definition of any one term will be just as appropriately

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Copi claims that the intension of a term is a part of its "informative significance," (this is the view of logicians which is narrower than those who believe that intension or connotation includes the emotive as well as the descriptive significance of a term).[2] Of the different senses of "connotation," Copi prefers the conventional sense and he describes conventional connotation as the outcome of agreement by those who attach the same meaning to a term, to use the same set of properties in deciding for any object whether it is part of the term's extension or not. "This agreement establishes a convention and so this meaning of a term is known as its conventional connotation or conventional intension."[3]

It is important to note that the agreement to which Copi refers need not be the outcome of a formal meeting or assembly of some sort. Some philosophers, Russell for one in Analysis of Mind, have seized upon allusions to agreement among linguistic performers to argue against a conventional view of language. Not considering the possibility that there can be informal conventions which come about gradually in the history of a people, Russell stresses the implausibility of thinking that there ever were large formal councils or meetings to determine linguistic conventions and he then stresses the implausibility of

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[1]Irving Copi, Introduction to Logic, p. 114.

[2]Ibid., p. 108.

[3]Ibid., p. 109.

regarding natural language as the outgrowth of any agreement or conventions at all! He says:

> It is natural to think of the meaning of a word as something conventional, either from the point of view of the individual or from that of the community. . . . If we trace any Indo-European language back far enough, we arrive hypothetically (at any rate according to some authorities) at the stage when language consisted only of the roots out of which subsequent words have grown. . . . We can hardly suppose a parliament of hitherto speechless elders meeting together and agreeing to call a cow a "cow"[1] and a wolf a "wolf."[2]

It would seem that those such as Copi who speak of meaning as a product of convention never envisioned a parliament called for the purpose of forming a language any more than Russell can envision it. What they probably do mean is that when the first person began to make the same sound repeatedly while pointing to a rock or whatever, his fellows tacitly agreed with his usage of this sound in succeeding circumstances when they wished the original speaker or speakers to notice a rock. If all of us made up our own word for an object and persisted to use it despite the differing words used for it by everyone else there would be little chance of linguistic communication. The question is not one of the origin of particular sounds coming to be used by individuals in the sense of a private language but rather of the informal convention via correction and compliance in inter-individual communication which must be the basis of any public language.

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[1]We have inserted the use-mention quotes.

[2]Bertrand Russell, Analysis of Mind, p. 190.

Aside from objections against the view expressed by Copi that language is conventional at least in an informal sense, other writers such as Arthur Pap have disagreed with Copi's contention that extensional meaning is determined by intensional meaning in the case of simple ideas such as the idea of red or of a standard meter.[1] Using the example sentence, "there are red surfaces" Pap claims:

> Such indubitable existential statements would be analytic in terms of being true by ostensive definition just as much as statements analytic by verbal definition. Like "red" if the expression "1 meter" is to have a meaning at all, one rod in the universe must have the predicated property by ostensive definition.[2]

Pap goes on to say that what he is really doing is nothing more than drawing an obvious inference from what he views as the well-founded positivistic thesis that all connotative meaning which is ultimately intelligible must merge into an ostensive definition.[3] As Pap notes it would be unreasonable to postulate that every significant term should be capable of both ostensive and verbal definition, but it is reasonable in the case of terms which are not ostensively defined, e.g., many scientific terms, to expect that these terms will be "capable of being related by a series of verbal definitions to terms which are ostensively definable.[4]

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[1]Arthur Pap, "Indubitable Existential Statements," Mind, 1946, p. 238.

[2]Ibid.

[3]Ibid.

[4]Ibid.

By verbal definition Pap means those strings of symbols (words) that give connotative meaning[1] and by ostensive definition Pap means the defining of terms in which meaning may be exhibited by pointing to one or several instances to which they are applicable. Ostensive definitions in Pap's discussion give a term denotative meaning. As Pap explains:

> In common discourse denotative meaning is as a rule genetically prior to connotative meaning. Thus the first and rudimentary method by which the meaning of words is usually explained to children is the method of ostensive definition. The intelligibility of abstract verbal definitions, exhibiting the connotation of a word, presupposes some intellectual maturity not possessed by infants.[2]

The foregoing quotation brings to focus an important point that we wish to make about the meaning of "meaning." Contrary to Pap's conclusion, it is our belief along with some other writers such as Dewey that ostensive definition is not an instance or type of definition at all. It is not the meaning of words which is usually explained to children by the activity of pointing to the objects which they denote but rather it is the use of words which is explained, or as we prefer to say, given to children by what has been traditionally called ostensive definition. It is our view that the meaning is given by definition and ostensive pointing does not give the meaning of a word but only its use. Therefore, we do not regard ostensive definition as a type of definition at all. This claim needs more elaboration since there is

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[1] Ibid., p. 239.

[2] Ibid., p. 243.

a philosophical view which identifies "meaning" and "use" by claiming that the meaning of a word is its use. It was Wittgenstein's directive[1] "If you want to find the meaning of X look to the use of X," however, "looking to the use of X to find the meaning of X" is not the same thing as saying that "the meaning of X is the use of X" or vice versa.

"Meaning" in our view is a metalinguistic term used to relate words or word phrases. Therefore, we maintain that when a speaker says, "'X' means Y" his utterance is more correctly and precisely written "'X' means 'Y.'" The word "means" functions in the sentence "'X' means 'Y'" as a metalinguistic term relating the two verbal expressions 'X' and 'Y' which normally occur on the material[2] level of a language, e.g., English, to talk about things. Viewed in this way the meaning of terms is expressed or given only in definitional statements and definitional statements are always verbal entities that are used to talk about other verbal entities. The act of pointing to objects while trying to teach the names of those objects to a child (usually called ostensive definition in the literature) is not a definition at all since pointing is not a verbal statement or utterance but a gesture which attempts to relate not strictly verbal entities but rather one verbal entity a common noun and an object. Stephen Pepper describes the so-called ostensive definition as:

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[1]Some writers prior to Wittgenstein made this same suggestion.

[2]Sellars uses the term "material" in this regard. We shall not follow his convention in succeeding pages but we shall refer to this level of language as the object level.

> Here S is the symbol defined, and O is some empirical fact. The relation of indication between S and O is presumably a factual reference of some sort. Probably the relation of indication is at the least an operation. It is a set of directions for the performance of certain acts which being carried through reach a certain result. The symbol S is at one end of the operation and the object O at the other, and the one "indicates" and is said to "mean" the other in virtue of the operation.[1]

Dewey criticizes Pepper for still calling the old (ostensive) indicating operation as described in the preceding quotation, a definition for in doing so Pepper shows the "old mixture of word and object."[2] Dewey reflects that John Stuart Mill remarked a hundred years ago that however unambiguously one can make known who the particular man is to whom a name belongs by pointing to him such pointing has not been esteemed one of the modes of definition.[3]

As already expressed, we agree with philosophers such as Dewey and Mill in maintaining that ostensive pointing of the sort that is done when one teaches a young child his first words is not a form of definition nor does it convey to a child any meaning. However, ostensive pointing does teach a child the use of his first words. Once the child matures to the extent that he knows the use of many words, it becomes possible to teach him the meanings of further new words by means of what Pap calls verbal definition. When definitions are employed there is no pointing but only a verbal utterance or written expression that

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[1]Stephen Pepper, "The Descriptive Definition," Journal of Philosophy, XLIII (1946), 30.

[2]John Dewey and A. F. Bentley, "Definition," Journal of Philosophy, XLIV (1947), 300.

[3]Ibid., p. 304.

metalinguistically informs the child that the new word or word phrase has or ought to have the same use as another word or phrase whose use he has already learned ostensively.[1] Definitional statements, which often employ the term "means," relate words or terms by expressing the fact that the definiendum and definiens have and should have the same use and the definiens whose use is known is said to be the meaning of the definiendum whose use is unknown. A meaning (we do not like using "meaning" as a subject term but English does not seem to afford a way around it here) is always a linguistic word or expression that has a known use. The meaning[2] of a definiendum is another verbal expression--the definiens. The meaning of the definiendum is not the use of the definiens but the definiens itself--a verbal entity! Of course it can be said that construed in this manner the meaning of the definiendum depends on use--the known use of the verbal expression or word that is the definiens. Thus Wittgenstein's imperative that to find the meaning of a term one must look to the use of X is somewhat in agreement with the view here proposed, except that the meaning of 'X' is the expression 'Y' whose use happens to be known and the use of 'Y' is stated to be the same for future discourse as the use of 'X' by the definitional statement.

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[1]This is not to say that the use of a word is always learned ostensively. It is well known that children will learn the use of terms by hearing them used in a given context. They often use the term correctly in later situations though they do not know the meaning of the term or what they are saying.

[2]Usually dictionary entries include several definiens, i.e., several senses of a term. When we speak of <u>the meaning</u> of a term we mean only one of these definiens taken at a time for consideration.

The metalinguistic theory of meaning circumvents criticism

Adoption of this metalinguistic theory of meaning curcumvents many of the common problems usually associated with other meaning theories. For example as Alston notes:

> First, whatever sort of entity is identified with meaning, there will be meaningful expressions corresponding to which no such entity can be found. Not all words refer to something and not all have connotation, e.g., "is" "although."[1]

On the present proposed theory in which the sort of entity identified with meaning is another verbal word or expression which can easily be found in any dictionary there will not be any meaningful terms in English for example to which no such entity that we propose as a meaning can be found to correspond.

Alston focuses attention on the difficult problem that arises in the meaning theories which treat meaning statements (definitions) like statements that employ 'is' to establish an identity relation among entities. In illustration he mentions sentences such as:

1. The capital of France is Paris.
2. The conductor of the Philadelphia Orchestra is Eugene Ormandy.
3. The wife of Henry Luce is Clare Booth.[2]

In the above sentences Alston claims "that we can always "make explicit what we are saying about a country when we give its capital by

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[1]W. P. Alston, "The Quest for Meanings," Mind, LXXII (1963), p. 79.

[2]Ibid., p. 80.

saying what sort of thing a capital is." This will involve specifying (1) the general category to which it belongs (city) and (2) the sort of relation a member of this category must have if it is to be the capital of that country."[1]

However, in the case of a definitional statement such as "The meaning of 'procrastinate' is _____" it is not generally true that what follows 'is' in the blank designates anything at all. Therefore, it is impossible to determine any category to which the meaning of 'procrastinate' belongs or how it might be related to 'procrastinate' in order to be the meaning of the word.[2] Alston states, e.g., that "The meaning of 'auspicious' is favorable" and "The meaning of 'gradually' is bit by bit," but neither meaning statement consists of the identification of some entity which is related to these words as its meaning.[3] Further in cases where what follows 'is' is a referring expression "we cannot construe the meaning statement as an assertion that the entity referred to "by the definiens" is identical with the meaning of the expression in question," the definiendum. Taking the example of 'courage' as a definiendum, Alston stresses that though 'courage' refers to a certain trait of character as does 'steadfastness in the face of danger,' as typically found without quotes as a definiens 'steadfastness in the face of danger' does not refer to that to which "the meaning of 'courage'" refers. On the present theory this

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[1]Ibid., p. 80.

[2]Ibid., pp. 80-81.

[3]Ibid., p. 81.

problem does not arise. Alston points out the problem more clearly by juxtaposing the following sentences while using the rule of substitution.

1. The meaning of 'courage' is steadfastness in the face of danger.

2. Steadfastness in the face of danger is all too rare in these times.

3. The meaning of 'courage' is all too rare in these times.

In our theory the identity established by sentence (1) does not arise. Rather we would write sentence (1) as "The meaning of 'courage' is 'steadfastness in the face of danger.'" In terms of the identity established by the revised sentence (1a) of our theory, sentence (2) becomes by substitution of the definiens--"'Steadfastness in the face of danger' is all too rare in these times" which reads just as strangely as sentence (3) in which Alston has substituted the definiendum--"The meaning of 'courage' is all too rare in these times.

Another problem, involved in more usual theories of meaning, is that none of the predicates which can be attached to the meaning of 'courage,' i.e., 'easy to grasp,' 'rather vague,' can sensibly be coupled with the definiens 'steadfastness in the face of danger.'[1] Thus he claims, "the trait and the meaning can hardly be identical though the meaning of the word 'courage' is steadfastness in the face of danger. But again on our present theory the predicates 'easy to grasp,' 'rather vague' which might be attached to the meaning of 'courage' could also be attached to its definiens 'steadfastness in the face

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[1]This is when the definiens is written without quotation marks as in usual theories of meaning.

of danger' the linguistic phrase that we are here claiming is the meaning of the term 'courage.'

Objections to the metalinguistic theory of meaning

The view of meaning presented in our discussion has not been commonly proposed and has therefore not received much critical attention in philosophical literature. However, the philosopher Max Black has commented on this kind of theory in Models and Metaphors. He analyzes what he calls meaning formulas. In Black's discussion a meaning formula is "used to stand for any statement of the form, 'S meant (A) by (X),' in which 'S' is replaced by a reference to some person, 'X' by a specification of some gesture or utterance produced by him on a particular occasion, and by 'A' any expression that stands in the place of 'A'; the accusative of the meaning formula."[1] He also counts shorter versions of the above such as "S meant A" as meaning formulas. With regard to these meaning formulas Black says:

> When a meaning formula is printed, it is customary to use quotation marks at each end of the accusative, so that we have "He meant 'Dim the lights'" rather than "He meant Dim the lights." Now since a common use of quotation marks is for mentioning the word or expression that appears between the marks, we might suppose that the accusative of a meaning formula mentions a verbal expression but this is easily shown to be wrong.[2]

Black argues that it is wrong to suppose that the accusative of a meaning formula is a verbal expression since such formulas would

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[1]Max Black, Models and Metaphors, p. 17.

[2]Ibid., p. 19.

be exhibiting the mention of an expression in the accusative. If this were so then it would be appropriate to make the mention of the expression explicit by inserting the words "the expression" at the appropriate place in the sentence, e.g., the mention of an expression in the statement, "'Dim the lights' consists of three words," is made explicit by transforming the statement into "the expression, 'Dim the lights,' consists of three words." However, if one inserts the words 'the expression' into a meaning formula Black contends that the results are nonsensical. The nonsensical result would be "He meant the expression 'Dim the lights.'"[1] Black does admit though that if the original meaning formula is replaced by the longer formula, "He meant what would be meant by saying 'Dim the lights,'" the result does not seem to be nonsensical since the longer formula clearly is a statement about an expression and could serve the same purpose as the original explanation.[2] Nevertheless Black rejects this alternative treatment by saying:

> . . . There might be some inclination to say that the latter was after all "really" about words. But this would be a mistake. The statement "This is red" is also replaceable by, and in some way equivalent to, the longer statement "This has the color usually called 'red.' "But while the latter statement clearly mentions the word "red," it by no means follows that the original statement does. And the same can be said of our original example.[3]

In answer to Black's objection it must first be noted that his analyzandum is not the same as the one discussed herein. Meaning

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[1] Ibid., p. 19.

[2] Ibid., p. 20.

[3] Ibid.

formulas such as "He meant 'dim the lights,'" are in no way comparable to what we have referred to in this paper as meaning statements, i.e., definitions. Black himself makes it clear at the outset of his discussion that he does not intend to give an account of statements such as "'Loch' means a narrow lake." But such a statement is precisely the kind of statement that we are solely concerned with in the present view of meaning. Black states that a dictionary entry such as "'Loch' means a narrow lake" will not be referred to as a meaning formula," since it does not refer to a particular speaker and a particular occasion.

In this paper we have chosen not to discuss statements similar to Black's meaning formulas simply because they do refer to a particular speaker and a particular occasion. A theory which would treat such statements adequately would be a theory about the meaningfulness of statement tokens, not a theory about the meaning of terms.[1] As stated earlier, it is the present view that with regard to whole sentences, one cannot correctly pose the question "What is the meaning of that statement STn?" Rather it is only appropriate to ask either the question "What is the meaning of this word 'W'?" or the question "Is this statement Stn meaningful?" Whether a statement STn is meaningful or not will depend on many things--the meaning of the terms in it, the context in which it is spoken, the syntactical and grammatical rules of the language it was written in to name just a few. Therefore, we cannot at all accept Black's meaning formulas as similar to the meaning

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[1]Our theory does not deal with what people mean (intend) when they utter words in sentences.

statements of our metalinguistic theory of meaning. In the sentence "He meant 'X'" the term 'meant' is expressing some sort of relationship between a speaker and a word or expression. But in our view 'means' or 'meant' expresses a relationship between linguistic expressions whose uses may or may not be known to speakers and writers. When Black uses the cognate of 'mean,' i.e., 'meant,' he does not make explicit the sense of 'mean' that he intends. Alston in Philosophy of Language notes that linguistic meaning as we describe in our theory is only one of the uses of the term 'mean.' On the other hand Alston says:

> There are many other uses of 'mean,' some of which might be confused with our sense
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> 1. That is no mean accomplishment (insignificant)
> 2. He was mean to me (cruel)
> 3. I mean to help him if I can (intend)
> 4. The passage of this bill will mean the end of second class citizenship for vast areas of our population (result in)
> 5. Once again life has meaning for me (significance)
> 6. What is the meaning of this (explanation)
> 7. He just lost his job. That means that he will have to start writing letters of application all over again (implies).[1]

In these cases we are talking about people, actions, events or situations rather than about words, phrases or sentences. In Black's meaning formulas it seems that 'meant' is being applied to a linguistic expression in the accusative but it also seems to be applied to a person--"What did S mean when he said 'Dim the lights.' Such a question might arise not only and perhaps even rarely when the meaning of the phrase 'Dim the lights' is unknown to a hearer or reader. The meaning of the

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[1]W. P. Alston, Philosophy of Language, p. 10.

phrase might be perfectly clear but as a sentence used by S it might misfire. It is possible that S may say 'Dim the lights' in a room that is already quite dim. Then meaning formula statements might be given such as "S meant 'make the room still darker' by 'Dim the lights'" or "S meant sarcastically 'that this room certainly is dim' by 'Dim the lights.'"

It appears then that Black's objection does not apply to the meaning statements of our theory and it is difficult to assess his objection even in the context of his own discussion since he seems to be analyzing 'meant' as applied to an "uneasy mixture"[1] of persons and linguistic expressions. It may simply be that he is taking statements or sentence tokens as the smallest unit of his analysis while our theory is confined to individual words or word phrases that are not sentential. The possible ambiguity of Black's discussion of 'meant' is even more apparent by his reference to the statements "This is red" and "This has the color usually called 'red.'" In the passage formerly quoted, he seems to be objecting that the longer transformation of a meaning formula (which seems to indicate that a meaning formula is really about expressions) does not really indicate that a meaning formula is about words since "This is red" is not about words while its longer transformation "This has the color usually called 'red,'" seems to indicate that "This is red" is in part about words. But it certainly is not obvious how the statement "This is red" is in any way analogous to Black's

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[1]We here refer to a quotation from Dewey given on p. 184.

example meaning formula such that what is true of the former can correctly be said to be true of the latter. In any case "This is red" is far removed once again from those examples of meaning statements that we are now discussing.

Meaning statements

The present theory of meaning has been called the metalinguistic theory of meaning. It is so-called because the paradigm example of a meaning statement in this theory is "'X' means 'Y'" which is a first-level meta-statement[1] about linguistic expressions. The term "means" in the meaning statement is a metalinguistic term relating the definiens expression to the definiendum expression in the manner previously described. Such a meaning statement is a definition. If we now return to our meaning criterion of analyticity it is clear that a statement Stn is analytic iff its truth or falsity can be determined by reference to the meaning of the terms of which STn is composed. Thus an analytic statement will be a statement which is deducible from the definition statements of its terms.

Let us take again as an example of an analytical statement ST, "All planets move round the sun," a token which might occur in a first-order extensional language E which contains the usual connectives, and primitive descriptive predicates P, H and M to stand for "planet,"

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[1]We shall distinguish meta-statements about linguistic expressions in the object language from meta-statements further removed from the object language according to various levels. A meta-statement about a first-level meta-statement would be a second-level meta-statement in our view.

"heavenly body" and "moves round the sun." The meaning of "planet" in a hypothetical dictionary might be "a heavenly body that moves round the sun." However this dictionary entry cannot be expressed in E according to our theory but only in a metalinguistic language E' which contains the same connectives, predicates and individual constants and variables as E with the addition of intensional verbal expressions such as "is necessary" and "is to be necessary." Our formulation of this dictionary entry will differ from more usual ones in yet another way as well.

Some writers such as F. Waismann who write definitions as object language expressions have preferred to write meaning statements such as "'Planet' means a heavenly body which moves round the sun" as D_1 '$(x)(Px \supset Hx \cdot Mx)$';[1] however, we have chosen to reflect the term "means" in meaning statements by the equivalence symbol '$\equiv$' instead of the '$\supset$' symbol. Thus our definition is compatible with Beck's symbolization for analytic statements in terms of Kant's second identity formulation of the A-S distinction. In our present example Beck's symbolization would be $P = MX$ where X is a collection of the meaning terms of P one of which is H. MX together constitute the whole collection of these terms. The predicate of ST_1 "moves around the sun" is thought through identity with the subject term "planet." We thus write D_1, the meaning statement of "planet" as "'$(x)\ (Px \equiv Hx \cdot Mx)$'. . . ."[2] In order to complete D_1 above let us examine metalinguistic statements in more detail.

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[1]This is probably because H and M may not be the only application criteria for P. We are assuming that H,M is a complete list of these criteria.

[2]Again we assume that X consists here only of H.

To adequately characterize definitional meaning statements we shall borrow an analysis of entailment statements proposed by P. F. Strawson in his article "Necessary Propositions and Entailment Statements."[1] Strawson describes statements which he calls intensional contingent statements and he makes the following six points concerning them:

1. Statements descriptive of the use of expressions are contingent (not either necessary or self-contradictory)
2. Entailment--statements (i.e. statements in which the main verb is 'entails') are "intensional contingent statements in which the main verb is the verb "to be" and the complement of that verb is some expression such as "necessary," "impossible," "consistent," used in the sense "logically necessary". . . . Such words as "entails," and, when used in this way, "impossible," "consistent," "necessary," etc., will be referred to as "intensional words."[2]
3. In making contingent intensional statements, we use the main intensional words, and mention the other expressions they contain.
4. Some expressions mentioned in some contingent intensional statements are themselves intensional expressions.
5. Every contingent intensional statement of the form "'p' entails 'q'" is logically equivalent to another contingent intensional statement of the form" 'p⊃q' is necessary" or "'p • not-q' is impossible.
6. To avoid the paradoxes arising from C. I. Lewis' analysis of entailment--Strawson claims that no necessary statement and no negation of a necessary statement can significantly be said to entail or be entailed by any statement.'[3]

Strawson developed this account of intensional contingent statements in an effort to adequately characterize metalinguistic entailment

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[1]P. F. Strawson, "Necessary Propositions and Entailment-Statements," Mind, LVII (1948),

[2]We shall regard "means" as this kind of intensional word also.

[3]Ibid., pp. 185-186.

statements of the kind '"__" entails "__,"' after rejecting the account of entailment statements given by C. I. Lewis. We also reject the Lewis' account of descriptive entailment statements (statements which report that '"p" entails "q"' within some deductive system). However, Strawson's theory of IC statements is acceptable[1] and can be expanded, for Strawson's account is not only a suitable analysis of descriptive entailment statements but it also seems to be an excellent characterization of lexical definitions, i.e., meaning statements which we shall consider quasi-reportive legislative entailment statements. A meaning statement 'x' means 'y' can easily be translated into a statement such as 'p' shall entail 'q.' This latter statement after instantiation would read, "'b being or having x' shall entail 'b being or having y.'" Each meaning statement can be translated into such a quasi-reportive legislative entailment statement.

We will therefore adopt the first five points of Strawson's theory as a characterization not only of a metalinguistic descriptive statement that "p" entails "q" but also of a metalinguistic quasi-reportive legislative statement that "p" and "q" are to be considered as related in all instances by entailment.

A definition says not only that it happens to be the case that P means H & M, i.e., that '(x) (Px ≡ Hx • Mx)' but also that '(x) (Px ≡ Hx • Mx)' is to be considered true for all future cases, i.e., "(x) (Px ≡ Hx • Mx)" is to be necessary. Thus the metalinguistic

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[1]We do not accept no. 6.

definition statement "'planet' means 'heavenly body that moves around the sun'" corresponds to the intensional contingent statement '"(x) (Px ≡ Hx • Mx)" is <u>to be necessary</u>.' We shall refer to this last statement as IC_1. As a metalinguistic statement, IC_1 is true and yet prescriptive. IC_1 itself is not necessarily true and it corresponds to the metalinguistic definitional statement in a natural language, e.g., English which establishes, presents, or legislates a connection which is to be necessary between object-level expressions of the natural language. In this view then lexical definitions can be both legislative and informative, i.e., true or false.[1] It is also the case that a quasi-reportive legislative statement which exhorts that certain words are to be related necessarily is a necessary and sufficient condition for saying truly that they are so related. Thus "'(x) (Px ≡ Hx • Mx)' <u>is</u> to be necessary" entails"'(x) (Px ≡ Hx • Mx)' is necessary" and <u>vice versa</u>. Words do not mean each other in our theory until we have given them a verbal definition which establishes that they are not only accidentally used in the same ways by some linguistic performers but that they ought to be used in the same ways. This of course does not mean that there are or will be no renegade linguistic performers for rules are broken. It must also be remembered that not all entailment statements whether strictly descriptive or quasi-reportive legislative IC statements are definitional IC statements. As we shall see in Chapter V a necessary relation can be established conceptually among things, properties or events as well as among words.

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[1]This will soon be explained in greater detail.

Analyticity

The entailment relationship between IC_1 and our analytic statement ST_1 can be expressed by another purely descriptive meta-linguistic entailment statement MST_1[1] "IC_1 entails ST_1" which corresponds to "'$(IC_1 \supset ST_1)$' is necessary." In carrying out the deduction of analytic statements from definitions their necessity (that of the analytic statements) referred to by Kant in formulation five (the Leibniz' criterion) is evident. The premise "'$(IC_1 \supset ST_1)$' is necessary" together with the premise IC_1 entails ST_1. If these premises are true ST_1 must be true. We say therefore that ST_1 must be true in relation to these premises. If we construe "true necessarily" not as "true" followed by a modal qualifier but as "true" followed by a 2-place relational predicate which obtains between true premises and the statements they entail we can say that ST_1 an analytic statement is true necessarily. An analytic statement cannot be false relative to the premises which entail it. However an analytic statement can be falsified whenever these premises are altered in appropriate ways. In support of our views on analyticity, we shall examine in Chapter IV the various senses of "necessity" to determine if indeed there ever are any statements which are absolutely necessary, i.e., in no need of demonstration and incapable of becoming false. We claim that analytic statements are not of this kind and in Chapter IV we shall claim the same for a priori statements.

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[1]This is our notation for meta-statements, one level removed from the material or object level of language.

Definition

The theory of meaning being presented is confined to definitions which have been referred to as meaning statements. The scope of our analysis of meaning is deliberately narrow so that the confusion that arises from talking about "meaning" in other contexts can be avoided. Our metalinguistic theory of meaning which indirectly is part of our revised criterion for the analytic-synthetic distinction is concerned only with the meaning of individual words or word phrases since sameness of meaning among the terms of analytic statements is the sine qua non of their necessary character. However, narrow as our theory of meaning is, there still are many kinds of definition, i.e., meaning statements, even within the scope of our theory which will need at least brief discussion.

Richard Robinson in his book Definition gives two major classifications of definitions--real definitions and nominal definitions. The purpose of real definitions, he says, is to relate things with things while the purpose of nominal definitions is to relate words with words or words with things. We will not approach the classification of definitions in this manner since it has already been stated in this paper that definitions should be regarded as meaning statements which always relate words with other words. It may happen that a definition or a meaning statement which relates two symbols may indirectly relate the things to which the symbols refer (if they refer) but this secondary relation cannot be considered the chief function or main character of a definition statement. As an example of real, or as he Robinson calls them thing-thing definitions, Robinson discusses the work of Plato. As Robinson claims:

> . . . Socrates and Plato were obviously thinking only of the definition of things and not at all of the definition of words. The search for the definition of piety in Plato's Euthyphro is certainly an inquiry about the thing piety, not about the word 'piety' . . . the same is certainly true of every other place in Plato's writings where there is discussion of a question having the form "What is x?" that is to say, a request for a definition.[1]

Contrary to the last sentence of the above passage, it is our contention that the question "What is it?" is not a request for a definition but rather for an identification. It is the vagueness of the term "is" which allows for Robinson's conclusion that a search for identification is a search for meaning.

Statements about identity and statements about meaning are similar. Both kinds of statement explicitly express a relation legislated as necessary, the former between things and the latter between words. The emotion love is identified with the emotions joy, exhilaration, attachment by the identification statement "Love is joy, exhilaration, attachment, etc." When this identification becomes a necessary one intensionally, then we can write the statement "The word 'love' is identified with the words 'joy,' 'exhilaration,' 'attachment' etc." and we can frame the particular kind of IC statement which is a definition, i.e., "Love" means "joy, exhilaration, attachment etc." Statements that express an identification between things can result in statements that express an identification between the words that refer to those things if the things connected become identified with

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[1]Richard Robinson, Definition, p. 149.

one another as an identity.[1] In this case the speaker or writer intends that one thing be necessarily connected, i.e., identified necessarily, with the other. While some blue things are flower things and some flower things are blue things unless a speaker or writer intends that all flower things and all blue things are necessarily connected, i.e., identical, there will result no true statements such as "blue" means "flower." The statement "Flower things and blue things are necessarily connected" is itself a contingent statement which expresses the fact that there is a partial identity between flower things and blue things. Such a statement is contingent because it is not necessarily true that flower things be identified with blue things all the time or ever until the speaker or writer declares that he intends that this should be so. Once the speaker uses a statement which necessarily relates things via identity, it is then possible for that speaker to utter or write meaning statements or definitions involving the words that refer to those things and these meaning statements express an identity between these words. It is important to note, however, that this genetic relation between thing-identity statements and word-identity statements does not always occur. The thing-identification statement "That flower is red" does not express an intensional necessary identity between the two things, i.e., the flower and red thing such that being the first thing, the flower, is always correlated with being the second, the red thing. Therefore no word-identity statement can arise from it such that we would say

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[1]One thing becomes a mark of the other.

"flower" means "red." Likewise there are many word-identity statements that do not arise from any thing-identity statement. Many definitions express a relationship between words which themselves do not refer to any things such as 'and' or 'although.' These definitions are licenced differently.

Our conclusion then is that there are no thing-thing definitions as Robinson supposes, but rather identity statements which express necessary relations between things and a special subset of these identity statements are definitions which express a necessary relation between linguistic things, i.e., words.

Types of linguistic meaning statements

It should not be construed from the above discussion and the theory of meaning here advocated, that all definitions are nominal, if by "nominal" the reader means "stipulative." These two terms have often been used synonymously and in contrast with the terms "real" and "lexical." But as we have just seen in Robinson's discussion "real definition" has quite a different referent from "lexical definition." The first refers to what he calls thing-thing definitions while the second refers to what he calls word-thing definitions.[1] Word-thing definitions which he claims are all nominal can be lexical definitions or stipulative definitions. Other writers such as Irving Copi who believe as we do that there are only word-word definitions refuse to use the old and

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[1] Ibid., p. 19.

confusing terms "nominal" and "real" in application to definitions and we shall here follow suit. Let us consider the two major classifications of definitions which most writers seem to recognize--lexical and stipulative definitions.

Lexical definition

Dictionary definitions are often referred to as lexical definitions. Irving Copi states that when the term being defined is not new but already has an established usage, its definition is lexical.[1] Lexical definitions report the meaning of terms and so can be true or false. At times when we might doubt the definition that someone had given us of a commonly used term in English we might consult Webster's Dictionary and find that the definition statement given by the person was indeed false. At other times we might note a change in the widespread usage of a dictionary term and find that older dictionaries contained a false definition of that term.

It has sometimes been maintained that no definitions are true or false, i.e., that no definitions are descriptive or reportive but only normative. In this view dictionary definitions express only how words should be used or what they ought to mean but not what they do mean. To this claim there is overwhelming reply in philosophical literature. For one, Robinson notes:

> Though a rule is neither true nor false, a statement that certain people observe a certain rule is either

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[1]Copi, op. cit., p. 102.

> true or false, and a lexical definition is such a statement.[1]

Robinson is also careful to note, however, that dictionaries "tend to be histories not of all the usages prevailing at a given time and place but of those of the preferred group of persons.[2] Copi maintains that the word "usage" refers to a statistical matter. In his own words:

> The need for lexical statistics cannot be evaded by reference to "correct" usage for that too is a matter of degree, being measured by the number of "first-rate" authors whose usages of a given term are in agreement.[3]

Lexical definitions according to the metalinguistic theory of meaning

In the meaning theory proposed a definition relates terms in the following ways:

1. The use of, or a meaning of the definiendum is part of the public language and known to the speaker but not to the hearer while the use of or a meaning of the definiens is known to both.

2. The use of, or a meaning of, the definiendum is not part of the public language or known to the speaker or hearer while the use of or a meaning of the definiens is known to the speaker or to both speaker and hearer.

A lexical definition is one which relates terms in sense (1) and is thus covered by our theory. The relation of words described in (2) is one expressed by stipulative definition which is also covered by our metalinguistic theory of meaning.

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[1]Robinson, op. cit., p. 39.

[2]Ibid., p. 37.

[3]Copi, op. cit., p. 103.

Inspection of (1) indicates more clearly how it is that lexical definitions convey information to a hearer and can therefore be said to be true or false. The hearer knows at least how to use the definiens verbal expression. Perhaps he knows not only how to use the definiens expression but also that another verbal expression found in the dictionary, the meaning of the definiens, has the same use as it, the definiens, has. The lexical definition token spoken or written by the hearer's companion (the speaker or writer) presents a meaning and perhaps a use theretofore unknown to the hearer. Once the definition token statement MSTn or as we have previously been calling it, IC_1, is uttered, the hearer is informed about the meaning or use of the definiendum. However, the hearer is not only informed that many speakers use a term in a certain way or that the term has a certain meaning (another verbal expression in our theory) but also that this use of the definiens or the meaning of the definiendum which is the definiens must be adopted as correct. Why? The definiens is already accepted by most speakers or the preferred writers as the meaning of the definiendum and it is intended that the hearer communicate by means of this public language already adopted. Lexical definitions are once again the contingent intensional statements which legislate that two verbal expressions the definiendum and the definiens must be considered equivalent, i.e., as an identity that is to be necessary. But as we have already said lexical definitions are also informative and descriptive. It appears thus that these very unique identity statements elliptically combine both a descriptive and prescriptive element. The speaker is really

saying via his utterance of the lexical definition that you the hearer must mean 'X' by 'Y' in order to communicate with me because the rest of us who use a particular language already use 'X' as though it means 'Y.' The prescription and the descriptive reason for the prescription are both included within these statements. There is in addition to this informative aspect of definitions another which is that we are informed by the speaker of his intention to use a term 'Y' as part of a public language and that he wishes the hearer to communicate with him on the level of the public language. It must also be noted that though the definition statements themselves establish certain identifications as identities yielding necessary connections, the definition statements are contingent and not necessary. Lexical definitions which are assertions of an empirical fact about speakers are not themselves necessary. What is true necessarily is the analytic statements that follow from definitions. These analytic statements which arise from definitions and are true by reference to them are thus indirectly both discovered and justified by empirical investigation. In this same indirect way analytic statements can be falsified as when a definition is or has become false. But the analytic statement does not chiefly function as a conveyor of empirical facts about linguistic entities. It may be, as Norman Malcolm suggests, that analytic statements serve a role in our calculations within a language facilitating inferences. We agree with him that a necessary proposition is not really a proposition describing how people use words.[1] However, whereas Malcolm

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[1]Norman Malcolm. "Are Necessary Propositions Really Verbal?" Mind, XLIX (1940), 199.

concludes that analytic propositions are not empirical and not even statements we conclude that they are statements for they have a truth value, truth and that they may be said to be empirical in many of the senses that could be given to the statement "A is an empirical proposition." We have noted that analytic statements which may originate from our knowledge of definitions can be said to have an empirical origin. We have also noted that analytic statements may be indirectly falsified. They are justified, i.e., regarded as true necessarily via the truth of a definition which can be called an empirical statement in any of the usual senses of the phrase. Further, the words which occur in analytic statements may refer to empirical or observable entities thus analytic statements may be about empirical entities. Thus in what sense can analytic statements be regarded an non-empirical or as non-statements? The whole appellation "empirical proposition" in this context seems vacuous or if meaningful at all, confusing. It is for this reason that we have sought to avoid including Kant's fourth formulation of his A-S distinction in our reconstruction in any but the weakest sense of "empirical independence" viz., that analytical statements need not be verified by empirical investigation other than that of checking a dictionary. Since checking a dictionary can be thought of as a form of empirical investigation the whole discussion of the empirical aspects of analytic statements is unenlightening and detrimental to effective discussion. Even writers such as Gover Maxwell who strongly assert the prescriptive aspect of definitions admits:

> Facts are involved in analytic sentences in the following way. When we give reasons for adopting rules or stipulations [definitions in our terms] which render certain

> sentences analytic we usually appeal to facts. We point to the linguistic fact that most people have a certain set of habits involving the word 'bachelor.'[1]

Stipulative definition

We have described cases of stipulative definition already in (2) as being those in which the use of or the meaning of the definiendum is not known to the speaker or hearer while the use of or a meaning of the definiens is known to the speaker or to the speaker and hearer. The chief difference between stipulative and lexical definitions is that the former introduces a verbal expression whose use or meaning is unknown to both speaker or hearer while both may be familiar with the definiens, whereas the latter introduces only to the hearer a definiendum whose use is already known to the speaker via a definiens known again to both. Irving Copi suggests that the definiendum need not be totally novel to the speaker and hearer in the giving of a stipulative definition but only that the definiendum be new in the context in which the defining takes place.[2] Given that the introduced expression, the definiendum, is new, it would seem that stipulative definitions unlike lexical definitions are purely prescriptive. As Copi claims:

> Since a symbol defined by a stipulative definition had no prior meaning the definition cannot be regarded as a statement or report that the definiendum and the definiens have the same meaning"[3] (this phrasing is contrary of course to that compatible with our Metalinguistic Theory).

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[1]Grover Maxwell, "The Necessary and the Contingent," Minnesota Studies in the Philosophy of Science, III (1962), 399.

[2]Copi, op. cit., p. 100.

[3]Ibid., p. 101.

Despite the above claim even if it were agreed that stipulative definitions do not convey information about past usages, it must be said that they do nevertheless convey information to the hearer about what ought to constitute a future usage as well as the intentions in this respect of the speaker. As Robinson suggests:

> There is still another way in which truth or falsehood enters into stipulative definition. In stipulating a meaning for a word a writer demands that his reader shall understand the word, in that sense whenever it occurs in that work. The writer thereby lays upon himself the duty of using the word only in that sense, and tacitly promises to do so, and tacitly prophesizes that he will do so. But sometimes a writer does not use the word only in the sense he has stipulated. Then his stipulation implied a false promise and a false prediction.[1]

In addition to the above description of a possible factual element in stipulative definition Robinson also describes another:

> But though stipulation as such cannot be true or false, it usually implies an element of assertion, and consequently of truth or falsehood, in the following way. The assumption that the word and the thing both exist in some way. The assumption that the word exists cannot be false in stipulative definition; for in uttering the definition we utter the word and thus make it exist. But it can be false in lexical definition, for the existence there implied is utterance by other persons. . . . Thus the geometers who defined 'horned angles' as those made by the intersection of curves as opposed to straight lines were implying and believing in the possibility of such a thing, whereas the angle between any two curves can only be the angle between the two straight lines that are tangent to the curves at the point of intersection.[2]

The point Robinson makes in the above passage can also be made in terms of the metalinguistic theory of meaning. As discussed

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[1]Robinson, op. cit., p. 64.

[2]Ibid.

previously, definition statements (stipulative ones here) in the metalinguistic theory of meaning establish a necessary identification which expresses a relationship only between verbal entities, not between words and things. However, we pointed out, too, that a definitional identity statement often arises from non-definitional identity statements expressing a relationship between things. In the example above, given by Robinson there may be an identity statement which serves to pick out various elements of the given as constitutive of but one phenomenon or event, e.g., the intersection of curves. From this identity establishing statement among elements, which form one phenomenon, e.g., a certain angle, may arise the stipulative definition that the unknown phrase 'horned angles' shall mean the known phrase 'the intersection of curves.' Indirectly the stipulative definition may be considered false if the existence statement that there is something, the intersection of curved lines, is not true. Once again then we see the vagueness of claims that a certain definition statement is or is not factual, is or is not true or false. As is also the case with lexical definitions stipulative ones are contingent intensional statements which establish a necessary identification between verbal entities.

Synonymy

There are some types of supposed stipulative definition which are not characterized by (2) on page 205. In such definitions it may happen that the use of the definiens is not known to speaker or hearer just as the use of the definiendum is unknown to both. These definitional statements relate symbols which are mere marks. Pepper classifies

such stipulative definitions under the heading equational nominal definitions.[1] However Pepper claims that even in the category of equational nominal definitions, the symbols that are the definiens are "generally assumed to be symbols having meaning in their own right."[2] But for the moment let us consider definitional statements where a symbol of unknown meaning is said to mean another symbol of unknown use or meaning. Can such a statement really be considered a definition? Certainly not on the present theory of meaning advocated herein. Rather such a statement would be a mere rule of synonymy. By "rule of synonymy" we mean a statement which tells a reader or hearer that two symbols have the same meaning, such that one can always be substituted for another salva veritate but it does not inform the reader or hearer what the common meaning is for the use or meaning of neither symbol may be known. The stipulative definitions which might be considered the exception to the rule of our theory of meaning are therefore really not exceptions or counter instances for they are not definitions but rather rules of synonymy. It is important to note that such definitional statements are not disallowed as definitions on the basis of our meaning of "meaning" and "definition" which would involve a circularity but rather on the basis of a separate characterization of "rule of synonymy" which seems to capture these few stipulative definitions within its extension. To say therefore that "'X' and 'Y' are synonymous" is not to give a definition or the meaning for either directly.

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[1]Pepper, op. cit., p. 30.

[2]Ibid.

The synonymy statement may be written as "'X' = 'Y'" but the truth of "'X' = 'Y'" depends on two definitions, e.g., "'X' = df 'Z'" and "'Y' = df 'Z.'" Thus by these definitions it is true that "'X' = 'Y.'"

In his interesting article on synonymy, Benson Mates cites several circumlocutions for expressing synonymy, e.g., we might say "to say A is only to say B" or "A; in other words, B" or "when I say A, I only mean B."[1] In none of these expressions do we find the term "means"[2] or any suggestion that knowing the meaning of any terms is expected. Within the framework of our metalinguistic theory of meaning synonymy statements are metalinguistic expressions which convey the information that two linguistic entities have the same meaning such that if we looked them each up in our dictionary we would have in some way the same verbal entry written next to each. These statements of synonymy however are not used to give the meaning of either of the expressions they relate for they would then be definitions and not statements of synonymy. Failure to recognize this difference between definitions and synonymy statements can lead to serious confusions such as are found in comments by Max Black on analytic statements.

Max Black describes analytic sentences in natural languages as necessary statements which are certified by checking against a corresponding rule of language.[3] Using an example analytic statement

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[1]Benson Mates, "Synonymy," Semantics and the Philosophy of Language, ed. by Linsky, p. 118.

[2]Here we mean "means" in the metalinguistic definitional sense as we have already defined it. "Mean" used in the sentence above seems to be used by Mates as one would use "intend"--see page 192.

[3]Max Black, "Necessary Statements and Rules," Philosophical Review, 1958, pp. 313-341.

"Monday is the day before Tuesday," Black conjures the linguistic rule that "Monday" may be replaced by "the day before Tuesday" and vice versa. Such a rule certifies the example statement. Thus in order to "certify" analytic statements one must look for rules of synonymy which are in force in the English language. However, is it not plausible to ask why two terms are synonymous? Finding a synonymy rule may explain how it happens that a statement is analytic, e.g., we find within it a term joined with its synonym but why stop explanations of analyticity at the level of synonymy, when synonymy itself is in need of explanation? One word can be substituted for another salva veritate simply because they have the same meaning. If one can have recourse to the meanings of the terms he uses he can then "certify" Black's rules of synonymy themselves. How would one know he has seized upon the correct synonymy rule unless he can check the meanings of each term to see in fact if the terms are synonymous--substitutable salva veritate. Synonymy statements then are true or false depending on the meaning of their terms as given, legislated or conveyed by definitions and definitions which are verbal and establish one linguistic entity as the meaning of another are true or false and depend ultimately on usage which is not learned by definition at all but by observation.

The reconstruction of the A-S distinction

In view of the foregoing discussion, the virtues of our proposed reconstructed criterion of the analytic-synthetic distinction and our proposed meaning theory should be clear. By proposing that a statement is analytic iff its truth or falsity can be determined by reference to

the meaning of the terms which constitute the statement, one can avoid all the objections levelled against the distinction as drawn by Kant.

Re: the vagueness objection--Our reconstructed criterion is not metaphorical or vague.

the form objection--Our reconstructed criterion divides exclusively all declarative statements not just those of S-P form.

the variability objection--Our reconstructed criterion applies only to particular statement tokens which occur only once and are at that time either analytic or not. No sentence or judgment therefore is at one time analytic and at another synthetic.

the oversight objection--Our reconstructed criterion provides for statements whose falsity can be determined by reference to the meaning of the terms in the statement.

the epistemological objection--Our reconstructed criterion prescribes that we refer to the meanings of terms within particular statements in order to determine whether the statement is analytic. This meaning is, according to our proposed metalinguistic theory of meaning a verbal expression found in a dictionary. Thus any person making an assessment of a statement need not depend upon his own understanding of terms within the statement.

the perspective objection--Our reconstruction circumvents this criticism aimed against Kant's psychologism in the same way as above (the epistemology objection).

the ambiguity objection--Our formulation makes no claim about any characteristic of empirical indifference with respect to analytic statements. They may originate from empirical considerations. They also may be indirectly falsified by experience (as already explained). If we wish they may be presently justified by empirical data though we need not resort to empirical investigation in order to justify them. The terms within

analytic statements may refer to observational entities and therefore analytic statements may indirectly pertain to the world of empirical fact.

the psychologistic objection--Our reconstruction as that of Frege captures Kant's fifth formulation and makes it more stringent by requiring that definition is basic to analysis. In this way the psychological relativity of Kant's view is avoided.

the definitions objection--Our reformulation allows for the fact that analytic statements can serve in explication of concepts which we already have (as Kant might say) in the sense that they are in a dictionary not presently open to us.

Aside from avoiding the many difficulties of the A-S distinction as Kant discusses it, our formulation captures in the ways already explained his first, fifth and sixth formulations as well as the spirit of the second and fourth. Analytical statements are necessary, entailed by intensional contingent definition statements (which may include the law of non-contradiction) which establish identities between terms as necessary. As such the predicate term may be contained in the subject term as part of its meaning. Given these characteristics analytic statements need not be verified or falsified by empirical investigation.

Criticism of the A-S distinction

The distinction between analytic and synthetic propositions has come under severe attack in recent literature by W. V. O. Quine, whose work suggests that such a distinction is untenable. In his now classic article "Two Dogmas of Empiricism" Quine offers two major objections to the analytic-synthetic distinction. The first objection rests on three assumptions Quine appears to hold:

1. analyticity = df a characteristic of sentences which can never be given up as false
2. "analytic" and "a priori" are synonymous
3. sentences are enduring entities.

If one holds the above three assumptions then one cannot escape Quine's first critical conclusion that there is no[1] clear dividing line between analytic and synthetic statements at least if one admits any statement can be given up if the epistemic situation demands it. But the mark of analytic statements assumed by Quine in #1 is the least desirable mark out of the six which we discussed in Chapter III. We there referred to Quine's assumed criterion of analyticity as the empirical independence criterion and described the ambiguity of the phrase "empirical independence" as used by Kant and his successors. In Kant's text, there is evidence to suggest that by this phrase he did not mean either that empirically independent propositions could not indirectly originate in experience nor that they could not be verified by empirical investigation. Nevertheless this problematic criterion is assumed by Quine though Kant offers several other criteria of perhaps greater merit.

Quine may assume #1 because he assumes #2 that analytic and a priori statements are the same kind of statement. Historically "a priori" has been commonly characterized as referring to judgments (sentences) not subject to falsification. However as we will show in Chapter IV, this criterion is not even a good one for the a

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[1]In fact according to Quine the notion of analyticity should be discarded.

priori-a posteriori distinction; and we will also show that in modern times the terms "analytic" and "a priori" have become identified as synonymous terms by assumptions on one side (e.g., the work of Ayer among others) and default on the other (with the notable exceptions of L. W. Beck and N. R. Hanson).

The third of Quine's assumptions, that analyticity is a characteristic of sentences as enduring entities, leads him to the conclusion that sometimes a given entity, a sentence, can be analytic while at other times it can be synthetic and that once again the A-S distinction cannot be clearly drawn. Quine claims that at one time a sentence will seem conventional and at another time it will not seem merely conventional. Precisely due to the apparent and clear truth of this claim we have sought in Chapter III to explicate "analyticity" with respect to only concrete particular statements which are always sentence tokens never enduring signs unvarying from context to context. A statement is fleeting and transient. It occurs only once and whatever it is on the occasion it occurs, analytic or synthetic, that is what it is. It seems odd that Quine or anyone should have ever talked about sentences simply because he recognizes they change their analytic or synthetic status over time.

Earlier in this chapter, mindful of Quine's logical but unsound conclusions as well as the historical objections to Kant's theory, we deliberately avoided discussing sentences and chose only to discuss discrete non-enduring sign tokens--concrete statements. At one point a given statement is definitionally true. At another point a numerically

different statement which is expressed by the same sentence as the first is not definitionally true but as Quine might say discursive.

We have also formulated a metalinguistic theory of meaning to avoid Quine's other objections to the analytic-synthetic distinction. In our theory, meanings are not regarded as non-physical quasi-metaphysical shadows behind words but as simply other words, strings of symbols physically existent on the pages of our dictionaries.

In efforts to embrace a nominalism which does not allow for the existence of meanings as obscure entities Quine finds attempts to explain analyticity in terms of meaning, definition or synonymy inadequate.

If one were to suggest as does Benson Mates, that synonymy is the interchangeability of linguistic expressions (except within words) which is salva veritate, there would be no way to claim as one would want to claim that the statement "All creatures with a heart are creatures with a kidney" is synthetic while "All bachelors are unmarried men" is analytic. The interchangeability of the terms in the first statement is salva veritate just as is that of the terms in the second. It seems here that Quine's second objection is much the same as our own with respect to Black's discussion of certifying rules of synonymy. How are we to know even in terms of interchangeability salva veritate which rules (statements) of synonymy are true or false? It certainly appears that the synonymy statement "'Creatures with a heart' is synonymous with 'creatures with a kidney,'" is false. In terms of our present theory we would find out a posteriori that such a synonymy

statement is in fact false as soon as we consult our dictionary. "Creature with a heart" and "creature with a kidney" are both co-extensional. But if we look in our dictionary we find no definition that "creature with a heart 'means' creature with a kidney."[1] Thus these two phrases fail to be united by an IC meaning identity statement and we cannot write any true synonymy rule for them. According then to our view of analyticity and synonymy the two phrases "creature with a heart" and "creature with a kidney" are not synonymous and therefore there is no true metalinguistic statement that "creature with a heart" and "creature with a kidney" have the same meaning. Since the two phrases have not the same meaning there is no question according to our revised meaning criterion but that Quine's example sentence "All creatures with a heart are creatures with a kidney" is synthetic. Quine's puzzlement concerning synonymy is reflected in the following passage:

> Some say that statements of the second class reduce to those of the first class the logical truths by definition. "Bachelor" for example is defined as "unmarried man." But certainly the definition which is the lexicographers report of an observed synonymy cannot be taken as the ground of the synonymy.[2]

Quine's second objection might bear some force if the above passage were a correct view of definition. But as we have tried to

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[1]The definitions of "heart" and "kidney" are very different!

[2]W. V. Quine, "Two Dogmas of Empiricism," From A Logical Point of View, p. 24.

show already it is not. Definitions are based on similar uses between terms. But definitions via their report of similar uses establish the meaning of a term (explained in our theory in terms of IC statements). When we have a sufficient cross reference repertoire of definitions (IC statements) we can then speak about the definienda which have similar written definientia, i.e., we would write or utter statements of synonymy. In contrast with Quine, we claim that a statement of synonymy does not refer to the sameness of use of two terms but rather to the sameness of meaning of two terms. Quine's own example sentence indicates the importance of not confusing the uses of a term with the meaning of a term. The two phrases "creature with a heart" and "creature with a kidney" might well be put to the same use, i.e., to refer to animals but they hardly have the same meaning. It is indeed a strange idiom which Quine uses when he says that definitions are reports of a lexicographer of observed synonymies. On our theory "synonymy" does not refer to some elusive thing "out there" that a lexicographer might observe. Rather just as "meaning," "synonymy" is a metalinguistic term which refers to a relation between linguistic expressions.

Our characterization of definitions as IC statements also circumvents Quine's pessimism about semantical rules. He says:

> Not every true statement which says that the statements of some class are true can count as a semantical rule--otherwise all truths would be 'analytic' in the sense of being true according to semantical rules. Semantical rules are distinguishable apparently only by the fact of appearing on a page under the heading "Semantical Rules" and this heading is itself then meaningless.[1]

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[1] Ibid., p. 33.

In reply R. M. Martin states:

> Both Quine and White seem to have had difficulties understanding what Semantical Rules are. . . . Now it seems fairly evident that in Carnap's formulations of semantics, semantical rules are to be regarded either as (1) definitions in the metalanguage, or as (2) semantical axioms in the metalanguage, . . . in either case we know quite well what the semantical rules are. To object to them in the sense (1) is to object to semantical truth definitions of the Tarski kind. And to object to them in the sense (2) would seem tantamount to objecting to the very kind of general semantics Quine is . . . demanding![1]

Our view of IC statements adapted from Strawson characterizes definitions as unique in form and evidence of their form enables us to write such statements under the heading semantical rule. In sum Alan Gewirth writes the following reply to Quine's first criticism:

> But if, following Lewis, we say that these difficulties prove that we must refer to "intensional meaning" since extensional meaning does not meet the salva veritate test, . . . he (Quine) intimates the need for a "pragmatic" as against a merely "semantic" explication of synonymy and analyticity; but on grounds of unclarity he rules out, as constituents of such explication, any reference to such intensional or mentalistic factors as "meaning," "sense," "understanding," "definition," "necessary," by which one might naturally seek such explication. Paradoxically however he uses those very terms and others like them to refute proposed explications of synonymy which themselves use such terms.[2]

Rather than reject the use of terms such as "meaning," "definition" and "synonymy" we have sought to clarify them and then use them in reconstructing Kant's A-S distinction. In order to avoid Quine's criticism we have closely reviewed the problems of Kant's fourth

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[1]R. M. Martin, "On Analytic," Philosophical Studies, LXI (1952), 45.

[2]A. Gewirth, "The Distinction Between Analytic and Synthetic Truths," The Journal of Philosophy, L (1953), 411.

formulation--the empirical independence criticism--and blunted much of its force. Many who have not done so have erroneously and superficially characterized analytic statements as those which are immune to falsification. We strongly disagree with this claim as does Quine (page 31) and in the next chapter we shall examine its wellspring, for such claims do not arise solely from Kant's fourth formulation but also from a fusion of the terms "analytic" and "a priori."

We will discuss this identification of "analytic" and "a priori" in Chapter IV. But before we begin our discussion there of Kant's a priori and a posteriori distinction let us recap our explicative progress thus far. We have seen already that analytic statements are true necessarily in relation to the IC definition statements which entail them. We have also seen that analytic statements may become false when the IC definition statements that entail them become false. Words change their meaning gradually but there comes a point when the meaning of a word has changed so much that the legislation that the word "X" should mean "Y" is false; everyone uses "X" in the same manner as "Z" and not "Y." It is also the case that we can empirically verify analytic statements if we want to do so. We can take a survey to see if in fact all bachelors really are unmarried men. Indeed the phrase "empirically verify" can be construed to include the checking of a dictionary to see if "bachelors" means "unmarried male." It is also the case that analytic statements may contain factual content and apply to the empirical world in as much as the terms within them apply to the empirical world. Therefore, we maintain that analytic statements though true necessarily

may be in many senses empirical. Does this mean that they are not necessary? No, for we have explained how it is that they are true necessarily; how they cannot be false in a relative sense. However, there are other senses of "necessary" and it may be that analytic statements are not necessary in any of these senses given their empirical aspects. It may also be suggested by traditionally minded critics that a priori principles are necessary in some absolute sense of "necessary." They might also argue that a priori truths are independent of experience despite our previous novel object objection to Hume's a priori argument in Chapter I. Let us move on now to consider what can be meant by a priori, i.e., whether a priori truths are the same as analytic, whether a priori truths are necessary in an absolute sense or necessary at all in any sense and whether a priori truths can be independent of experience.

CHAPTER IV

THE A PRIORI--A POSTERIORI DISTINCTION

Kant's second distinction

In the Introduction of the Critique of Pure Reason (2nd ed.), Kant begins his discussion by explaining the difference between a priori and a posteriori knowledge. A priori knowledge is independent of experience and even of all impressions of the senses. Kant notes at B2 that, though it has been cutomary to say, even of much knowledge derived from empirical sources, that it could have been known a priori; this is not his intended use of the term "a priori." According to customary usage, a mystified neighbor might say that Mr. Smith could have known a priori that his house would fall down based on the past experience that mankind has had with respect to old houses with cracked foundations and sagging beams of rotted wood or other similar defects. But when Kant says that Mr. Smith could have known something a priori, he does not mean that Mr. Smith could have known that his house would fall independently of this or that experience of its actually doing so but rather that Mr. Smith knows something absolutely independently of all experience. In contrast to a priori knowledge, empirical knowledge is possible only through experience; and empirical knowledge is therefore a posteriori.

Kant goes on to give a criterion by which one can distinguish a priori from a posteriori knowledge with certainty. In establishing this criterion, Kant gives two marks whereby a judgment can be known to be a priori. He says:

> First, then, if we have a proposition which in being thought is thought as necessary, it is an a priori-judgment; and if, besides it is not derived from any proposition except one which also has the validity of a necessary judgment, it is an absolutely a priori judgment. Secondly, experience never confers on its judgments true or strict, but only assumed and comparative universality through induction. . . . If then, a judgment is thought with strict universality, that is, in such manner that no exception is allowed as possible, it is not derived from experience, but is valid absolutely a priori (B4).

These two criteria, necessity and strict universality, were thought to be inseparable by Kant; but he claimed nevertheless that it was advisable to use them separately as criteria for assessing a priori judgments since the necessity of some judgments is more easily shown than their universality while, in other judgments, their universality is more apparent than is their necessity. Interestingly enough, it is in not many lines later that Kant seems to slip into yet a third mark of a priori judgments or principles. At B5 he claims that "it is possible to show that pure a priori principles are indispensable for the possibility of experience and so prove their existence a priori." If a principle is indispensable for the possibility of experience, its existence (to use Kant's wording) can be proved a priori; it is an a priori judgment. Thus if it appears that some judgment seems neither necessary nor universal, it may nevertheless be both if one can show that this judgment is a principle indispensable for the possibility of

experience. A good example of such an elusive a priori principle is the general law of causality. As we have already seen, Hume for one in his Treatise questioned the necessity and strict universal character of this judgment--that every event has a cause. But Kant sought to prove that the Law of Causality was necessary and universal and therefore a priori in the "Second Analogy" by demonstrating that the general law of causality is indeed a necessary presupposition of experience as we know it, i.e., as an experience which partly consists of events. Such principles if not a priori in origin could hardly be regarded as first principles from which experimental judgments can derive their certainty since these principles themselves would be derived from experience. Kant gives then in these last remarks a third criterion for a priori judgments, viz., that they are not derivable from experience. But already in his text we note a contradiction concerning this third criterion of a priori judgments. As an example of a pure a priori judgment (B5), Kant mentions the proposition "every alteration must have a cause"--the Law of Causality once again. He claims:

> . . . the very concept of a cause so manifestly contains the concept of a necessity of connection with an effect and of the strict universality of the rule that the concept would be altogether lost if we attempted to derive it, as Hume has done, from a repeated association of that which happens with that which precedes, and from a custom of connecting images, a custom originating in this repeated association and constituting therefore a merely subjective necessity.

At once it is obvious that this passage contradicts his words of a few lines previous when he says:

> A priori modes of knowledge are entitled pure when there is no admixture of anything empirical. Thus, for instance, the proposition, "every alteration has its cause," while an a priori proposition, is not a pure proposition, because alteration is a concept which can be derived only from experience (B3).

What has been given as an identifying mark of first principles in the former passage has been reclaimed again by this latter passage. There are pure a priori principles which are completely underived (in some unexplained sense of "derived") from experience but there are also other non-pure a priori principles which are not completely underived from experience in that their concepts are derived from experience. Apparently, judging from the above contradictory passages, Kant has not decided whether the general law of causality is a pure a priori judgment or not. Aside from this contradiction, there is something additionally curious about the former passage in that Kant explains in it why the general law of causality is a pure a priori judgment very much in terms that one would expect him to use in explaining why a judgment is analytic. Yet of course we know from other places in his text that he distinctly denies that the law of causality is an analytic judgment. Nevertheless, in the former curious passage, Kant speaks about the concept of cause manifestly containing the concept of a necessity of connection with an effect; and containment of a predicate concept by a subject concept is one of Kant's criteria for analytic judgments. This description overlap between the present a priori-a posteriori distinction, which we shall refer to as the P-P distinction, and Kant's A-S distinction, previously discussed, raises a critical problem for Kant's whole treatment of these subjects. It will be remembered that Kant's treatment allows for the

possibility that some judgments are both synthetic and a priori. Yet his A-S distinction is usually considered a mutually exclusive division of all judgments at least in the class of S-P judgments (on our view herein it would be of the class of all declarative token statements). But if a judgment is analytic and thereby in no way synthetic, how is it possible that both analytic judgments and synthetic judgments may be a priori? Would not a priori analytic judgments and a priori synthetic judgments have something in common, some common characteristic which would make them both a priori? If so, it would seem that this characteristic, which would be common to both analytic a priori judgments (statements) and synthetic a priori judgments (statements), should not be any characteristic proposed in Kant's A-S distinction or in our reconstructed criterion for this distinction. For if the/a characteristic which renders a statement a priori were the same as the/a characteristic which renders a statement analytic, then synthetic a priori statements would be closer in formal status to analytic a priori statements than they would be to other synthetic statements which were a posteriori.[1] By the same token, if the/a characteristic which renders a statement a priori were the same characteristic as the/a characteristic which renders a statement synthetic, then analytic a priori statements would be closer in logical or epistemological status to synthetic a priori statements than perhaps to any other analytic statements that might possibly be a posteriori. The claim we are making then is simply

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[1]There would be no synthetic a priori statements.

this: If Kant's A-S and P-P distinctions are going to cut across each other with respect to the class of statement tokens, then these two distinctions must have independent characterizations. If they do not, as illustrated above, one or both distinctions will fail to divide the class of statement tokens into mutually exclusive categories and both distinctions may be defunct.

Are there really two Kantian distinctions?

The three criteria for a priori judgments given by Kant, viz., necessity, strict universality, and independence from experience (the empirical indifference criterion again), are the same as[1] some of the criteria for analyticity, e.g., necessity and empirical indifference (Kant's 4th and 5th formulations). If Kant's view of these distinctions is to be workable, then ideally it should not be the case that the criteria for a priori judgments should be the same as any of the criteria for analytic judgments if some a priori judgments are to be considered synthetic. We will thus examine Kant's criteria for the P-P distinction in order to determine if there is a P-P distinction to be drawn at all beyond the A-S distinction already discussed.

The a priori criteria

The first criterion, strict universality, and the second criterion, necessity of Kant's P-P distinction, are interdependent, as Robinson suggests,[2] in that the universality of a judgment (statement)

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[1]We shall see by the end of this chapter if this sameness is but a superficial feature of both sets of criteria or if it runs deeper.

[2]Richard Robinson, op. cit., p. 293.

depends upon its necessity. However, if necessity is viewed as the chief mark of a priori judgments, it may well be that Kant has not made a case for two separate distinctions, A-S and P-P, since necessity is also a characteristic of analytic judgments. It would seem then that the saving of Kant's P-P distinction and any reconstruction of it will depend upon an analysis of the term "necessity." If there are several senses in which a statement can be necessary, then it will be possible for analytic statements and a priori statements to be necessary in different ways. If there are at least two distinct senses of "necessary," one which can apply to analytic statements and one which can apply to a priori statements, then there may be a genuine P-P distinction in addition to Kant's A-S distinction.

Necessity

There are at least two major classifications of necessary statements which were discussed as far back as Aristotle in his "Posterior Analytics." Aristotle claimed that the truth obtained by demonstrative knowledge is necessary. However, necessary conclusions are relatively necessary truths since their truth follows demonstratively from necessary premises. Concerning absolute necessity (necessary premises), Aristotle states:

> Assuming then that my thesis as to the nature of scientific knowing is correct, the premisses of demonstrated knowledge must be true, primary, immediate, better known than and prior to the conclusion, which is further related to them as effect to cause. . . . The premisses must be true. . . . The premisses must be primary and indemonstrable. . . . In saying that the premisses of demonstrated knowledge must be primary, I mean that they must be the 'appropriate' basic truths, for I identify primary premiss and basic truth. A 'basic truth' in a

> demonstration is an immediate proposition. An immediate proposition is one which has no other proposition prior to it.[1]

In an effort to explain exactly what the premises of demonstration are, Aristotle distinguishes three types of attributes. There is a kind of attribute which is (I) true in every instance of its subject, (II) an essential attribute, and (III) a "commensurate and universal" attribute. Of type (I), Aristotle says:

> I call 'true in every instance' what is truly predictable of all instances--not of one to the exclusion of others--and at all times, not at this or that time only; e.g. then if it be true to say 'this is a man,' 'this is an animal' is also true, and if the one be true now the other is true now.[2]

Of type (II) Aristotle says:

> Essential attributes are (1) such as belong to their subject as elements in its essential nature (e.g. line thus belongs to triangle, point to line; for the very being or 'substance' of triangle and line is composed of these elements, which are contained in the formulae defining triangle and line; (2) such that, while they belong to certain subjects, the subjects to which they belong are contained in the attributes own defining formula. Thus straight and curved belong to line, odd and even, prime and compound, square and oblong, to number; and also the formula defining any one of these attributes contains its subject--e.g. line or number as the case may be.[3]

Attributes which are not related in either the first (I) or the second (II) way are called accidents or "coincident," "e.g. musical or white is a 'coincident' of animal."[4] Attributes which are of yet a

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[1]Aristotle, "Posterior Analytics," The Basic Works of Aristotle, ed. by Richard McKeon, p. 112.

[2]Ibid., p. 115.

[3]Ibid., p. 116.

[4]Ibid.

third kind (III), "commensurately universal," are those which belong to every instance of its subject and to every instance essentially "from which it clearly follows that all commensurate universals inhere necessarily in their subjects."[1] Aristotle states:

> An attribute belongs commensurately and universally to a subject when it can be shown to belong to any random instance of that subject and when the subject is the first thing to which it can be shown to belong. Thus, e.g., (1) the equality of its angles to two right angles is not a commensurately universal attribute of figure. For though it is possible to show that a figure has its angles equal to two right angles, this attribute cannot be demonstrated of any figure selected at haphazard, nor in demonstrating does one take a figure at random--a square is a figure but its angles are not equal to two right angles. On the other hand, any isosceles triangle has its angles equal to two right angles, yet isosceles triangle is not the primary subject of this attribute but triangle is prior.[2]

After presenting his distinction of the three kinds of attributes, Aristotle concludes that basic premises, necessary truths, in an immediate (absolute) sense must express essential "connexions," i.e., they are premises which mention essential attributes. As he says:

> Now attributes attaching essentially to their subjects attach necessarily to them: for essential attributes are either elements in the essential nature of their subjects, or contain their subjects as elements in their own essential nature. . . . It follows from this that premisses of the demonstrative syllogism must be connexions essential in the sense explained.[3]

We see in this Aristotelian account of demonstrative reasoning a distinction between premises that are immediately necessary (absolute

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[1] Ibid., p. 117.

[2] Ibid.

[3] Ibid., p. 119.

necessity) and other propositions, conclusions, of demonstrative reasoning which are necessary only because they are deduced from necessary premises. The latter which are only relatively necessary must be demonstrated while the truth of the former is independent of demonstration.

In Probability and Induction, William Kneale also refers to Aristotle's discussion of absolute and relative necessity in the "Posterior Analytics." Kneale notes that the premises used in demonstrations are themselves independent of demonstration. Their necessity is thus absolute rather than relative to any other premises. These primary premises must be grasped by intellectual intuition, and Kneale states that this intellectual intuition is not the uncovering of something innate in the mind but a kind of induction which "exhibits the universal as implicit in the clearly known particular."[1] It appears then that this intuition would be impossible without experience. As Hamlyn writes:

> We come to see the truth of the axioms of particular sciences through a form of induction that may be called intuitive; we see their truth in particular instances.[2]

Though Aristotle has distinguished between truths which are relatively necessary and truths which are absolutely necessary, it is clear in view of the above comments that both kinds of necessary truths may be empirical in several senses of the term "empirical." It was only

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[1]Kneale, Probability, p. 31.

[2]D. W. Hamlyn, "Contingent and Necessary Statements" (already cited in Chapter III along with another Hamlyn article), p. 199.

in seventeenth and eighteenth century empiricism that the realm of necessary truth was restricted to relations between ideas and contingent truths (those regarded as accidental by Aristotle) became identified with truths that state facts about the empirical world.[1] In light of this change, let us now examine various views concerning the meaning of "necessity."

Kinds of necessity

In his very interesting article "Necessary Propositions," Richard Robinson maintains that neither the origin nor the meaning of the phrase "necessary truth" is clear even though philosophers often say that a proposition is a necessary truth if it is impossible that it should not be true, i.e., if there is no possible alternative. However, the layman or philosopher upon some reflection might come up with as many as five different meanings for "necessary proposition."

First, according to Robinson, a thoughtful person might venture that a necessary proposition was a proposition which it is necessary for at least some of us to believe.

> A proposition could be necessary for us to believe because it seemed to us obviously true, or because something compelled us to believe it, or for other causes. Or it could be necessary for us to believe if a certain purpose was to be fulfilled . . . in the sense that it is necessary for you to believe this proposition if you are to be saved.[2]

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[1] Ibid., p. 199.

[2] Robinson, op. cit., p. 290.

A second sense, offered by Robinson, of "necessary proposition" is one discussed by Aristotle in his "Prior Analytics" (i, 8-12) which is the modal proposition of the apodeictic kind. In English these propositions would be of the form "S must be P" or "S cannot be P" or "S is necessarily P."[1]

A third more familiar view of necessary propositions is the one of Leibniz that "A truth is necessary when the opposite implies contradiction, and when it is not necessary it is called contingent."[2] In this third sense Robinson thinks a definition of "necessary proposition" can be formed which is that "a proposition is necessary if either itself or its contradictory is self-contradictory."[3] He says:

> I will call this the analytic kind of necessary proposition, because Leibniz remarked that 'when a truth is necessary, its reason can be found by analysis resolving it into more simple ideas and truths, until we come to those which are primary.[4]

A closely related view to that above is a widespread belief especially among logicians that a necessary proposition is one which is true in all possible worlds, that is of course logically possible worlds. Lord Russell quotes Baldwin's Dictionary in discussing this brand of necessity in Mysticism and Logic. "Necessary. That is necessary which not only is true, but would be true under all circumstances."[5]

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[1] Ibid., p. 290.

[2] Ibid.

[3] Ibid., p. 291.

[4] Ibid., p. 291, quoted in part from the Monadology, p. 33.

[5] Bertrand Russell, Mysticism, p. 181, cited from Baldwin's Dictionary.

Russell maintains that propositions can only be said to be true or false and that it is only propositional functions which can be said to be true in all circumstances.[1] But nevertheless he says:

> A proposition is necessary when it is a value of a propositional function which is true under all circumstances, i.e., for all values of its argument or arguments . . . by specifying the constituent which is to be regarded as argument. . . .[2]

Similarly, Wittgenstein in the Tractatus tried to describe logical truth as "a proposition which is true for all truth-values of its constitutent propositions and true under all truth conditions as revealed by the use of truth tables."[3] But as Hamlyn notes, there cannot be a general use for necessity described in this manner since not all logical truths are truth functional. Hamlyn states:

> The problem here is equivalent to the decision problem for logical calculi. What means can be provided for determining all logical truths? It is now known, thanks to Alonzo Church, that this problem cannot be solved generally for all calculi. Hence, there cannot be a single criterion for logical truth. The one that Wittgenstein offered for truth-functions was roughly equivalent to one of Leibniz' criteria for truths of reason - that they are true in all possible worlds.[4]

A fourth and last sense of necessary proposition is one which Robinson calls the universal sense of necessary proposition. This would be any proposition which asserts a universal connection with

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[1] Ibid., p. 182.

[2] Ibid., pp. 182-183.

[3] Hamlyn, op. cit., p. 201.

[4] Ibid.

unrestricted generality, e.g., "All A is B" when this is understood to be unrestrictedly general.[1]

Robinson claims that the several senses of "necessary proposition" described above are independent of each other (he does not consider Russell's view which is distantly a Leibnizian theory of necessary proposition). Of the four main senses noted by Robinson, a universal-necessary proposition may be an Aristotelian type of necessary proposition or a compulsory-belief necessary proposition. A necessary proposition in Leibniz sense might be expressed modally or it might be a compulsory-belief proposition. However, Robinson claims that Kant's necessary proposition in the Critique is in part all of these types of necessity.[2] The Aristotelian modal view is found in those Kantian examples where he uses the term "must."

Kant's necessary proposition is also partly the fourth sense of necessity, that of universality, when he speaks (B3) of necessity and universality as two marks of the a priori. Robinson thinks that when Kant says necessity and universality belong together inseparably he does not realize that this is so because they are one and the same thing.[3] As Robinson states:

> The unrestricted universal "All S is P" has necessity in that it entails that, if anything were S, it would necessarily be P also. . . . If absolutely all S's are P, then any particular S must be P. There is no other

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[1]Robinson, op. cit., p. 291.

[2]Ibid., p. 293.

[3]Ibid.

> necessity about many of Kant's examples than just their universality, which necessitates something about every particular falling under the subject-term.[1]

When Kant speaks about analytic judgments being necessary, he is thinking of necessary propositions of course in the Leibniz sense; but as Robinson observes, when Kant proceeded from Leibniz' "necessary truths" to his own different kind of a priori necessary propositions, he failed to notice that his "necessary propositions" were no longer guaranteed to be true. Kant assumed that universality entailed necessity (a non-Leibniz view of necessary propositions), and that necessity entails truth, but necessity does not entail truth Robinson stresses in the case of some universal necessary statements such as those of science which may in fact be falsified.[2] Only the Leibniz kind of necessary propositions, or what Kant would have called analytic propositions, are those whose truth is guaranteed by their necessity. At the same time, Kant exhibits in his writing the first view of necessary proposition, i.e., that it is one which we are compelled to believe. As Robinson states:

> If there is a statement to the effect that any S must be P, and I feel myself obliged to believe it, that shows that it is a necessary statement. For Kant, it goes without saying, if it is a necessary statement it is a true statement. Why was Kant confident that necessary propositions were true propositions? . . . Leibniz had

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[1] Ibid., p. 293.

[2] In Chapter I we have seen that some philosophers characterize the laws of science as unrestricted universals. They also think that as such law statements are in some unexplained sense necessary. Yet we know that the laws of science are not always true; some have been falsified and rejected over the years.

> spoken only of necessary truths, and given them a definition which made them indeed necessarily true. Kant spoke of necessary propositions and tacitly repudiated Leibniz's definition without giving another; but he went on assuming that they were all necessarily true.[1]

It is this muddle in Kant with which we will contend after further consideration of the term "necessary."

The kinds of necessary proposition which are relatively necessary

After review of the various senses of necessary propositions, one aspect of them is particularly striking. None of these kinds of necessary propositions are necessary in and of themselves (absolutely).

In the first compulsion sense of necessary proposition discussed by Robinson, something may have compelled us to believe a proposition (perhaps another belief?); or it could be a certain purpose that compels us to believe a given proposition. In either case, the proposition which we must believe is necessary only in relation to something else, i.e., another belief or purpose.

In the Leibniz sense of necessary proposition, the relative aspect of the necessity which characterizes them is most clearly seen. These propositions are necessarily true relative to the meaning of the terms of which they are constituted usually together with the laws of non-contradiction and/or identity. As already discussed, analytic statements are true necessarily but only relatively to the intensional contingent definition statements from which they can be deduced.

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[1] Ibid., p. 295.

Robinson claims that statements of the type "All S is P" have necessity in that they entail that if anything were S, it would necessarily be P also. Aside from the awkward phrasing "have necessity," is it not the case that the particular statement "If this is S then it is also P" is the statement which is true necessarily relative to "All S is P."

Of the view of necessity advanced by Russell, that "a proposition is necessary when it is a value of a propositional function which is true under all circumstances," we can once again say that no necessary proposition is necessary simpliciter (absolutely) but rather only necessary (if necessary at all) in relation to a propositional function which is true under all circumstances. There are those who say that if all the values of a propositional function are true, then any one of these values is just true and not necessarily true. However, one may surmise that those who hold a Russellian view may be basing their claim of necessary truth on the following kind of move. All the values of a given propositional function are true. X is a value of this same propositional function. Therefore X must be true. The notion of necessity is dragged in at the metalinguistic level as a relational predicate said to obtain between the premises and conclusion of a metalinguistic deductive argument.

Up to this point, we have omitted discussion of Aristotle's apodeictic sense of necessary proposition since it is very likely that it is parasitic on some other sense of necessary proposition. If we write "S must be P," it is probably because we regard the statement

"S is P" as necessary in one of the other senses mentioned herein. Thus we shall not consider this an independent view of necessity.[1]

It appears in view of the foregoing survey that if these five/four[2] senses of "necessity" constitute a complete list of the senses of "necessity," then there are no necessary statements simpliciter but only statements necessary relative to other statements which are assumed to be true. As D. W. Hamlyn states in his article "Contingent and Necessary Statements":

> To maintain this categorically would be to maintain that necessary truth, as such, is relative. A conclusion of an argument is necessary if the premises are true.[3]

All necessary statements are necessary relative to other true statements which entail them. The true premise statements themselves are all contingent though some such as "'All S are P' is unrestricted" are intensional contingent statements which establish or legislate a necessary connection between S's and P's. Necessity arises therefore from entailment, and the necessity which characterizes any necessary statement is fundamentally a type of logical necessity. This relationship between necessity and entailment is thoroughly discussed by William Kneale.

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[1]We shall soon see that there is no absolute sense of necessity to which this view might refer.

[2]We mean here the four main senses discussed by Robinson and the fifth somewhat related view of Russell.

[3]Hamlyn, op. cit., p. 198.

Relative necessity

William Kneale, in his well-known article "Truths of Logic," discusses two traditional views about what sort of truths constitute the science of logic. According to one view expressed by Aristotle in the "Prior Analytics," the truths of logic are principles of entailment which, qua schemata, tell us what propositions follow from what others. Formal principles of entailment are stated as general principles or schemata with arbitrarily chosen letters to mark gaps which would have to be filled if a genuine argument were to be produced. Such an entailment schema might be:

"If p then q
But p
Therefore q [sic]";[1]

and such a schema of entailment is distinct from a particular truth of entailment that is an instance of it. The former would be a truth of pure logic while the latter would be a truth of applied logic. When examining the validity of individual arguments, Kneale maintains that principles of entailment may be employed either as premises in the presentation of the argument or, as is more generally the case, as an implicit rule of inference.

The alternative account of what are considered the truths of logic refers to certain propositions such as the principle of non-contradiction and the principle of excluded middle which do not themselves look like entailments. According to this second account of

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[1]William Kneale, "Truths of Logic," Aristotelian Society Proceedings, XLVI (1945-1946), 209.

logic, its truths are principles of necessary truth or falsity, e.g., that the disjunction of any proposition and its negation is necessarily true.

Both views concerning truths of logic can be synthesized into one basic view, Kneale claims, if one but realizes that the metalinguistic entailments described by the first view "can easily be presented as second-order propositions of necessary truth [sic]" in the manner of the law of non-contradiction as described by the second theory of logical truths. One might say as Kneale does:

> If one proposition entails another we may say that the hypothetical proposition which has the first as protasis and the second as apodosis is necessarily true.[1]

Due to the greater comprehensiveness of this second account of the truths of logic, it has been the more widely accepted view. However, Kneale stresses that a confusion between "formal truisms" and "logical truth" often enters into discussions of the second view. Kneale regards object-level propositions, for example, the formula "P or not P" as formal truisms. But a metalinguistic proposition expressed in the formula "It is logically necessary that P or not P" is a logical truth or truth of logic. In the past, Kneale maintains that the confusion was strengthened by an unsatisfactory theory of modality according to which phrases such as "it is necessary that" were "supposed to refer only to the speaker's ground for asserting what followed." In more modern times philosophers have often used the

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[1] Ibid., p. 212.

phrase "it is a logical truth that p or not p" when they mean only that the truth of the proposition is determined by its form. However, this use of "logical" "can easily be taken to imply that the science of logic consists of such truths as that p or not p."[1] Such a view is found according to Kneale in the work of Frege, Whitehead, and Russell, who supposed the science of logic to consist of formal truisms.

With this much apparatus, we can now turn to the crux of our concerns in our discussion of necessity. Kneale has presented three kinds of formulae as necessarily true: (1) formal truisms, (2) logical truths which claim that such and such a truism is necessarily true or a logical truth, and (3) entailment statements[2] which can be[3] assimilated to formulas of type (2). Though it might appear on Kneale's account of formulae of types (1), (2) and (3) that there may be propositions which are necessary in an absolute sense, we maintain as does Kneale that there are not. Kneale refers to C. I. Lewis' view of strict implication which we have previously rejected as an adequate account of the entailment relation. Lewis brings the notion of modality within his calculus by saying that p strictly implies q" is equivalent to "It is necessary that $p \supset q$." The commonly cited disadvantages of Lewis' theory[4] of entailment are regarded as points of advantage by Kneale in

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[1] Ibid., p. 213.

[2] Ibid., p. 214.

[3] This is in reverse order of presentation in previous discussion.

[4] Though we have rejected the Lewis theory, it points toward our own conclusion about necessity in this instance.

illustrating the relationship between entailment and necessity. According to the Lewis view, a necessarily false proposition strictly implies every proposition; and a necessarily true proposition is strictly implied by every proposition. Kneale regards this supposed predicament as a strength of Lewis' view in the following way:

> For it can be shown that according to ordinary notions of entailment a formal absurdity (i.e., the negation of a formal truism) entails every proposition and a formal truism is entailed by every proposition. These assertions seem strange only because we do not commonly think of absurdities or truisms in connection with entailment. . . . In some recent works on logic it is sometimes said that the propositions I call truisms are consequences of the null class of premises. . . . The special interest of this result is that it enables us to understand the relation between principles of entailment and those other principles of logic which do not seem to have the form of entailments. We have seen that entailment can be defined in terms of necessity, but it now appears that necessity can be defined in terms of entailment.[1]

If the view expressed in the above passage is accepted, it would appear that the necessity of at least logical truisms can be said to be relative in that they are entailed or logically follow from the null class of premises. This, however, is a way of arguing for the relative necessity of these propositions which may be hard to accept. A better way of stating the point might be that formal truisms are true necessarily because of the semantical rules of the system in which they appear. "As Carnap has pointed out (p. 30),[2] the truth-value tables in which we try to explain to ourselves our usage of such words as "and"

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[1]Ibid., p. 217.

[2]Kneale is referring to Carnap's Introduction to Semantics.

are really formulations of semantical rules."[1] If we combine this last thought of Kneale's thoughts on entailment and necessity, we find the following explanation of the connection between necessity and entailment previously expressed. Kneale writes, quoting from the Tractatus:

> Those possible combinations of truth - values of its arguments for which a truth - function is true may be called its truth - grounds (5.101) and for a finite number of arguments these can be indicated most conveniently in a truth - value table of the form which now has become familiar (4.31). One sentence entails another if the truth-grounds of the first are included among the truth-grounds of the second (5.12), and this is the only kind of necessitation, because all elementary sentences are independent of each other (5.134). It follows that if a sentence is true in all possible circumstances it is entailed by every sentence, and just because it excludes no possibility it says nothing (5.142). . . . Similarly a self-contradictory sentence, which is not true in any possible circumstances, entails every sentence.[2]

Expressed in these terms, Kneale's assertion of the connection of necessity with entailment and entailment with necessity is perhaps more acceptable.* Metalinguistic propositions such as "it is necessary that 'p v ~p' is true" might well be said to hold necessarily themselves relative to the necessary truth of the truism which they mention. However, this latter contention might well be challenged by some logicians such as Quine. In his article "Truth by Convention" Quine points out the fact that some truths of logic such as the law of non-contradiction (it is not obvious whether it is meant as a truism or a metalinguistic formula) antecede the adoption of conventions (semantical rules) since the very application of these conventions presupposes the adoption of

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[1] Ibid., p. 233.

[2] Ibid., p. 220.

logical truths such as the law of non-contradiction. In this view, it would seem that a statement of the law of non-contradiction, if necessarily true, is not necessarily true relative to anything but is perhaps pragmatically adopted. This conclusion, however, need not invalidate the view that all necessity claims are relative. Rather we maintain that logical truths, even those referred to by Quine, are themselves contingent assertions[1] which legislate that certain propositions are to be considered as necessarily true. For example, Hospers writes the law of non-contradiction as "not both A and not A." He then says:

> Sometimes, however, they are formulated as truths about propositions, in which case they (he's referring to the laws of thought here) are all tautologies:
>
> Law of Identity: If p, then p — $p \supset p$
> Law of Non-contradiction: Not both p and not p — $-(p \cdot -p)$
> Law of Excluded Middle: Either p or not-p — $pv-p$
>
> There is an advantage in this formulation in that the three laws cannot be used as rules of inference in the logical deduction of propositions. But these are nevertheless only special cases of our first formulation: unless it were true that A is A, one could have no basis for asserting that p is p (or have p implies p)."[2]

In view of the above passage, the statement of the law of non-contradiction 'not both A and not A' is itself contingent but legislative.[3] The logical tautologies such as '-(p•-p)' are as Quine maintains

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[1]Here we reject the Kneale solution at *.

[2]John Hospers, op. cit., p. 210.

[3]In terms of our IC theory in Chapter III we would write "'Not both A and not A' is to be necessary

not mere truths of convention but necessarily true relative to the law 'Not both A and not A' which is a truth by convention.

Another candidate for a truth which may be necessary in an absolute sense has been discussed extensively by Kneale himself as an exception to his entailment-necessity views. Exceptional necessary truths of this type are not formal entailment statements. An example is "It is necessarily false that a thing is both red and green." Kneale thinks that this statement reflects an "objective necessity independent of all linguistic conventions."[1] However, it might be countered to this contention that if experience imposes belief in such a principle upon us, it does so with no greater force than it does any other description which is true repeatedly with no known violation. In an approaching age where psychedelic phenomena may be the norm, it may well be that something will appear to be red and green at the same time; or it may be that principles of identity and individuation may change in such a way that something identified as one thing might be regarded as both red and green simultaneously as we now regard one thing as both short and fat at the same time. Thus these non-formal principles have much the same status as a highly confirmed hypothesis, and statements which express these principles can be regarded as themselves contingent though they may establish and report that it is to be considered necessary that certain relationships pertain, in our example that no one thing can be wholly two colors at the same time.

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[1]Kneale, "Truths," p. 232.

From the preceding discussion, it can be concluded that those propositions commonly regarded as necessary are necessary relative to the semantical rules and definitions within the systems in which they occur. Those other propositions which appear to be necessary in an absolute sense are really not necessary at all but are more adequately viewed as intensional contingent statements presented by Strawson which we have adapted as well as adopted herein. This conclusion leads us back at this point to our main line of work--the explication of a criterion for Kant's P-P distinction.

Before resuming our main discussion, we must pause to clarify our position in light of Kneale's article with respect to the two symbols "⊃" and "→." According to Kneale, it would seem that Lewis' characterization is to be adopted for all entailment relations (this would include logical deductions). This, however, is contrary to much of contemporary logic which seems to recognize a model interpretation of the binary English connective "that . . . entails that . . ." but yet seems to also recognize a non-modal sense of entails" such that "a sentence A entails a sentence B iff it follows from the meanings of A and B that B would be true if A should be true."[1] Of this second interpretation of "entails" G. J. Massey says:

> . . . if A and B are sentences of a P-language, then A entails B if A implies B. . . . It can also be readily shown that implication is a sufficient but not a necessary condition of entailment among sentences of a P-language.[2]

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[1]Gerald Massey, Understanding Symbolic Logic, pp. 79-80 (1 of 2) galley.

[2]Ibid., p. 80 (1 of 2) galley copy.

In succeeding pages, we shall use "entails" in the non-modal sense as it is defined by Massey. In the next section of this chapter, we shall give a definition of "entails" more precisely tailored to our discussion of presuppositions. However, "entails" should always be understood as a 2-place metalinguistic predicate. If A entails B and A is true, B is true necessarily, relative to A.

The necessity of a priori statements

We have already noted that necessity has been offered by Kant as a mark not only of analytic judgments but also of a priori judgments. The manner in which analytic statement tokens are necessary in our view has already been described. The necessity of analytic statements is relative to the definitions of the terms within them from which they can be derived in accordance with certain logical laws.

If Kant's view that there are a priori statements which are not analytic but synthetic is to be accepted, we must now discover in what sense a priori statements are necessary which is different from the sense in which analytic statements are necessary. Since all concepts of necessity are relative, it must be the case that a priori statements are necessary relative to something other than definitions or semantical rules.

Presuppositions

We have already noted a reference in Kant's discussion of a priori truths to the claim that they are necessary presuppositions of experience. In the case of his paradigm example of an a priori truth, the general law of causality, both the usual marks of a prioricity,

i.e., strict universality and necessity, are challenged by Hume. Kant seeks to demonstrate in the "Second Analogy" that the general law of causality is a necessary presupposition of experience and therefore necessary, strictly universal, and of course an a priori truth. Before attempting a reconstruction of "a priori," we think it a fruitful tact to follow Kant's lead and discuss presuppositional truths in order to determine if necessity and strict universality are adequate marks of a priori truths qua presuppositional truths.

Little has been written on the subject of presuppositional truths or presuppositions[1] even though there has been intense interest during the past 25 years in the related topic of contextual implication. Contextual implication has been described as a "concept that applies to those conditions that must be satisfied before an utterance can count as normal in the circumstances in which it is made."[2] Discussion of contextual implication is mainly connected with developments in moral philosophy, especially with the work of G. E. Moore. But the notion of presupposing has arisen from developments in logical theory, particularly in the work of P. F. Strawson whose view of presuppositions was developed in opposition to Russell's theory of descriptions. We shall refer to Strawson's view in coming pages; however, we agree with writers such as Wilfred Sellars, Avrum Stroll, David Rynin, and Roger Hancock that Strawson's theory is an undesirable explication of "presupposing."

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[1]We shall always mean what is presupposed and not the activity of presupposing.

[2]Avrum Stroll, "Presupposing," Encyclopedia of Philosophy, 1st ed. (1967), p. 447.

As Sellars points out, Strawson's theory is more an account of when statements are correctly asserted, i.e., contextual implication, than it is an account of presupposing.

A more encompassing treatment of presuppositions is contained in an older work, An Essay on Metaphysics by R. G. Collingwood. Though Collingwood's treatment is somewhat confused and unclear, it has been central in less recent discussions of presuppositions; and it covers to some degree the major topics that are involved in any discussion of presuppositions. We shall explore some of the lines of Collingswood's view contrary to pronouncements by Alan Donagan, one of Collingwood's major critics, who says:

> Collingwood's projected reformation was therefore too riddled with confusions and contradictions to stay afloat: and no considerable parts of its wreckage can be salvaged.[1]

Despite this criticism, we believe that some worthwhile parts may be either salvaged from Collingwood's discussion or suggested by his mistakes. As D. Rynin contends:

> No man willfully utters stupidities, involves himself in obvious inconsistencies or commits his reputation to patent errors. Collingwood could of course be as poor a thinker as Donagan makes him out to be on the subject under discussion (presuppositions). . . . In any case, I wish to read Collingwood on the assumption that he is not an intellectual dolt, and the least I can do is to seek out, if possible, some interpretation of his thought that leaves it not utterly ridiculous and obviously mistaken to see whether what he seems to be saying may not be worth saying and even listening to.[2]

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[1]Alan Donagan, The Later Philosophy of R. G. Collingwood, p. 279.

[2]David Rynin, "Donagan on Collingwood: Absolute Presuppositions, Truth and Metaphysics," Review of Metaphysics, XVIII (1964-1965), pp. 307-308.

Let us begin our quest of such an interpretation by considering Collingwood's initial pronouncement concerning presuppositions. Collingwood writes:

> Whenever anybody states a thought in words, there are a great many more thoughts in his mind than are expressed in his statement. Among these are some which stand in a peculiar relation to the thought he has stated. They are not merely its context, they are its presuppositions.[1]

The peculiar relation to which Collingwood refers in the above passage is described by him at the end of his book as:

> The relation here described as "presupposing" or 'being derived from' might, I take it, be understood . . . as a logical relation, where 'b presupposes a' means that a state of things a exists contemporaneously with a state of things b, and a is an indispensable condition of b.[2]

The former passage speaks about a relation obtaining between the thoughts expressed by a statement and unexpressed thoughts; but if this is any kind of logical relation, it must be regarded as holding only between statements or what they express when stated but not between expressed and unexpressed thoughts. We shall thus view these thoughts in the mind, referred to by Collingwood, as mentioned linguistically in metalinguistic statements such as "My object-level statement ST_2 is logically related to the claim CM_2 that . . . , which was in my mind but not stated." In keeping with this linguistic approach, we might rewrite Collingwood's latter passage as:

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[1]R. G. Collingwood, An Essay on Metaphysics, p. 21.

[2]Ibid., p. 291.

> A statement B which describes a state of things b presupposes A, a statement which describes a state of things a, when A is true if B is true, i.e., when a is a necessary (indispensable) condition of b. It is also the case that the truth of a statement A is a necessary condition for the truth of B (present author).

In reading these two passages, two claims already can be made about presuppositions. First, presuppositions are not stated. They do not enter our object-level discourse. Secondly the truth of a presupposition as a necessary condition for the truth of various statements ST_2, . . . , ST_n^1 is logically prior to those statements. We may therefore write that if ST_2 presupposes CM_2, then ST_2 entails CM_2.

It might seem that logical priority is a better characterization of the antecedent ST_2 than it is of the consequent CM_2. However, the truth of ST_2 is only a sufficient condition for the truth of CM_2 while the truth of CM_2 is a necessary condition for the truth of ST_2. As a sufficient condition for the truth of CM_2, the truth of ST_2 may be temporally or epistemologically prior to CM_2; but it is not logically prior; for the truth of some other antecedent, let us say ST_3, might also be a sufficient condition for the truth of CM_2; and we might mention CM_2 in a metalinguistic discourse, saying that it is a presupposition of ST_3 without considering the sufficient but non-necessary condition ST_2 as true. On the other hand, if the truth of CM_2 is a necessary condition for the truth of ST_2 whenever ST_2 <u>is</u> mentioned as

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[1]We use ST_2 as the name of a statement in this chapter since we have already used ST_1 in Chapter III.

true in a metalinguistic discourse CM_2, its presupposition must be considered true; and thus CM_2 is logically prior to ST_2.[1]

It is important that logical priority not be confused either with temporal priority or epistemological priority. It is fairly easy to note that if CM_2 is a presupposition of ST_2, CM_2 may be both logically prior to ST_2 and temporally posterior to ST_2. CM_2 may be so temporally posterior to ST_2 that no one may ever mention CM_2 though they constantly state ST_2. It would seem, in fact, that since presuppositions are always unstated, the statements which presuppose them are always temporally prior to them. By the same token a presupposition CM_2, qua unstated claim, may or may not be in our conscious awareness when we state ST_2, a statement which presupposes it. We may discover CM_2 only when someone else points out the fact that our assertion ST_2 presupposes it. In this situation, CM_2 would be logically prior to ST_2 but epistemologically posterior to ST_2. With respect to epistemological justification of CM_2 as opposed to discovery of CM_2, it may also be the case that CM_2 is epistemologically posterior while logically prior to ST_2. Suppose we have always considered ST_2 a true statement and ST_2 presupposes CM_2. In this context, ST_2 entails CM_2 and CM_2 is presupposed. However, evidence may later indicate that, in fact, ST_2 is not true; and the rules of implication indicate then that CM_2, as merely a necessary condition for the truth of ST_2, may be true or false.

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[1]This assumes that CM_2 is also sufficient as well as necessary or that all the other necessary CM's are mentioned.

CM_2 which is presupposed by ST_2 may not be true; its justification is pending; and therefore, CM_2 is logically prior but epistemologically posterior to ST_2 in the sense of epistemological justification.

In contrast to our characterization of presuppositions as logically prior to the statements that presuppose them in the sense that the truth of a presupposition is a necessary condition for the truth of these statements, P. F. Strawson claims that a statement S presupposes a statement S' in the sense that the truth of S' is a precondition of the truth-or falsity of S.[1] In the sense given "presuppose" by Strawson, S does not entail S' as we claim in our theory. As Strawson says:

> It is self-contradictory to conjoin S with the denial of S' if S' is a necessary condition of the truth simply of S. It is a different kind of logical absurdity to conjoin S with the denial of S' if S' is a necessary condition of the truth or falsity of S. The relation between S and S' in the first case is that S entails S'. We need a different name for the relation between S and S' in the second case; let us say as above, that S presupposes S'.[2]

Objections to Strawson's theory

Several thinkers have raised objections both to Strawson's definition of "presuppose" and to his motivation for formulating it as he does. Let us consider objections to his definition.

Roger Hancock notes that the relation of presupposing as Strawson defines it cannot be one which obtains between statements if

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[1]P. F. Strawson, Introduction to Logical Theory, p. 175.

[2]Ibid.

statements are true or false by definition.[1] A false presupposition is presupposed by a non-statement since Strawson claims that a true presupposition is a necessary condition for either the truth or falsity of a statement. If this necessary condition is not satisfied, i.e., if the presupposition is false and not true, then the so-called statement that presupposes it is not true or false and so by definition not a statement at all.[2]

Avrum Stroll notes another objection to Strawson's view raised by David Rynin. Stroll writes:

> . . . when "necessary condition" and "truth or falsity of the statement that" are interpreted in the ordinary, truth-functional way, the definition has the paradoxical consequence that all presupposed statements are true. Rynin's demonstration is that (S ⊃ S') and (-S ⊃ S'), but (S v-S) therefore S'.[3]

Stroll also discusses an objection which deals more specifically with the goal Strawson seeks to achieve via his definition of presupposition. Strawson rejects Russell's theory of descriptions. It will be remembered that according to Russell a sentence such as "The king of France is bald" contains in part an assertion that the king of France exists. Strawson argues that this existence claim is not an explicit part of the sentence "The king of France is bald" but is rather a

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[1]Bas C. Van Fraassen discusses presuppositions when this principle of bivalence is given up in his article "Presupposition Implication, and Self Reference," Journal of Philosophy, LXV (1968), 136-151.

[2]Roger Hancock, "Presuppositions," Philosophical Quarterly, X (1960), 73.

[3]Stroll, op. cit., p. 448.

presupposition of such a sentence when a speaker uses it to make a statement in normal circumstances. Stroll raises the objection that "if 'The king of France no longer exists' is used to make a true statement then by Strawson's criterion one who employs it thereby presupposes the existence of the king of France. If we disregard this last criticism for a moment, there surely is some sympathy for Strawson's wish to maintain that we cannot say whether the sentence "All John's children are sleeping" is true or false unless it is true that John has at least one child. However, as Sellars points out, there is a big difference between its being false that 'All John's children are sleeping' when in fact John has no children and its being correct to say "'All John's children are sleeping' is false" when John has no children. Sellars comments:

> . . . if John were to say "The table is large," it would be a mistake for Smith to say "No, that's false" unless he believes that the uniqueness condition is satisfied. If he doesn't he should say rather, "There's no table over there," or, "There are seven tables over there, which one do you mean?" Strawson infers from this that the utterance is neither true nor false unless the uniqueness condition is satisfied. . . . But even though both the original utterance and the reply presupposes that the uniqueness condition is satisfied, the utterance is nevertheless false if the uniqueness condition is not satisfied. The utterance is false if the uniqueness condition is not satisfied, even though it is not correct to say that it is false unless one believes that the condition is satisfied.[1]

In agreement with Sellar's conclusion, we maintain that a presupposition is an unstated claim whose truth is a necessary condition

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[1]Wilfred Sellars, "Presupposing," Philosophical Review, LXIII (1954), 207-208.

for only the truth of a statement which presupposes it. We maintain this not only in light of the above objections to Strawson's view but also in keeping with the ordinary sense of "presuppose" in English which we shall soon discuss. This ordinary use of "presuppose" (one of the senses of "presuppose" in an American dictionary) is a stronger meaning than that of terms such as "assume" or "suppose." But let us begin the next section by discussing the weaker sense of "presuppose" which identifies it with "assume" and "suppose."

The weaker sense of "presuppose"

Collingwood in his discussion of presuppositions goes on to define a proposition as that which is stated, i.e., that which can be true or false, and the stating of propositions is propounding them. Thus in keeping with Collingwood's somewhat dated terminology, only propounded propositions are statements. It should be noted here that Collingwood is implicitly stating, via his definition of proposition, that statements are those linguistic entities which may be either true or false. Thus far in our discussion, we have been talking about statements which presuppose unstated claims. But Collingwood now goes on to maintain that every question involves a presupposition; and that "to say that a question does not arise" is the ordinary English way of saying that it involves a presupposition which is not in fact being made.[1] For example, we could say that the question "Is this clock accurate" presupposes that the clock is sometimes not accurate; and if such a

[1]R. G. Collingwood, op. cit., p. 26.

presupposition is not made, the question of accuracy does not arise. But what claim is Collingwood really making here? When such a question arises, it indicates more clearly perhaps that we no longer presuppose that the clock is accurate which is not to say that we do presuppose that the clock is not accurate. Perhaps it can be said that when a question of this sort arises we presuppose that it may be the case that the clock is not accurate. But if we presuppose that the clock may not be accurate, it could still be said that we presuppose also that the clock may be accurate. What kind of presupposing is this?

The dictionary definition of "presuppose" is:

1. to suppose or assume beforehand; take for granted.
2. to require or imply as a preceding condition as, a healthy body presupposes healthful living.[1]

As a synonym, the dictionary gives "presume." The definition of "presume" is the following:

1. to take upon oneself without permission or authority.
2. to take for granted; accept as true until proof to the contrary is furnished; suppose, presuppose . . . "presuppose" is the broadest term here, sometimes suggesting a taking something for granted unwarrantedly . . . and in another sense, implying that something is required as a preceding condition.[2]

The above definition confirms the uneasiness expressed previously about Collingwood's claim that every question presupposes some statement. In the case of the question "Is this clock accurate?" we indeed are not taking for granted that the clock is not or may not be

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[1] Webster's New World Dictionary of the American Language, ed. by J. H. Friend, p. 1155.

[2] Ibid., p. 1154.

accurate (dictionary sense (1) of 'presuppose'); nor would the possible inaccuracy of the clock be a necessary precondition for asking such a question (sense (2) of 'presuppose'). Thus, it appears that Collingwood is at the outset of his discussion using 'presuppose' in some unexplained and weak sense which is neither of the usual senses of the term as found in our English language dictionary. Rather he seems to be using 'presuppose' loosely as a synonym for 'surmise' which means according to Webster's dictionary: ". . . an idea or opinion formed from evidence that is neither positive nor conclusive; conjecture; guess."[1]

Faced with two timepieces with different readings, the question "Is this clock accurate?" reflects not any particular presupposition but only a guess that of the two timepieces it may be the clock which is inaccurate. The word "guess" is indeed a weak synonym for "presuppose"; however, it may not really be weaker than "assume," a synonym mentioned in dictionary sense (1) which did not seem prima facie to capture Collingwood's use of "presuppose" with regard to questions (as we claimed above in our clock example).

In his article "Presuming," Roland Hall says of "assume":

> Elsewhere I have argued that the latter in its positing uses (except the prothetic uses) indicates, when used protopersonally, the possession on the part of the speaker of slight grounds for making the assertion which it introduces or which flank it, and rules out knowledge of the truth of that assertion while leaving the speaker's commitment to its truth intact.[2]

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[1] Ibid., p. 1467.

[2] Roland Hall, "Presuming," The Philosophical Quarterly, XI (1961), 10.

Hall's account of the meaning of "assume" is quite compatible with the definition of "surmise"; and we conclude, therefore, that the weak sense in which Collingwood is using "presuppose" with respect to questions is probably dictionary sense (1) of "presuppose."

In view of this initial confusion between the weak and strong senses of "presuppose" in Collingwood's discussion (he explicitly adopts sense (2) in his formal definition of "presuppose" but then uses the term in sense (1) when discussing questions), it may be well now to consider other relations that may hold between statements such as supposing and assuming. But before undertaking this discussion, let us recap what can be said about presuppositions thus far. A presupposition is:

1. logically prior to the statement(s) that presuppose(s) it.
2. not necessarily or even usually epistemologically in either a discovery or justificatory sense of the word "prior" to the statement that presupposes it.
3. an unstated claim CMn which does not occur within the context of the discourse in which STn the statement which presupposes it occurs.
4. in one sense, dictionary (1), much like an implicit or hidden assumption which we take for granted as true.
5. in another sense (2) not only an entailed hidden claim that is true but one that must be true since its truth is a necessary condition for the truth of STn, the statement which presupposes it.
6. best understood in sense (2) formally adopted by Collingwood, since sense (1) is very general and can serve as the meaning of many related terms such as supposition, or assumption.

Assumptions

Collingwood goes on to claim that when a person makes an assumption, he is making a supposition about which he is aware "that he might, if he chose, make not that but another."[1] Thus for Collingwood all assumptions are suppositions, but all suppositions are not assumptions, for some suppositions are made when the person making them is unaware that there are other alternative suppositions which he could have made. It may be well to note here that Collingwood is introducing a psychological factor in discussing assumptions. A person may think that there are alternatives to his supposition even when there are not and therefore consciously think that his supposition is an assumption. On the other hand, in cases where indeed there are alternative suppositions that could be adopted, a person may not know that there are and thus not regard the adoption of a particular supposition as an act of assuming. Collingwood sums the matter up well by claiming that "To assume is to suppose by an act of free choice."[2] When one says "let us assume $x = 10$," there is an implication of free choice attaching to the term "assume."

Of suppositions, Collingwood claims that their logical efficacy does not depend upon the truth of what is supposed or even on its being thought true but only on its being supposed. As he says:

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[1]Collingwood, op. cit., p. 27.

[2]Ibid.

> It (that the logical efficacy is constant) is a matter of common knowledge in the conduct of scientific thinking; where it is possible and profitable to argue from suppositions which we know to be false, or which we believe to be false, or concerning which we have neither knowledge nor belief as to whether they are false or true.[1]

It should be noted in the passage above that Collingwood is using "supposition" as if it is equivalent to "assumption" though he has already said that the two terms are not equivalent. If an assumption is implicit, we probably are not even aware that we are assuming it. Thus we are not aware that our implicit assumption has alternatives since we are not even aware of our implicit assumption in the first place. It is hidden! It seems then in terms of Collingwood's own criterion concerning the awareness of alternatives that he has not made a distinction between suppositions and assumptions but rather a distinction between explicit or implicit assumptions or suppositions. Therefore, from this point on, we shall use "supposition" and "assumption" as synonyms and discuss those that are explicit and those that are implicit. Assumptions, even implicit ones, may have alternatives whether we are aware of them or not; but as we have said already, presuppositions as necessary preconditions do not. Let us move on now to consider the specific differences between assumptions (suppositions) and presuppositions. We shall start by discussing what is meant by our use of the word "alternative."

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[1] Ibid., p. 28.

Alternatives

Collingwood distinguishes between suppositions that are taken for granted, sometimes unwarrantedly, and suppositions[1] which are not taken for granted but consciously adopted as true when it is realized that there are alternative suppositions which could have been adopted equally as well. This latter underlined phrase can be interpreted in two ways. First, (I) we might say that an assumption A_1 has viable alternative assumptions A_2 or A_3 or A_4 or A_5 or A_6 , any one of which we could have adopted as true instead of A_1 in order to derive a particular statement ST_2 which we regard as true. On the other hand (II), it might be the case that we have no great attachment for ST_2; and we could have adopted A_2 or A_3 or A_4 or A_5 or A_6 instead of A_1, any one of which would not yield ST_2 deductively but rather ST_3, ST_4, and ST_5, respectively. When mathematicians adopt an assumption, e.g., A_1, they are usually aware that they could have adopted instead another assumption A_2 or A_3 or A_4 in sense (II), i.e., they adopt an assumption in order to follow wherever it might lead perhaps to S_3 S_4 S_5, respectively, or S_6.

In this paper, we wish to confine our discussion of assumptions to any object-level discourse in which a particular true statement ST_2 does occur and therefore, when we speak of alternative assumptions to A_1, we will mean view (I) that there are other assumptions which when adopted as true entail ST_2 as well as A_1 entails ST_2 when adopted as

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[1]We identified these with assumptions.

true. Therefore, any assumption $A_1, \ldots, A_6$ individually is sufficient for the truth of ST_2; but none are individually necessary for the truth of ST_2. None are individually a required condition for the truth of ST_2. Thus if we look for the presupposition of ST_2, it would perhaps be the unstated claim CM_3 which would be the disjunction of all the sufficient conditions for ST_2 in cases where it is possible to list them, when they are finite in number. If this disjunction of sufficient conditions constitutes a necessary condition for the truth of ST_2, as it often does, and no disjunct is stated on the same level of discourse as ST_2, then this disjunction is a presupposition of ST_2.[1] However, if all the assumptions or any of them are stated within the same level of discourse, then our disjunction is not a presupposition but perhaps a presumption (see def., p. 261). We see here the connection between the phrase "hidden assumption" and "presupposition." Hidden claims without alternatives are presuppositions; whereas, hidden claims with alternatives are merely hidden assumptions. Hidden assumptions have alternatives even when we are not aware of them. But presuppositions do not no matter what we think. The truth of the antecedent is sufficient for the truth of the consequent; and the truth of the consequent is necessary for the truth of the antecedent; therefore, the consequent is a necessary precondition, a presupposition, of the antecedent.

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[1]This excludes ST_2 itself as one of the $A_1, \ldots, A_6$. Though ST_2 is sufficient to entail itself, ST_2 is always a stated Ax. But when we rule ST_2 out as one of the A's we also leave open the possibility that an exhaustive disjunction of sufficient conditions is not automatically a necessary condition. But this possibility is also the possibility that there are some statements which presuppose nothing but themselves which is doubtful.

To summarize then our additional conclusions about "presuppositions" up to this point we can say:

7. Suppositions are assumptions, and assumptions are suppositions.

8. Suppositions, i.e., assumptions may be explicit or implicit (hidden).

9. When assumptions are implicit, we are unaware that they have alternatives or that there are alternatives we have not taken into account. If a claim has alternatives of which we are aware or are not aware, a claim is an assumption. But if an unstated claim has no alternatives, then it is a presupposition. If the truth of a stated claim is necessary for the truth of a statement which entails it, then this stated claim is not a presupposition but a presumption.

10. A presupposition in sense (1) is the same as an implicit assumption or a hidden assumption.

11. All assumptions have alternatives which we can adopt in their place either in view (I) or (II); thus if a "hidden assumption" can be established as lacking any alternative in sense (I), it is a necessary precondition and, therefore, not an assumption at all but a presupposition in the dictionary sense (2).

Before going on, let us look at the two dictionary senses (1) and (2) of "presupposition" more closely. Collingwood makes a final distinction concerning presuppositions, one between relative and absolute presuppositions. But careful reading will indicate that this distinction is none other than the distinction between the dictionary sense (1) and (2) of "presuppose."

Collingwood declares that by a relative presupposition he means one which "stands relatively to one question as its presupposition and relatively to another question as its answer."[1] In explanation of this rather enlightening distinction, Collingwood describes the situation

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[1]Collingwood, op. cit., p. 29.

where one asks "What is the distance between these two points?" while measuring the distance with an old measuring tape. This question presupposes that the old tape has not stretched and that it is still an accurate measuring device. Such a presupposition is relative because "the accuracy of the measuring tape, which while I am using it is a presupposition of the questions I ask, is one of the two possible answers, the affirmative answer, to the question I ask while I am thus checking it."[1] If, as Collingwood describes, the accuracy of the tape is the presupposition which gives rise to the questions of "How long or what distance does the tape indicate?" then it is certainly not the case that the presupposition itself is being questioned. The other "checking question" to which he alludes, "Is this tape accurate?" arises not from a presupposition at all but from a supposition, "This tape may have stretched" or the alternative supposition that this tape may have been manufactured faulty. If either of these suppositions is entertained, then the presupposition that the tape is accurate is no longer presupposed. It appears from the rest of his discussion that by relative presupposition Collingwood means something which, though taken for granted, can nevertheless be questioned; for he says:

> To question a presupposition is to demand that it should be 'verified'; that is, to demand that a question should be asked to which the affirmative answer would be that presupposition itself, now in the form of a proposition. To verify the presupposition that my measuring-tape is accurate is to ask a question admitting of the alternative answers "the tape is accurate," or "the tape is not accurate." Hence to speak of verifying a presupposition involves supposing that it is a relative presupposition.[2]

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[1] Ibid., p. 30.

[2] Ibid.

The above passage clarifies Collingwood's position, but there appears now to be something amiss with the position itself. Once we question a presupposition, can we really still regard it as a presupposition? There seems to be afoot an implicit contradiction in terms. Presupposing is not questioning, and questioning is not presupposing. Questioning the truth of a claim is what we do when we no longer presuppose it. We no longer take it for granted but suppose that some other claim, e.g., CM_3, may be true. However, these last remarks arise from an understanding of "presuppose" in sense (1) which is really the definition of assumption or supposition. It is more clearly the case then, on our reconstructed view, that assumptions and suppositions when questioned are no longer assumed or supposed; and this contradiction brings us back to the confusion in Collingwood with respect to suppositions (though it appears that in his passage he means specifically suppositions that are assumptions). He says that the logical usefulness (efficacy) of a supposition does not depend upon whether the supposition is thought true or not.[1] In fact, we may well know it to be false. However, even if we know a statement or claim is false, if we adopt it as an assumption in our deduction, we are treating it as if we regard it as true. Even in reductio proofs, where we wish to demonstrate that an initial premise is in fact false, in the act of assuming

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[1]It will be recalled that suppositions in Collingwood's view are entertained when one is unaware of their alternatives. Assumptions are entertained when we are aware of their alternatives. We have chosen to disregard this awareness factor and regard suppositions as assumptions if they in fact have alternatives whether we are aware of them or not.

it, we adopt it as true and treat it as if it were true in order to show that when treated as true it leads to an absurdity; and therefore, it must be false. The same mistake is made by Collingwood in regard to presuppositions understood in sense (2). If a statement ST_X occurs in our discourse and we investigate which claim CM_X it presupposes, we may find that ST_X entails CM_X. But if ST_X does entail CM_X and we consider ST_X true, then we cannot question the truth of CM_X. CM_X must be true if ST_X is true when ST_X entails CM_X. To question the truth of CM_X when the underlined conditions obtain is to question the fact that it is presupposed. We may perhaps question whether a certain CM_2 is presupposed by ST_2 without questioning the truth of that CM_2 in cases where ST_2 itself is not considered true. But when ST_2 is considered true, we may question whether it presupposes CM_2; but we cannot question the truth of CM_2 without questioning whether CM_2 is presupposed by ST_2. To make this position quite clear, let us consider a particular object-level discourse which contains a statement ST_2. Operationally we might enlist a stenographer to write down all the statements made during a particular discourse in a certain room between time t_1 and time t_2. Looking at a stop watch, we tell her when to start writing and when to stop. No other statements are written down but those that are stated between t_1 and t_2. Our example statement ST_2 is a statement that is made between t_1 and t_2. Now as the stop watch stops at t_2, we take the pad from our stenographer and examine the statements written upon it. After perusing the list, we may decide to order the statements logically where any entail one another or other unmentioned claims; and we would

write down these relationships on a second sheet of paper. When these determinations are complete on our second sheet of paper, we find mention of not only ST_2, but also of claim CM_2 which ST_2 presupposes. If we look from our second sheet back to the first sheet, we find no statement CM_2 written on it. If we were questioned as to why CM_2 does not appear on sheet 1 but does appear on sheet 2, we would answer that sheet 2 contains assertions about the statements written on sheet 1. Thus on sheet 2, we find a statement MST_1[1] "ST_2 presupposes CM_2"; and MST_1 is a metalinguistic statement about ST_2. We might equally well write the metalinguistic statement "If ST_2 is true then CM_2 must be true." When Collingwood says that a relative presupposition is one that is subject to verification or is a statement which can be questioned, he is making a second-level meta claim $MMST_2$, "'While 'ST_2 presupposes CM_2' is true,' it may be that ST_2 itself is false; and thus CM_2 may be false," or, on another interpretation more in keeping with Collingwood's confused identification of sufficient but non-necessary hidden assumptions and presuppositions, the statement $MMST_2$, "'While 'ST_2 seems to presuppose CM_2,' is true,' ST_2 also seems to presuppose CM_3, which is contrary to CM_2; and we must verify which CM_X is true since ST_2 is true and can therefore only entail a presupposition that is true." We will ignore this second second-level meta-statement which arises from a basic error in Collingwood's discussion. He accepts sense (1) of presupposition which violates his own definition of "presupposition" which agrees with sense (2). Sense (1) captures the

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[1]Notation for first-level meta-statements.

meaning of "supposition"; and as the addition of a prefix suggests, "presupposition" has a different meaning than "supposition." The second second-level meta-statement is in fact the one that Collingwood is discussing; but for interest's and completeness' sake, let us consider the first second-level meta-statement MMST$_1$, "'While 'ST$_2$ presupposes CM$_2$' is true,' it may be that ST$_2$ itself is false; and thus CM$_2$ may be false." This second-level meta-statement may be made about any presupposition, i.e., any unstated claim CM$_X$ which is a necessary condition for the truth of ST$_X$, when the truth of ST$_X$ is not verified. However, there are cases where certain statements that we make are undeniably true, e.g., any true particular affirmative statement.[1] Now if these true statements ST$_X$ presuppose some CM$_X$, then CM$_X$ must be true. We could state this fact by making the first-level meta-statement MST$_2$, "Since ST$_2$ is true, and ST$_2$ implies CM$_2$; CM$_2$ must be true, i.e., is true necessarily." When a statement such as MST is true, we say that CM$_2$ is a presupposition which is necessary, i.e., a necessary presupposition.

Mere presuppositions, which are commonly regarded as relative, can be viewed as relative in the sense that they can be either true or false because ST$_2$ can be either true or false; and we do not know which it is, true or false. On the other hand, a necessary presupposition CM$_2$

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[1]For elaboration see N. R. Hanson, "A Note on Statements of Fact," Analysis, XIII (1952), 72. Factual statements are corrigible in the light of further evidence but statements of fact cannot be false.

can be characterized in terms of relative necessity since it is true necessarily only in relation to the known truth of ST_2 which presupposes it. This is consistent with our view expressed earlier that all assertions of necessity are assertions of relative necessity. In view of these confusing and competing senses of "relative," we shall not call any presuppositions relative. We shall, however, remember that some presuppositions may be true necessarily and that this necessary truth is relative.

A necessary presupposition, i.e., a presupposition which is true necessarily relative to some true statement ST_2 which presupposes it, may be what Collingwood calls an absolute presupposition. He defines an absolute presupposition by saying that it is "one which stands relatively to all questions to which it is related as a presupposition, never as an answer."[1]

By this, Collingwood means basically that an absolute presupposition is one which is "not verifiable."[2] He explains:

> This does not mean that we should like to verify them but are not able to; it means that the idea of verification is an idea which does not apply to them, because, as I have already said, to speak of verifying a presupposition involves supposing that it is a relative presupposition.[3]

In the above passage, it seems that Collingwood's view coincides with our own previously expressed one that questions of verifiability are not pertinent to presuppositions. But where he sees that

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[1]Collingwood, op. cit., p. 31.

[2]Ibid., p. 32.

[3]Ibid.

this is the case with respect to absolute presuppositions, we claim that this is the case with respect to what we have described as necessary presuppositions. In view of the fact (stated in the above passage) that a presupposition (absolute in Collingwood's view) is not subject to verification, Collingwood goes on to state that these presuppositions are not propositions (statements) since the distinction between truth and falsehood does not apply to them. He says, afterall, that questions such as "Is it true?" "What evidence is there for it?" "How can it be demonstrated?" are not relevant to absolute presuppositions. There are many issues involved in the above Collingwood claim.

There are situations when the question "Is it true?" or "What evidence is there for it?" is not or should not be asked because a statement is obviously true. As Austin would say, if the pig is in the room, we do not ask for evidence that it is true that the pig is in the room. Likewise, when a proposition is presupposed by a statement ST_2 which is known to be true, it is not in need of verification simply because its truth is automatically assured by its being presupposed. No proposition (statement) that is false or supposed false can be a presupposition of other statements which are true. However, the necessary truth of presupposed claims does not make them non-statements even when statements are defined (as Collingwood defines them) as that which may be true or false. That which is entailed by another true statement is true and necessarily so. The necessary presupposition CM_2, therefore, satisfies one of the disjuncts of being either true or false, viz., being true and necessarily so.

We see then that presupposition statements are necessary[1] because they are entailed by other true statements. But this necessity is a logical matter, a function of the role of the statement relative to other true statements which presuppose it; and this necessity does not preclude the possibility of empirical origination (discovery) or justification of this presupposition. A presupposition is not in need of verification or justification when it is presupposed by a true statement; for its truth is presupposed, but this is not to say that presuppositions are immune to verification or falsification should empirical findings (which, by the way, may not be sought after for purposes of falsifying or verifying the presupposition) indicate that what has been presupposed is in fact true or false. We do not question our presuppositions or seek to prove them true, but if evidence comes our way then a presupposition CM_2 which it negates might well become falsified.[2] If this occurs, we would likely have to regard ST_2 which presupposes CM_2 as false, i.e., we could no longer regard ST_2 as true. A falsified presupposition requires us to give up ST_2. It will be recalled here that a falsified assumption or supposition does not require that we abandon ST_2, for assumptions and suppositions in our

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[1]In our non-modal sense, we mean.

[2]We may perceive some object emerge right before our eyes. We have in no way moved our head and the perception of this object seems to have just popped into existence. It is an anomaly which we cannot integrate into any conceptual pattern formed by our present causal laws. If this kind of perception randomly reoccurred we would have observational evidence against the uniformity principle of causality and some evidence to at least suspect the universality of causality.

reconstructed theory of presuppositions are not necessary for ST_2 or entailed by ST_2. Rather assumptions and suppositions imply ST_2 while ST_2 implies not assumptions and suppositions but presuppositions.

Thus it is the case that a presupposition is not immune to falsification. It could itself be falsified by evidence in which case it could no longer be logically prior to a <u>true</u> statement ST_1 which presupposes it. A presupposition CM_2 might also be falsified or at least suspected of being false if ST_2 which presupposes it is somehow falsified. In addition, to maintain that one statement is logically prior to another is not to make any assertion as to the origin (empirical or otherwise) of either statement. A presuppositional statement may originate (be suggested) via empirical research. It may even be justified as true by empirical research, but when it is presupposed by another statement its empirical suggestion or justification becomes secondary to the role that it now plays as a presupposition in relation to other statements within a deductive system which presuppose it.

Let us summarize what can now be said concerning presuppositions. A presupposition is:

1. logically prior to the statement(s) ST_2 that presupposes it.
2. not necessarily or even usually epistemologically (in either a discovery or justificatory sense of the word) prior to ST_2 the statement that presupposes it.
3. a usually unstated claim CM_2 which does not occur within the context of the discourse in which ST_2 the statement which presupposes it occurs.
4. in one sense, dictionary (1), much like an implicit or hidden assumption which we take for granted as true.

5. in another sense, (2), not only a hidden claim that is made but one that must be made since its assumption (adoption as true) is a necessary condition for the truth of ST_2 the statement which presupposes it.

6. perhaps best understood only in sense (2) adopted by Collingwood since (1) is very general and can serve as the meaning of many related terms such as supposition or assumption.

and:

7. Suppositions are assumptions, and assumptions are suppositions.

8. Assumptions, may be explicit or implicit (hidden).

9. When assumptions are implicit, we are unaware that they have alternatives or that there are alternatives we have not taken into account.

10. A presupposition in sense (1) is the same as an implicit assumption or a hidden assumption, viz., an unstated assumption.

11. All assumptions have alternatives which we can adopt in their place either in sense (I) or (II); thus if a "hidden assumption" can be established as lacking any alternative in sense (I), it is a necessary precondition and therefore not an assumption at all but a presupposition in sense (2).

12. Presuppositions can be discovered through experience though it is not the case that they must be discovered through or arise from experience.

13. Presuppositions can be falsified directly by empirical evidence though perhaps not immediately, for their logical role may incline us not to accept falsifying evidence.

14. Presuppositions can become suspect as untrue indirectly when the statements ST_n which presuppose them are falsified.

15. Falsification of a presupposition demands that ST_2 which presupposes it be abandoned as untrue.

16. Falsification of a supposition does not demand that ST_2 which it implies be given up or abandoned as untrue.

17. Questioning the truth of CM_2 is no longer to presuppose it if ST_2 which entails CM_2 is true.

18. If ST_2 which presupposes CM_2 is regarded as false, any questioning of CM_2 is compatible with saying that ST_2 presupposes it.

19. Statements that ST_X presupposes, CM_X, are all metalinguistic statements.

20. Virtually all presuppositions are considered necessary presuppositions, for we rarely entertain or state false statements knowing that they are false. Except for very speculative disciplines, ST_X which presupposes CM_X is usually considered or thought or known to be true; however, it may not be.

With this much determined about presuppositions, it is well now to return to our discussion of Kant.

Kant's proof of an a priori principle

Kant claimed that the general law of causality (GLC), "Every event has a cause," is a necessary presupposition of experience,[1] if the distinction between subjective perceptions and objective perception successions (events), is to be made. To demonstrate that the general law of causality is a necessary presupposition of experience, Kant showed that GLC was entailed by various premise statements which are true.

It is likely that by "necessary presupposition" Kant meant merely "necessary condition." On our theory, of course, "necessary presupposition" would constitute a redundancy; for "presupposition" already means a necessary precondition. However, we have reserved a non-redundant interpretation for "necessary necessary precondition," i.e., necessary presupposition, but is not only that the truth of a claim CM_2 is a necessary precondition of a statement ST_2 but also that

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[1]It is important to note that GLC is a necessary presupposition of experience only if experience is equivalent to the discernment of objective perceptions and subjective successions of perception. This need not always be the case. Thus GLC is only a presupposition of this or that kind of experience or part of experience.

CM_2, as a necessary precondition, is also true necessarily since it is entailed by ST_2, a true statement. Whether Kant had this view in mind when he used the phrase "necessary presupposition" is not important, for his argument in the "Second Analogy" is a classic proof of a CM_2 which is a necessary presupposition in our sense of the phrase "necessary presupposition." As we have already seen in the "Second Analogy," Kant provides a deductive argument as proof that "Every event has a cause." This claim, which we have referred to as the general law of causality, is the conclusion of an argument which Kant deduces from five premises. The premises are several statements ST_3 ,..., ST_7 which jointly entail GLC. As such these statements ST_3 ,..., ST_7 could be interpreted as assumptions or suppositions from which GLC may be deducible. From previous close examination of Kant's argument in Chapter II, we have concluded that it is the case not only that ST_3 ,..., ST_7 jointly entail GLC but also that ST_3 ,..., ST_7 are true. Thus it can be said that GLC must be true. We see up to this point that in our terminology GLC is a necessary precondition of ST_3 ,..., ST_7; however, there is no apparent reason yet for terming GLC a presupposition rather than a theorem[1] within some system of ordered discourse in which all the statements of Kant's argument are asserted. The crucial aspect of Kant's discussion becomes obvious when one interprets Kant's argument as actually a metalinguistic discourse in which ST_3 ,..., ST_7 are

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[1]To say that ST_3 ,..., ST_7 jointly entail GLC is not to say that GLC is a presupposition of ST_3 ,..., ST_7 yet, for ST_3 ,..., ST_7 could well be stated assumptions of an axiomatic system from which GLC might be deduced as a theorem.

metaphysical or quasi-linguistic, meta-statements about the experiential or empirical justification for the truth of any object-level statement, st_1 "This is an event A," or st_2 "This is a happening," or st_3 "I perceive an objective successive sequence of percepts."[1] It is Kant's point that all these object-level statements that all of us make at sometime or other are assertable only in virtue of the nature of our perceptions as described in the premises ST_3, ST_4, ST_5, ST_6, ST_7. The conclusion of Kant's argument, GLC, is not a statement that is asserted within the discourse of empirical or perhaps, as Kant might say, experiential discourse. Thus on the object-level we have statements st_1 ,..., stn about this or that event. GLC is never an st_x statement. No one can say on purely observational or experiential grounds that they see or perceive that every event has a cause. Thus GLC is not a statement made within the object-level system of discourse. But the five premises of Kant's quasi-metalinguistic argument which describe the empirical given [also described by the object-level statements st_1 ,..... stn] imply the unstated claim GLC. It is in this way that GLC is a presupposition, an unstated claim whose truth is a necessary condition for the truth of the conjunction ST_3, ST_4, ST_5, ST_6, and ST_7 and thereby every

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[1]If ST_3, ST_4, ST_5, ST_6, and ST_7--the premises of Kant's argument were straightforward metalinguistic statements which mentioned object-level statements we would have written them as MST_3, MST_4, MST_5, MST_6, and MST_7 as has been our method of notation so far. However ST_3, ST_4, ST_5, ST_6, and ST_7 have an object-level appearance while serving what I call a metaphysical metalinguistic function of describing those characteristics of perceptions which determine the assertion of object-level statements about reality. These object-level claims I choose to refer to as st_1, st_2 ,..., stn to preserve in this particular case the difference in levels of discourse which I believe Kant's argument exhibits.

st_1 ,....., stn about this or that event. In assessment of Kant's argument, we might make the quasi-second-level metalinguistic claim that "ST_3, ST_4, ST_5, ST_6, and ST_7 presuppose GLC."[1] In sum, Kant's move is to show that st_1 ,...., stn each presupposes ST_3, ST_4, ST_5, ST_6, and ST_7 and therefore st ,...., stn each presupposes GLC. But the force of Kant's argument is still not fully apparent. If we examine it again, we note also that, in as much as each of his premises are true, GLC must be true, i.e., a necessary precondition. GLC is not merely implied by five premises which are false or perhaps true or false in which case GLC would be a precondition stillborn with logical but no epistemological efficacy or role. Rather, GLC is a precondition of premises which seem acceptable to all as true. Kant's premises describe the empirically given at the low level of percepts; and he seems to have given, as his five premises commonly acceptable truths (with the exception of premise I, which was easily modified without affecting the force of Kant's argument). Thus it would seem on the analysis herein that Kant has demonstrated that GLC is a necessary[2] presupposition of object-level statements about events. However, his argument has even greater strength.

We have already claimed that non-necessary presuppositions, even necessary ones are falsifiable. Falsification is always possible, for a presupposition can stand or fall with the statements such as ST_3, ST_4, ST_5, ST_6, and ST_7 which jointly presuppose it. But as mentioned with

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[1]Again this is in appearance a metalinguistic statement.

[2]This is not a modal sense of "necessary."

respect to Kant's argument, the statements ST_3 ,..., ST_7 which jointly presuppose GLC are quite certainly true.

Even more spectacular, however, is the fortification given GLC by the fact that ST_3 ,..., ST_7 are general statements which describe the perceptual grounds for asserting an infinite number of st_x statements, "This is an event," "This is another event," etc. We have seen from Kant's argument that not only his five premises entail GLC but also all the st statements st_1 ,..., stn which generally presuppose ST_3 ,..., ST_7 in non-philosophical discourse. Thus it is not only the case that Kant's argument is convincing and strong but extraordinary in logical force. Kant's argument exhibits the logical role of GLC which, serves to make it almost impregnable to falsification. As a presupposition even a necessary one, however, GLC is always subject to falsification. There may be a day when ST_3 or ST_4 or ST_5 or ST_6 or ST_7 no longer appear true or when they are viewed as entailing a competing CM_n[1] (one that contradicts GLC) which displaces GLC as the presupposition of these ST statements.

Let us return to our discussion of a priori judgments as described by Kant. It will be recalled that Kant regarded a priori principles as those which were necessary presuppositions of experience. We have treated the argument which Kant gave in illustration of this characteristic in the case of one of his prime examples of an a priori statement the general law of causality. During the course of the

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[1]The meaning of words in ST_3 ,..., ST_7 may change.

treatment of Kant's argument, we have seen that presuppositions can be characterized as necessary in a two-fold sense. First, the truth of a presupposition is a necessary condition for the truth of the statements which presuppose it; and second, when these statements which presuppose some claim are true, the claim, a presupposition, must be true. Both aspects of necessity are relative just as we have claimed all concepts of necessity are. In view of what has been previously maintained about statements of the form "All S are P," we shall omit from our view of a priori statements the claim that they are universal since attributing this characteristic to a priori statements is only a corollary of the assertion that statements of this form are necessary in an absolute sense. On the contrary, we have tried to show that some statements such as 'All S are P' are better considered intensional contingent statements which establish necessary connections. Thus we claim for a priori statements all the characteristics of necessary presuppositions; and we identify a priori statements and presuppositions and, of course, necessary presuppositions as one and the same.

Can a priori statements be synthetic?

Given the earlier reconstruction herein of analytic statements, it should be clear that necessary presuppositions can very well be a priori and synthetic. Again in Kant's paradigm example, we find several premises ST_3 ,..., ST_7 which jointly entail GLC. However, none of the statements ST_3 ,..., ST_7 are definitions (as we have explained definition); therefore, while GLC is presupposed by ST_3 ,..., ST_7 jointly, GLC does not follow from ST_3 ,..., ST_7 as an analytic statement which

would be entailed by definitional statements of its terms. Interestingly enough, any claim that an analytic statement is a priori would be a complicated claim indeed in terms of our theory of a priori since presuppositions, unlike analytic statements, are not even stated within the level of discourse where they are said to be presupposed. This is not true, however, of analytic statements. Just the reverse is true; analytic statements are stated within a lower-level system of discourse than the IC definition statements from which they follow. It might be suggested perhaps that analytic statements presuppose various definitions. However, a statement ST_X may be analytic via any number of competing definitional statements in which case a given definitional IC statement is not necessary to but only a sufficient condition for the truth of ST_X, the analytic statement. Thus IC_X entails ST_X but ST_X would not imply IC_X. For a definition statement IC_X to be a presupposition, ST_X would have to imply IC_X. It might be claimed that analytic statements and presupposition statements are both deductively entailed by other statements, either IC_X or ST_3 ,..., ST_7, and are therefore of the same logical status, both necessary in the same way. But we have tried to show that there is a difference between the necessary and jointly sufficient presupposing premises of Kant's argument and the non-necessary but sufficient explicit assumptions which are analogous to the definitional IC statements from which analytic statements are deduced. In the former (in terms of Kant's very strong argument), we would say ST_3 ,..., ST_7 jointly presuppose GLC; and in

the latter, we would write ICn entails STAn.[1] However, we know from lengthy discussion that in the former we have a metalinguistic statement about a set of written or uttered object-level statements and an unstated claim which they entail such that we can write the second-level meta-claim "'ST_3 ,..., ST_7 presupposes GLC' is true"; but in the latter, we have a second-level meta-statement to the effect that a stated first-level metalinguistic definitional IC statement entails a stated object-level analytic statement. The two-presuppositions and analytic statements are the same only on a very superficial level of investigation. In addition, it will be recalled that IC statements which entail analytic statements are very different in kind from the premise statements of Kant's argument.

Several writers have realized that there are possible reconstructions of Kant's two distinctions the A-S and P-P such that a priori statements need not be merely defined as analytic or vice versa. N. R. Hanson, in his article "The Very Idea of a Synthetic A Priori," is one who stresses this point. He describes the A-S distinction as a bisection of judgments which is exclusive and exhaustive in the following way:

> P is analytic if and only if its negation is of the form (or leads to something of the form) Q • -Q. . . . However, a synthetic proposition is such that its negation, -P is not of the form (nor does it entail anything of the form) Q • -Q.[2] The knife called "a priori-a posteriori" however

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[1]Notation for analytic statements.

[2]N. R. Hanson, "The Very Idea of a Synthetic A Priori," Mind, LXXI (1962), 522.

> cuts the class of propositions through quite a different stratum. To characterize a proposition as "a priori" is to say nothing whatever about its formal structure or the structure of its negation or consequences derivable therefrom. It is, rather, to remark the mode whereby the truth of the proposition is discovered. A proposition is a priori if its truth is established without recourse to any possible experience (past, present, or future).[1]

In view of his beliefs expressed above, Hanson claims that there is no reason for identifying 'analytic' with 'a priori' such that these two terms would have exactly the same extension. Ultimately Hanson adopts a non-falsifiability criterion for a priori propositions but he does not adopt this characteristic (as we have not) as a mark of analytic propositions:

> To say that a proposition is analytic is not to say just that it is forever and always true. That P is forever true follows from (but is not identical with) the fact that P's negation is self-contradictory.
>
> Confusions result from failing to make this distinction. Thus when analytic propositions are said to be those which are forever true and couldn't be false, the idea of analyticity collapses into that of invulnerability.[2]

In our present theory, we have tried to avoid such a collapse not only by characterizing analytic and a priori statements in very different ways but also by avoiding the adoption of the ambiguous non-falsifiability (empirical independence) criterion as a mark of either analytic or a priori statements. Unlike even Hanson who holds our own position that it is possible for a statement to be a priori and non-analytic, we have identified the a priori as a necessary presupposition, not necessarily of experience (as Kant would claim) but of other

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[1] Ibid., p. 522.

[2] Ibid., p. 523.

empirical statements. The reason for our departure from Kant will be evident in Chapter V where we will discuss a priori claims in science. Were we to think only of the entire system of empirical discourse as did Kant, then surely our presuppositions as unstated claims would have to be non-empirical in at least the discovery and justification senses, if not the content sense of "empirical." But we are interested in discussing the empirical presuppositions of various subset paradigms of empirical discourse that one finds in science. We have therefore defined "a priori" in terms of its functional role as a necessary presupposition and not in terms of its empirical status.

There is of course a second reason for avoiding the non-falsifiability criterion as a mark of either analytic or a priori statements which is simply that its formulation as a criterion by Kant was inconsistent, confused, and confusing. As such, it has led thinkers (even those sympathetic to the very idea of a synthetic a priori) to conclude that it is impossible or logically inconsistent that there be any statements both a priori and synthetic. Hanson seems to be one of the few who avoids this conclusion while adopting the non-falsifiability criterion as a mark of a priori propositions (statements). However, in as much as he does use this criterion, the extension of "a priori" statements is limited so as to include only Kantian examples such as GLC. We wish of course a broader application of the term "a priori."

Views on the synthetic a priori

The a priori-a posteriori distinction as drawn by Kant is typically interpreted by critics as a distinction between statements that cannot be falsified by experience and those that can be so falsified. This characterization of the difference between a priori and a posteriori statements is basically the third criterion for the distinction which was not formally proposed by Kant but nevertheless seemed to be suggested by his elaborative remakrs as noted earlier (page 226). Had Kant himself not provided some basis for choosing empirical independence as the definitive criterion of a priori statements, it could have been inferred from the two criteria which Kant specifically and formally did give, universality and necessity, in the following way, as pointed out by Jonathan Bennett:

> Necessity and strict universality '. . . are . . . sure criteria of' a priori knowledge! The context clearly implies that necessity and universality are entailed by a priority as well as entailing it. Thus, if the judgment that all F's are G is a priori then experience cannot render it false by yielding even a single F which is not G. If it is a posteriori, then it could be falsified by experience.[1]

Jonathan Bennett capsulizes the problem of the above quotation as one of deciding a sense for the term 'cannot' which is stronger than (a) 'flatly against what we have so far discovered about how the world works' but at the same time a sense other than that of (b) 'ruled out by the meanings of the words involved.'[2] The suitable sense of 'cannot'

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[1]Bennett, op. cit., p. 9.

[2]Ibid., pp. 9-10.

must be stronger than that of 'flatly against what we have so far discovered about how the world works,' claims Bennett, since Kant counts several judgments which have never had a counterinstance as a posteriori judgments, e.g., every human body is larger than any ant.

At first glance and perhaps even at last glance, the problem of finding a third sense of 'cannot' other than (a) and (b) above seems insoluble. It is perhaps for this reason that many philosophers have denied that there is any third sense of 'cannot' and that, since (a) cannot be the correct sense of 'cannot,' (b) must be the only correct sense of 'cannot' with regard to the impossibility of falsifying a priori judgments. But (b) is the sense of 'cannot' in which analytic statements are usually said not to be falsifiable, i.e., ruled out by the meanings of the words involved.[1] Therefore, the conclusion that contrary to Kant's Critique the only sense in which a statement is a priori is the sense in which that statement is analytic has become widespread. This conclusion rules out the possibility of any a priori synthetic judgment which Kant sought to establish in the Critique.

Prominent among writers who have considered a priori statements to be empirically non-falsifiable is A. J. Ayer. In Language Truth and Logic, Ayer refers to Kant's two explicit criteria for a priori truths, universality and necessity, but quickly translates them both into the third troublesome criterion of empirical independence much in the manner of Bennett. By "independent of experience," Ayer means that the truth

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[1] Ibid., p. 10.

of a priori propositions is not determined by empirical verification. As he says with regard to the truths of mathematics and logic:

> We must come to discover them through an inductive process; but once we have apprehended them we see that they are necessarily true, that they hold good for every conceivable instance. And this distinguishes them from empirical generalizations. For we know that a proposition whose validity depends upon experience cannot be seen to be necessarily and universally true. . . . The principles of logic and mathematics are true universally simply because we never allow them to be anything else . . . we cannot abandon them without contradicting ourselves, without sinning against the rules which govern the use of language and so making our utterances self-stultifying. The truths of logic and mathematics are analytic propositions on tautologies.[1]

Within one page of text, Ayer moves smoothly and effortlessly from the universal and necessary character of a priori propositions whose truth does not depend on experience to the linguistic rule governing necessity of analytic propositions whose validity does not depend upon empirical verification. There seems to be no glimmer of suspicion in Ayer that possibly there is more than one sense of "necessary" at play in Kant's distinctions of the analytic and a priori. How could there be any difference in the necessity which characterizes both a priori and analytic propositions when neither are subject to falsification by experience? Not surprisingly, Ayer explicitly concludes what he implicitly assumed at the outset, i.e., that all a priori propositions are analytic. Ayer proposes that analytic propositions be considered propositions whose validity depends solely on the definitions of the symbols they contain and synthetic propositions are

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[1]A. J. Ayer, Language Truth and Logic, p. 26.

those whose validity is determined by the facts of experience. Since the validity of a priori propositions cannot depend on the facts of experience, a priori propositions can never be synthetic. In short, there are no synthetic a priori propositions.

Ayer's discussion is a classical case of the adoption of the "empirical independence" criterion of a priori propositions which leads inevitably, it seems, to their identification with analytic propositions and the resulting denial that there are any synthetic a priori propositions. As has already been indicated by this author, the adoption of this criterion is usually a fatal move because it is not only a confused and confusing criterion but also because it blurs totally the central insight for which the Critique of Pure Reason was written, though unwittingly perhaps, that not all necessary propositions are necessary in the same way.

C. D. Broad, in a symposium article "Are There Synthetic A Priori Truths?" seeks to defend the position that there may be synthetic a priori statements by reducing Mr. Ayer's discussion of the analytic a priori to the position that all analytic propositions are a subspecies of synthetic judgments. Thus if there are any a priori propositions at all and they are all analytic, they will also all be synthetic and will constitute examples of the sought for synthetic a priori judgments. Broad suggests that one can say that a person "knows a certain proposition if either it is self-evident to him or he actually sees it to be logically entailed by premises all of which are self-evident

to him."[1] It follows, he claims, that unless there are intuitably a priori truths, there can be no demonstrably a priori truths. Broad next proceeds to give his definitions of "analytic" and "synthetic" but first remarks that if "analytic" is to be applied only to the common examples found in logic textbooks, e.g., "all equilateral triangles are equilateral," then there are no analytic propositions (in the sense of a proposition being that which is either true or false); and therefore, if there are any a priori truths, they must one and all be synthetic.

Broad considers a wider view of analytic propositions which he believes to have been expressed by A. J. Ayer, viz., that analytic propositions are those whose validity depends solely on the definitions of the symbols which they contain and that they call attention to linguistic usages.[2] In contrast, Broad notes in Ayer an independent, unrelated definition of "synthetic" that a "proposition is . . . synthetic when its validity is determined by the facts of experience." Broad claims that Ayer's definition of "synthetic" is the usual definition of the word "empirical" as applied to propositions and that Ayer has really defined synthetic in such a way that all synthetic propositions will be empirical. By doing so, Broad concludes that Ayer has predefined the case against the possibility of there being any synthetic a priori since "empirical" and "a priori" are always understood to be opposed to each other.[3] Broad also concludes that there are no a priori propositions on Ayer's view saying:

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[1]C. D. Broad, "Are There Synthetic A Priori Truths?" Aristotelian Society Proceedings, suppl. vols. 14-16 (1935), 107.

[2]Ibid.

[3]Ibid., p. 106.

> Now I think it is evident that no proposition which was analytic in the second of Mr. Ayer's senses could be a priori in the sense just defined. No proposition about the linguistic usages of a certain language could possibly be seen to be true by mere inspection of its terms and reflexion on them and their mode of combination. And no such proposition could be entailed by premises all of which were of this nature.[1]

On a more charitable reading of Ayer, Broad surmises that perhaps Ayer maintains that there are ostensibly a priori propositions, i.e., propositions which seem prima facie to answer to our definition, and that all ostensibly a priori propositions are really synthetic empirical propositions of a certain kind, viz., announcements by the speaker of his present intention to use certain words and phrases in certain ways or statements about the current usage of certain words and phrases in a certain language";[2] and these "synthetic empirical propositions of this special kind are defined as "analytic propositions."[3]

It is doubtful that Ayer would accept Broad's analysis of his view since it is obvious that Ayer does not think that analytic statements which reflect linguistic usages as expressed by definitions are empirical. Rather the definitions themselves are normative and arbitrary without descriptive or factual content, and analytical statements determined by the definitions of the terms in them are also without empirical content. Thus analytic statements could not be considered a special sub-class of synthetic statements in Ayer's view if Broad is

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[1] Ibid., p. 109.

[2] Ibid.

[3] Ibid.

correct in regarding Ayer to hold that only synthetic statements are subject to empirical investigation in the determination of their truth value. But even if one would grant Broad that definitions are not merely normative but also and predominately descriptive and, therefore, that analytic statements can contain factual content though they need not be validated by investigation of the empirical world (the view presented in this paper); there is no need to conclude that analytic propositions in their reflection of linguistic usages are synthetic; for there need be no unique identification made between the synthetic and the empirical as has also been previously expressed in this work. If certain statements are analytic because their validity can be determined by analysis of the meanings of their constituent terms and other statements are synthetic because their validity cannot be determined in this way, then no analytic statement can be synthetic no matter what empirical information, old or new, it may express.

Though perhaps sympathetic to the possibility of synthetic a priori statements, Broad, via his adoption of an empirical dependence criterion for synthetic statements and a tacit adoption of an empirical independence criterion which he believes is implicit in the self-evidence conditions he sets for a priori statements, demonstrates that if there are any a priori propositions at all they are only ostensible a priori propositions and not real ones. This is hardly a defense of the possibility of synthetic a priori statements, and it fails precisely because one sympathetic to their cause nevertheless adopts the confused falsifiability criterion not only for a priori statements but for synthetic ones as well.

A more promising case, at least initially, was made by A. J. D. Porteous who began his discussion in agreement with the present writer on two major points:

1. He holds a relativist view of necessary truth for he says:

> For no proposition can be seen to be selfevidently true strictly in and by itself. A full understanding of it requires consideration of the propositions which define the meaning of its terms and relations, and it is in the light of these defining propositions that it is evident.[1]

2. That the primary criterion for "a priori" is the necessity of a statement for he says:

> . . . it was because of an alteration made by Kant in the meaning of the term "a priori" that our question was first introduced into the arena of philosophical discussion, and indeed appeared to Kant to sum up the main problem of the Critical Philosophy; . . . since he offered universality and necessity as the distinctive marks of them (the second being more important, since the first follows from it) he was, in effect, divorcing the a priori from its connexion with the self-evident.[2]

But while Porteous says in elaboration of 2 that he thinks it important to follow Kant in regarding necessity rather than self-evidence as the distinctive mark of the a priori, he adopts what he calls a self-evidence criterion "in an epistemological sense," not a psychological one, for analytic statements. In terms of it, an analytic statement is self-evident since it receives its meaning and certainty within a system of logic or mathematics from a selected set of independent postulates which serve jointly to limit the scope of

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[1]A. J. D. Porteous, "Are There Synthetic A Priori Truths?" Aristotelian Society Proceedings, supp. vols. 14-16 (1935), 120.

[2]Ibid., p. 101.

possible interpretations of the variables (symbolizing elements or relations) employed in its statement. Relative to the initial postulates and definitions of the system, the analytic statement is self-evidently true.[1] He considers synthetic statements not to be self-evident in this sense. Having decided to follow Kant's lead in regarding the mark of a priori truths to be their necessary character, Porteous seems not really to want to omit the old self-evidence criterion which had often been assigned to a priori propositions; and so he pins it on analytic statements, a totally unenlightening move. In departure from his initial statements about the a priori, he begins his discussion of the possibility of synthetic a priori statements not really satisfied with Kant's necessity criterion and drags in once again the non-falsifiability criterion when he says:

> The term "a priori" I shall use in the extended Kantian sense of "necessary propositions whose truth cannot be established inductively or on empirical grounds."[2]

Though Porteous does not explain what he means by "established" in the above criterion, we would have to conclude that on the basis of these extended criteria that Porteous' answer to the question of whether there are synthetic a priori statements such as the general law of causality would be different from that of this paper. For, as we have maintained, the general law of causality can be established on empirical grounds as Kant did via various empirical premises in his argument in

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[1] Ibid., p. 125.

[2] Ibid., p. 127.

the "Second Analogy" and yet be logically a priori instead of epistemologically a priori within an organized system of knowledge such as a paradigm of science. It would seem that Porteous could not hold such a principle to be a priori since it is established on empirical grounds.[1] But oddly enough at the end of his discussion, Porteous is in agreement that the general law of causality is a candidate for being a synthetic a priori statement; but one finds, once again just before this conclusion, mention of his original narrowed criteria at least in part when he says:

> Must we assume that the class (of synthetic a priori propositions) is empty--that in my sense of the words, there are no propositions which state necessary truths but are yet not analytic (evident)? I do not think so. . . . An obvious candidate for this class is the Principle of Causality, formulated in some such form as "Every occurrence must have a cause," or "All events are causally determined."[2]

Interestingly, contrary to his statement of the extended version of his original a priori criterion, he also says early in his discussion that he wishes to "vindicate a place for synthetic a priori propositions applying to nature." This is nothing different than the sense of being an empirical proposition stated herein, i.e., that a priori truths may be empirical statements which are subject at any given moment to empirical falsification. Thus if by "established" in his extended version of the a priori criterion Porteous means verified or falsified, then there is no disagreement between his view and ours. The only objection

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[1]The contradiction in Kant concerning pure a priori and non-pure a priori judgments (p. 228) should be recalled)

[2]Porteous, op. cit., p. 137.

to his discussion would be that his introduction of self-evidence as a characteristic of analytic statements is unnecessary to his real contention that such statements can be validated by recourse to the meanings of their constituent terms. In addition, its introduction is misleading because of its previous association as a mark of a priori statements. Secondly, if Porteous is not going to explain his use of "applying to nature" as opposed to "established on empirical grounds," it would be best not to introduce any semblance of the falsifiability criterion.

In an interesting article "On the Meta-Semantics of the Problem of the Synthetic A Priori," Lewis White Beck warns that the problem of whether there are synthetic a priori judgments should not be solved by deduction from the definitions of the four kinds of judgments but rather in light of the recognition that there are two principles of division. As he says:

> No real issue is solved by defining "a priori" in such a way that all a priori judgments must be analytic. Whether there are such judgments is a question of fact. . . . Discussion of these facts and not tampering with the definitions has been the fruitful way in which many of Kant's specific decisions concerning the status of single judgments have been settled. But when the question is discussed in greater generality, I think I detect a tendency to modify Kant's definitions in such a way that the general issue is decided against the possibility of a priori synthetic judgments. It is this kind of argument which seems to me to be perverse.[1]

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[1]L. W. Beck, "On the Meta-Semantics of the Problem of the Synthetic A Priori," Studies in the Philosophy of Kant, p. 94.

Beck regards the distinction between a priori and a posteriori as drawn by Kant as an epistemological distinction and the necessity of a priori judgments as different from that of analytical judgments which Beck regards as a logical necessity. If new definitions of "analytic" and "a priori" are formulated, he believes that they should take account of the historico-linguistic fact that "analytic" is a logical or a linguistic concept and that "a priori" is an epistemological concept.[1]

On the contrary, however, Beck notes that most competent original thinkers, particularly in English speaking countries writing during the period 1920-1950, concluded that there were no a priori synthetic propositions so that by 1946 it was considered a dead issue. But he claims further:

> With the triumph of the point of view that there are no synthetic a priori truths, there occurred, almost inevitably, a subtle meta-semantic change. Analytic a priori was seen as the only species of the a priori, and therefore "analytic a priori" seemed to be a redundancy . . . the decisive word was "analytic" and "analytic" came to function as a synonym for "necessary" which had previously been regarded as synonymous with "a priori." At least they were ascribed the same denotation, and since the criterion of necessity came to be regarded as exlusively logical or linguistic, nothing essential was omitted in saying simply "analytic" instead of "analytic a priori." And few people in the main current of recent philosophy talked about "a priori" at all.[2]

The foregoing situation led to what Beck calls a collapse of the two distinctions into one which made any further discussion of whether

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[1] Ibid.

[2] Ibid., p. 95.

there were or are synthetic a priori statements very difficult. Any proposed candidate for a synthetic a priori statement would not be admitted as a necessary statement unless it was logically or linquistically necessary; and once this was determined to be the case, the statement was admitted at once to be not only a priori but analytic as well.[1]

There is yet, however, another outcome of the collapse of Kant's distinction, which Beck calls a meta-semantic shift, found in recent discussions of "analytic." There is a modern theory of the analytic which "holds that a statement is analytic to the extent or degree to which it will be held impregnable against revision by experience."[2] In elaboration he states:

> Then there are two ways in which a proposition may be found to be analytic . . . (1) by inspection of the sentence itself, if it is logically or linguistically true; and (2) by investigation of its role in an organized body of experience we call knowledge.[3]

The first sense of analytic determined by test (1), which Beck regards as a microscopic sense, he calls "analytic$_1$." In contrast, "analytic$_2$" is the name he assigns to the second sense of "analytic" which he says is determined "simply by reference to the statement's necessity (in an epistemological or methodological, and no doubt watered down, sense which would not perhaps in some cases have been recognized by Kant as constituting necessity at all). Then "analytic$_2$" is formally

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[1] Ibid.

[2] Ibid., p. 96.

[3] Ibid.

equivalent to the old "a priori."[1] Thus, as he observes, "analytic" in the modern, broadened, two-fold sense of the term comes to mean not only what it meant classically, "analytic$_1$"; but it also comes to mean "analytic$_2$," the same as "a priori," with all the vagueness and imprecision of the latter. In conclusion, he makes the following interesting point:

> The former is the logical or linguistic analytic (analytic) and the latter means any one or more of the following; analytic truths which are factual or 'real,' the 'functionally a priori,' the 'methodological a priori,' the 'hypothetically necessary,' the 'material a priori,' the 'regulative a priori'--and the 'synthetic a priori.'[2]

It is then for the very same reason today that the general law of causality might be considered an analytic type statement in a particular language or body of science that Kant said it was synthetic a priori, viz., that it is "not known to be true either by reference to empirical facts or by inspection of its logical form but by reference to its contribution to the 'possibility of experience.'"[3]

In this chapter, we have sought to avoid any predefinition of "a priori" which would automatically make it coextensive with "analytic." We have tried herein and in Chapter III as well to follow the lines of Kant's original A-S and P-P distinctions to determine if they could indeed be characterized independently of one another while at the same time avoiding the many objections which his thought has provoked. We

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[1] Ibid., p. 97.

[2] Ibid., pp. 97-98.

[3] Ibid., p. 98.

found that analytic statements and a priori statements have two points in common. They are both necessary in a relative sense as we have explained relative necessity, and they are or can be both empirical in several senses of "empirical" which we have discussed.

Analytic statements cannot be false relative to the definitions which entail them. We have chosen the phrase "true necessarily" as a two place metalinguistic predicate which obtains between the conclusion and true premises of a deductive argument. In as much as analytic statements are true necessarily relative to true premises which entail them, analytic statements can become false if the premises are falsified and we have maintained that definitions, especially lexical ones, can be either true or false. Thus a true definition which entails an analytic statement can refer to the empirical world, and analytic statements may be about the empirical world.

Contrary to Kant's contention that a priori truths are independent of experience, we have found through close examination of his demonstration of the truth of GLC that GLC (the general law of causality), which is "true necessarily" relative to the empirical premises which presuppose it, is falsifiable, applies to the empirical world and is established via empirical premises.

We come then to the conclusion that the declaration of empirical independence for either analytic or a priori truths is false which was our initial suspicion in Chapter I concerning Hume's a priori argument.

With this much unraveled, we are now ready to present our necessity theory of the law statements of science. In terms of our above conclusions and our IC theory of metalinguistic statements as well as our non-modal theory of necessity, we shall explain how it is that law statements are contingent while involving claims of necessity, and are sometimes a priori while expressing empirical fact.

CHAPTER V

A NEW NECESSITY THEORY OF LAW STATEMENTS

Preface to our theory

We began our discussion in Chapter I by mentioning two controversial questions debated by modern philosophers of science. They were:

1. What is the complete logical form of laws of science?
2. What are the differences between them and other kinds of statements?

Empiricists answered these questions by formulating the regularity theory of law statements. According to this view, laws describe regular sequences of events. It can be concluded from their expanded discussions of this empiricist tenet that regularity theorists regard law statements as neither factual assertions which go beyond empirical data nor as necessary assertions. As such, law statements are characterized logically as material conditional statements in a purely extensional language.

In continuing discussion we reviewed serious objections to the regularity theory of laws which have made it untenable even to most empiricists. The chief weakness of the regularity theory has been its inability to provide for a distinction between true universal statements which are laws and true universal statements which are

accidental generalizations, since both these kinds of statements are formulated logically by regularity theorists as extensional material conditionals. In literature as recent as the 1960's, Hempel and Scheffler[1] have concluded that law statements can only be distinguished from accidental generalizations, or non-laws, by inspecting, as a whole, the body of ordered scientific statements in which the statement occurs. The role played by a given statement within such a system indicates whether it is a law or not. However, the distinctive role law statements play within a system of organized statements has still not been clearly explained.

One supposed characteristic of the role of law statements within a system of scientific statements is that such statements are used for prediction while their non-law counterparts are not. However, this suggested characteristic is not acceptable since there are practitioners of science, especially in the social sciences, who are willing to predict from statements not usually regarded as laws, e.g., regression equations. Even if we ignore this consideration and content ourselves that in the natural sciences only law statements are used for prediction purposes, we might still ask why it is that natural scientists are only willing to predict from some statements and not from others. Is the statement "All pears in this basket are ripe," an accidental generalization simply because no one uses it for prediction to future pears in

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[1]Carl Hempel, Aspects, p. 364; and Israel Scheffler, "Prospects of a Modest Empiricism," The Review of Metaphysics, X (1957).

this basket or is the statement "All the pears in this basket are ripe," an accidental generalization for the same reason that we would not predict from it? The latter would seem to be the case. If it would be possible, therefore, to show that law statements have a logical form which allows for predictions while non-laws do not, or cannot, have a logical form which allows for prediction; then there might be some deeper unpacking of this recourse to the role a statement plays within an organized system of statements.

In the past, as mentioned in Chapter I, writers who pursued the possibility of a differing logical form for law statements and non-law statements introduced notions such as necessity into their theories. The employment of this intensional term made their theories unamenable to the expression of law statements in a first-order extensional language--a major goal of contemporary empiricists. This has been considered a serious objection to necessity type theories.

Another problem for necessity views

There is a further objection to typical necessity views more formidable than the one just mentioned. Early writers such as Ewing and Blanchard had only made vague suggestions toward a necessity view of law statements, i.e., that law statements are somehow necessary or have nomic necessity while non-lawlike statements are not nomically necessary. Current writers who have tried to explain this necessity have referred to laws in some cases as analytically true[1] and hence

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[1]Maxwell, op. cit., pp. 1-25.

necessary or necessary as a priori truths.[1] Unfortunately the serious criticism of such views is that analytic statements as well as a priori statements (we have seen in Chapter IV that these two kinds of statements have been carelessly identified as one kind of statement by most modern writers) are commonly regarded by philosophers as non-empirical. Hence, the major drawback of current necessity views is that they render the laws of science unempirical. Thus philosophic literature dealing with law statements up to the present has offered only two unpleasant alternatives with respect to the status of law statements. Either law statements are compendious assertions of past observed facts framed as material conditionals in a first-order extensional language which gives rise to the vacuousness, hypothetical cases, mere coincidence, accidental generalization and subjunctive conditional objections as discussed in Chapter I; or law statements are necessary, as all these objections seem to suggest, but not expressable as first-order extensional statements nor empirical. Faced with this dilemma, we have chosen to pursue the direction indicated by the many serious objections of the regularity theory toward a necessity view. But we have also tried to frame a necessity theory which would not involve an intensional apparatus on the object-level of discourse for expressing law statements or require law statements to have a non-empirical status. Thus we undertook in Chapters I, II, III, and IV to investigate the unclear but often used notions of "analyticity," "a priority," and, indeed, "necessity."

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[1]Arthur Pap, The A Priori in Physical Theory.

We examined these notions to see if the major objection to a necessity type view, i.e., law statements are non-empirical, could be avoided, that is, to see if laws could be necessary or involve necessity somehow and still be empirical.

In Chapter I, we analyzed this second critical objection to any necessity type theory into the following three claims:

1. We cannot give a priori proofs of causal laws.
2. Causal laws are only probable, not certain.
3. No logical connection between cause and effect can be proved.

Each of these claims can be found in the writing of David Hume, the father of modern empiricism. However, for each of Hume's arguments in support of the above criticisms we found numerous rejoinders. Our discussion of these in Chapter I ultimately indicated that empirical statements might be known a priori and might even in some sense be certain. With these historical pillars of modern empiricism undermined, we proceeded to explore further the possibility that a statement would be certain or necessarily true but nonetheless empirical. Thus in Chapter II we explored Kant's "Second Analogy" where it has been claimed Kant gives a proof that the uniformity principle is a necessary presupposition of experience. If indeed Kant proved that some statement such as "Nature is uniform" is presupposed but nevertheless about the empirical world, it might well be that some statements are a priori (necessary) and also empirical.

In Chapter II we adopted a minimal interpretation of Kant's "Second Analogy" argument which was that Kant only proved the

universality of cause (GLC) to be presupposed by statements about empirical events. However, this weaker principle, the universality of cause, serves equally as well as an example of a presupposed truth about the empirical world as would the stronger uniformity claim.

Kant showed that GLC is a presupposition of all those who distinguish subjective perception successions and objective perception successions commonly called events. In Chapter II we showed in detail that GLC, deductively entailed jointly by five Kantian premises, conveys empirical information, and is contingent (could be false in an absolute sense) but certainly true relative to the premises from which it is deducible and therefore, in a relative sense, necessary. Kant had claimed that such a principle was synthetic and a priori. This agrees with our assessment. But due to the long standing rejection of Kant's synthetic a priori which historically reflects Hume's claim that no factual statements are a priori, we sought to work from our factual a priori statement (GLC) to theories which would underpin the possibility of our having such a factual a priori statement. Thus we set ourselves in Chapters III and IV to see if (1) analytic statements and a priori statements are really only one distinct kind of statement, (2) to see if a priori statements are necessary or if on the other hand they are in some sense empirical, (3) to see if analytic statements are necessarily true, yet if they might be considered in some respect factual and (4) to see if necessary law statements need be either analytic or a priori in order to be necessary.

In Chapter IV we examined the notion of "necessity." We have already said that GLC is relatively necessary since it is deducible from five true premises. However it might be rejoined that relative necessity is nothing but the expression of a logical implication and not a bonafide application of the term "necessary." For the term "necessary" is commonly meant by philosophers to serve as the label of self-evident truths which cannot be false in an absolute sense, not merely relative to other statements from which they are derived. Such necessary truths, it might be argued, are necessary in and of themselves.

As we discussed in Chapter IV, the distinction between absolute and relative necessity was maintained by Aristotle. However, in our examination of all four uses of the term "necessary" in current philosophical literature, none were found to be cases of absolute necessity. Each type of statement commonly called necessary was necessarily true only in relation to some other statement(s) from which they were deduced. We failed to uncover any examples of a statement which is self-evidently necessary in and of itself, not even logical truths referred to by Quine.[1] It should also be noted that there are philosophers who use the term "necessary" very specifically in a relative way. Carl Hempel emphasizes that logical inference or implication is expressable as B is necessarily true relative to A and that "necessary" should not be considered a modal operator (as it would be if used in an absolute sense)

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[1]See pp. 247-248.

but rather as a 2 place relational predicate.[1] Wesley Salmon says much the same thing in his introductory logic book.[2]

In view of these considerations and our investigation of the uses of "necessary" actually employed by philosophers, we concluded in Chapter IV that all claims of necessity are relative, i.e., all necessary truths are necessary due to their deducibility from other true statements. Not surprisingly we found in Chapters III and IV that analytic statements and a priori statements were in varying ways both relatively necessary. We first examined analytic statements. We claimed that a statement is analytic iff it is true or false by reference to the meanings of the terms within it. Given our metalinguistic theory of meaning in which definitions are viewed as intensional, contingent, quasi-legislative reports; we concluded that statements are analytic when deducible from the definition statements of their terms. It is in this way that analytic statements are true necessarily. They are not statements absolutely necessary such that we would never give them up or consider them false. Rather they are necessary relative to the definitions which entail them and these definitions which have a factual aspect can be falsified or changed.

Our investigation of the term "a priori" in Chapter IV revealed that while a prior statements are also necessary, as Kant had claimed, they are only necessary relative to statements which entail them.

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[1]Carl Hempel, "Inductive Inconsistencies," Aspects of Scientific Explanation, p. 59.

[2]Wesley Salmon, Logic, p. 9.

However, we did not find that a priori statements are analytic statements. The former statements are presuppositions. As such they are unstated but entailed by non-definitional statements, often about the empirical world. The truth of a presupposition, e.g., the truth of GLC, is a necessary condition for the truth of the statements which presuppose it. A priori statements can become false when the statements which presuppose them are falsified. In contrast, analytic statements are not presupposed by others. They are not unstated. However, when uttered, or written they are deducible from definition statements which are usually unstated. The truth of these unstated definitions is not necessary for the truth of analytic statements but only sufficient for it.

Ultimately we concluded from our research that there are two, viable distinctions applicable to statements, i.e., the A-S and the P-P distinctions. Both a priori and analytic statements are relatively necessary in as much as both are entailed in circumstantially different ways by other supposedly true statements. But when we return to our original question about the logical form of law statements, we can now see that while law statements are empirical and possibly necessary in some way they are not necessary qua analytic or a priori. Law statements qua laws are not entailed by a finite conjunction of other statements of fact.[1] Despite Hume and some regularity theorists it seems clear that laws are not merely abbreviations for long strings of factual assertions about past conjunctions of observed events.

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[1]We mean non-vacuously deducible.

Law statements as empirical and theoretical generalizations make assertions which go beyond scientific data. Indeed this characteristic has been cited as a problem of induction. This open-ended aspect of laws such that they are considered as applying to both actual and possible cases is due to what we shall call the scientific act of imputation.

Now we will explain imputation and how law statements, while not analytic or a priori or relatively necessary qua law statements, nevertheless involve an element of necessity and make assertions about the empirical world. We shall also see how laws can sometimes function as analytic or as a priori statements within a system but nevertheless remain empirical as provided for in our previous discussions of analyticity and a priority.

Law statements

In his interesting book Causality--The Place of the Causal Principle in Modern Science, Mario Bunge lists a minimum of eight different kinds of scientific law or determination. They are:

1. quantitative self-determination
2. causal law
3. interactive or reciprocal causation
4. mechanical determination
5. statistical determination
6. structural determination
7. teleological determination
8. dialectical determination.

An example of the first and lowest level type of law, quantitative self determination, is one in which a functional relationship is expressed between the successive positions of a freely moving macroscopic body and

its position and velocity at any prescribed instant of time.[1] Another example given by Bunge is the spontaneous transformation of an isolated thermodynamic system which leads to states of increasing entropy.[2] As Bunge says of type (1) law statements:

> Quantitative self-determination is the category of determination prevailing in the continuous unfolding of states that differ from one another in quantitative respects only; . . .[3]

The second type of scientific statement listed by Bunge, causal laws, is familiar. The usual example of such a law, according to Bunge is one in which change is produced by some external factor(s). He thus considers cause in terms of efficient causation. A similar kind of law, type (3) reciprocal causation, Bunge refers to as an interaction law. For example, he notes that the orbits of the components of a double star are determined by their gravitational interaction. As an example from biological science, he gives the case in which every gland in the human body depends on that of the remaining glands.[4]

The fourth type of law, which is partly an interactive and partly a causal kind of law, is the kind Bunge calls mechanical determination. Such laws pertain to situations in which a force might modify the state of motion of bodies. In further elaboration Bunge notes the fact that "the streamlines in a fluid are determined by the latter's

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[1]Mario Bunge, Causality--The Place of the Causal Principle in Modern Science, pp. 17-18.

[2]Ibid., p. 18.

[3]Ibid.

[4]Ibid.

previous state, by the external forces acting upon it, by internal friction (viscosity), and by internal pressure differences."[1]

The fifth type of law statement described by Bunge, called statistical determination, is one in which a change results from the joint action of independent or quasi-independent entities. Examples of this sort of determination are familiar to all of us. We know that the probability of throwing a six with a fair die is one sixth. As noted with respect to the previous categories of scientific law, Bunge maintains that this fifth type may also be in part other kinds of determination:

> As in the case of other categories of determination, statistical determinacy may emerge from processes on deeper levels, in which still other categories of determination are involved.[2]

Structural determination, the sixth type of law cited by Bunge, is illustrated by a molecule in a fluid where the behavior of an individual molecule is determined by the "over-all structure of the collection to which it belongs."[3] The seventh type of law, teleological law, has been common in some disciplines such as biology. In such a discipline, Bunge maintains, one might find talk of birds building their nests in order to safeguard their young. In this connection, Bunge is careful to state that goal-directed structures, functions, and behaviors need not be purposefully planned by anybody.

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[1] Ibid.

[2] Ibid.

[3] Ibid., p. 19.

The last category of determination listed by Bunge, dialectical determination, is exactly what its label suggests. These laws obtain in cases where there is a "qualitative self-determination of the whole process by the inner 'strife' and eventual subsequent synthesis of its essential, opposite components."[1] Changes of state in matter, in bulk, are produced by the interplay and final predominance of one of the two opposite trends:thermal agitation and molecular attraction.[2]

Bunge delineates the above kinds of laws which express various categories of determination in order to emphasize the point that causal laws are but one kind of scientific law, i.e., expressive of only one category of determination. However, he does admit that these various types of determination are genetically connected with one another, the higher types being dependent on the lower without being entirely reducible to them. He stresses:

> . . . no type of determination is found to operate in all purity, to the exclusion of all others save in ideal cases. To illustrate my first contention, take mechanical determination, which is a peculiar combination of purely quantitative self determination (in this case inertial motion) and reciprocal action, which can often be polarized into cause and effect. Or take statistical determination which emerges, with characteristics of its own, as a result of the interplay of a large number of elements that are individually determined in accordance with other types of determination (mechanical or teleological).[3]

In addition, all of the kinds of law statements mentioned above have the common bond of expressing a determination of some sort; and

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[1] Ibid.

[2] Ibid.

[3] Ibid., p. 20.

fittingly, Bunge does explain what he means by the term "determination" itself. He claims that there are two meanings of "determination": (1) property and (2) constant connection. In sense (1) Bunge claims that "determination" is synonymous with 'characteristic,' either qualitative or quantitative. It is this sense of "determination" which comes from the post-Roman Latin, "determinatio," and this first sense is the primary sense of "determination" in various European languages.[1] Bunge elaborates upon its meaning by saying:

> In this sense, that is determinate which has definite characteristics and can consequently be characterized unambiguously; when applied to descriptions and definitions, 'determinate' is used as an equivalent of precise or definite in contradistinction to vague.[2]

Sense (1) of 'determination,' which might be the general characterization of all eight types of laws listed by Bunge which express common types of determination (ways in which some thing, property or event is rendered determinate), seems also to characterize a specific type of scientific law not mentioned by Bunge. This ninth type of law which is a prima facie determination in sense (1) is a classificatory law. Campbell refers to such laws as the "laws of the properties of a substance, or a kind of system, the law, namely, which asserts that there is such-and-such a substance of such-and-such a kind of system steel or magnets."[3] In addition Campbell states:

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[1] Ibid., p. 7.

[2] Ibid.

[3] Norman Campbell, What Is Science, p. 56.

> These laws, in an elementary and imperfect form, are the earliest laws of science and they retain their peculiar significance through much of its consequent development.[1]

We have just referred to this ninth kind of law as a prima facie determination in sense (1); for it is our contention in this paper, as just suggested, that in a significant sense, every kind of scientific law is indirectly, if not primarily, classificatory, i.e., a determination partial or complete in Bunge's sense (1) of "determination." We add the qualification that determinations can be either partial or complete because the "unambiguous characterization of things, properties or events" is a phrase which can be understood in either a strong or weak sense. If a thing, property or event is characterized unambiguously in the strong sense then the characterization will serve as an identity mark of that thing, property or event. A set of characteristics which taken together are sufficient for the unambiguous identification of a thing, property, or event as a certain kind of thing, property or event would not be just a set of characteristics but would rather be taken as a mark of the thing, property or event. In such a case a statement of the set of characteristics would be a complete determination. On the other hand a law may present us with only one of the characteristics of a thing, property or event. In so doing the law characterizes the thing, property or event unambiguously in a weaker sense. We are not given a mark of the thing, property or event but only a characteristic which by itself may not be sufficient for identifying a

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[1] Ibid., p. 56.

thing, property or event as exactly a certain kind of thing. There may be in fact two or three kinds of things, properties or events with this characteristic. Thus reference to the characteristic will identify a thing, property or event as any of the three kinds. A law which characterizes the thing, property or event unambiguously in this weaker sense is only a partial determination. The complete determination of the thing, property or event will be given by a set of partial determining laws which when taken together identify the thing, property or event so unambiguously that it will be known as of one kind of thing and no other.

Thus we claim that scientific law statements or sets of law statements qua complete determinations unambiguously characterize things, properties, or events and, in so doing, provide the identifying marks of those things. We might clarify this claim by saying that things, properties, or events are <u>defined</u> via law statements; but we prefer to say that; whereas words are defined (as described in Chapter III) when characterized unambiguously; things, properties, and events are not defined but given an identity when characterized unambiguously. All eight types of law listed by Bunge express relationships among properties, things, or events; and these relationships which are constant and unique[1] connections provide or serve as a whole themselves at least as identity characteristics for entities under scientific investigation.

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[1]Here we mean connections hold in only specific ways for only specific relata and no others and we mean specific in kind or quality not number.

Indeed constant and unique connection itself is the second sense which Bunge gives of the term "determination." As he says:

> But in science the most frequent use of the word 'determination' that is relevant to our concern seems to be that of constant and unique connection among things or events, or among states or qualities of things, as well as among ideal objects.[1]

A constant and unique connection of this sort is expressed by the following law for the thermal expansion of a metal rod: $L(t) = L(o)(1 + a\,t)$ where $L(o)$ stands for the length of the rod at the temperature $t = o$, a being the coefficient of thermal expansion.[2] This statement of law may appear much like one which merely expresses a functional relationship quantitatively, but as Bunge notes, it also expresses a constant and unique relation "among the qualities length and temperature and the disposition expansibility of metal rods."[3] As such it serves at least partially to characterize metal rods unambiguously. Let us consider the case of a particular kind of metal rod.

Suppose we are presented with a rod made of a pure unidentified metal. In order to at least partially identify the metal, we can subject the rod to varying temperatures and record its changes of length. Given this information and the law for thermal expansion, we can obtain some functional relationship which may happen to be a particular functional relationship confirmed and accepted as law for rods made out of copper. The law statement which expresses the functional relationship

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[1]Bunge, op. cit., p. 7.

[2]This example is from Bunge.

[3]Ibid., p. 9.

between the length of copper rods and their temperature gives us an identifying characteristic of copper rods.[1] Heated rods which expand according to this particular functional relationship and satisfy other laws regarding copper are copper while those which expand according to a different functional relationship are not. Therefore, by rendered at least partially determinate, we mean in sense (I), being definitely and precisely characterized. In this first sense, a property or a functional relationship in toto expressed by a law statement can be said to render some things, e.g., copper metal rods, at least partially determinate. We see then that once constant and unique connections are expressed by scientific laws, even functional ones, things or properties, can also become partially or fully determinate; and the identity (whole or partial) of a property, thing, or event is established. Indeed as Richard Schlegel writes:

> In Western science, this abstraction of certain determinables seems particularly to be favored by the use of mathematics in science. The relations of a few selected and defined aspects of nature--for example, electric charge, electric current and magnetic field--can be explored and understood with immense scientific fruitfulness, once an association is set up that permits all the deductive power of mathematical reasoning to be directed to the relationship.[2]

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[1]There may be other laws about copper or some other metal may have the same coefficient of expansion.

[2]Richard Schlegel, "Do We Know The World Through Science?" Mind, Science and History, II, 176.

Properties which can serve to identify

In an attempt to provide an adequate explanation of how law statements establish the identity of things, properties, or events, we shall borrow some apparatus from Daniel Bennett's article entitled "Essential Properties."[1] We shall only employ one of his considerations in a very modified way since it is not our present concern to discuss essential properties but rather determinators (properties or functional relationships which partially or completely identify things, properties, or events) which are not in any historical philosophic sense essential or natural. Determinators are properties or relationships referred to in law statements which omnitemporally classify a thing, property, or event as distinct from at least some other individual things, properties or events but not always from all other things numerically distinct from this thing, property or event if there are any. In explanation we present the following claims concerning sortal properties:

> We shall say that a property P completely sorts an individual (a) at a time t, iff it is true of (a) at t but of nothing distinct from (a) at t. The property of being identical with Socrates sorted Socrates from all other individual things and therefore individuated him throughout his life. . . . In contrast a property P partially sorts an individual (a) at t iff it is true of (a) at t and some things distinct from (a) but not of all things distinct from (a).
>
> We shall say that a property P classifies an individual (a) at time t iff it partly sorts (a).

In view of the above, we now see that being a man and being a philosopher classified Socrates at certain times in his life. However,

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[1]Daniel Bennett, "Essential Properties," Journal of Philosophy, LXVI (1969), 495.

being identical with Socrates sorted him so completely that it did not classify him but individuated him from all other things including all other men and all other philosophers. We have chosen Bennett's treatment of "sortal properties" as suggestion for an appropriate partial treatment of what we shall call determinator properties mentioned within various kinds of scientific laws precisely because some sortal properties partially sort but do not individuate things, properties or events. Scientists are usually not interested in investigating samples of gold or copper for their individual differences qua samples; but rather they are interested in establishing the common properties of all sample ores which are to be considered gold or copper. Scientists therefore are interested in discovering classifying sortals but not individuating sortals.

Though we have found Bennett's account of sortal properties helpful in describing the difference between classifying sortals and individuating sortal properties, it is obvious that being a classifying sortal property is not all that is required for a property to become a determinator property within some law statement of science. Science is not concerned with temporary full or partial determinations which might be made by classifying sortal properties that are, as Bennett describes them, phase properties which sort. Such a classifying sortal phase property might be the property of being post-pubescent which classified Socrates not in infancy or adolescence but during most of his life. Classifying sortal phase properties which might serve to classify some thing are not thought to be omnitemporal properties and are not ordinarily chosen as determinator properties in the framing of scientific

laws. Indeed if we recall Bunge's second definition of "determinate" as constant and unique connection, it is apparent that sortals, which classify individuals must also classify omnitemporally in order to be adopted as determinator characteristics.

We now give our criterion for potential determinator properties:

> A property P or relationship R will be considered an omnitemporal classifying property P or relationship R iff:
>
> i. anything that is P or characterized in terms of R, for as long as it is P or characterized in terms of R, is partially sorted by P or R.
>
> ii. anything that is ever P or characterized in terms of R is, for as long as it exists, always P or characterized in terms of R.

If a given property P or a relationship R satisfies the above conditions, it will be an omnitemporal classifying sortal. It is a necessary condition that a property be an omnitemporal classifying sortal if it is to be a determinator property. But being an omnitemporal classifying sortal is not a sufficient condition for a property to be a determinator property. The necessary and sufficient condition for a property to be a determinator property is that it be an omnitemporal classifying sortal which is incorporated within a law statement of science. There may be non-law statements which contain only omnitemporal classifying sortals, but these sortals are not determinator properties nor is the statement the expression of a determinator relationship since such statements have not been accepted by the scientific community as law. If non-law statements contain only

omnitemporal classifying sortals and are confirmed (they have never been violated), they are lawlike statements which may some day for various pragmatic reasons be accepted as law statements. But until they are so accepted, the omnitemporal classifying sortals within them are not determinator properties.

The form of law statements

The connection between the law statements of science and what we have characterized as determinator properties or relationships should now be clear. When a true universal statement is also part of a statement of scientific law[1] it is a statement which can be mentioned in a metalinguistic statement such as "The true universal '(x) ($\Phi x \supset \Psi x$)' expresses a relationship which is to be determinate," (a relationship between a determinable thing, property or event and at least one determinator). We might thus write Newton's Law of Inertia as "'(x)($Bx \supset Ix$)'[2] is to be a partial determination." It is not only the case that all past examined bodies have had a tendency to remain at rest unless something moved them and to continue moving in a straight line unless something stopped them or caused them to change their direction but all bodies are determined by this tendency. This meta-statement claims that the true, universal statement "All bodies have a tendency to remain at rest etc.," expresses a relationship between bodies and their behavior such that the latter should be considered as

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[1]The full expression of a law of science is a metalinguistic statement saying of an object-level generalization that the relationship it expresses is to be determinate.

[2]x is a body and x has an inertial tendency.

at least a partial identity mark of the former. The property of inertia was found to be an omnitemporal classifying sortal, and it became related to bodies as one of their identifying characteristics by the law statement '"All bodies have a tendency . . ." is to be a partial determination.'

This law statement in turn is a sufficient condition for the framing of another meta-statement, viz., "The term 'body' means in part 'having the tendency. . . .'" The first meta-statement, the law statement, relates a body and its behavior. That behavior then is taken to be a partial identity mark of a body; and once this relationship is established between a thing and one of its properties, another meta-statement can be asserted which establishes a meaning relation between the words which refer to this thing and this property. This meta-statement is a meaning statement of the kind we have described in Chapter III, and it is a sufficient condition for asserting yet another meta-statement "'(x)(Bx ⊃ Ix)' is <u>to be</u> necessary." The IC intensional contingent (the name we have given to our metalinguistic meaning statements in Chapter III and which we now give to other quasi-reportive legislative statements) law statement is a sufficient but non-necessary condition for the framing of the IC definition statement because IC definition statements can be framed for words that do not refer to any things, properties, or events whether characterized unambiguously or not. Thus the metalinguistic statement about the true universal generalization "All bodies have an inertial tendency," viz., "'All bodies have an inertial tendency' is at least a partial determination," entails another

quasi-reportive legislative second IC metalinguistic meaning statement which corresponds to the statement "'(x)(Bx ⊃ Ix)' is to be necessary."[1]

To reiterate, the full expression of a law of science is not just an object-level true universal statement but rather a metalinguistic statement about some true object-level generalization that the relationship it expresses is to be a determinate one (involving a determinator property or relationship). This metalinguistic statement is both descriptive and legislative. It describes the fact that a property P is an omnitemporal classifying sortal of some thing, property, or event. But it also prescribes that this property P which is this kind of sortal should be considered an identity characteristic of that thing, property, or event. The metalinguistic law statements of science qua IC statements are of course themselves contingently true, yet they are sufficient for the positing of a metalinguistic definition IC statement about the terms which refer to the determinable thing, property, or event and the determinator property or relationship which determines at least partially the determinable. These contingent[2] definition statements in turn are the necessary and sufficient condition for asserting a statement of the form "'(x)(Bx ⊃ Ix)' is necessary," which we have already maintained in Chapter III is a regular descriptive entailment statement (if the antecedent is true the consequent must be

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[1]This is sufficient for "is necessary," and necessary for "is necessary."

[2]We use "contingent" here in an absolute sense. Some IC statements when entailed by others are relatively necessary as we have explained this notion.

true). Via a long chain of sufficient condition[1] statements, a non-necessary metalinguistic scientific statement of law ultimately leads to an assertion of necessity, i.e., something x must have a tendency . . . or "'x has a tendency . . .' is true necessarily," in those situations in which x is said to be a body and the true universal "All bodies have a tendency . . ." is said to be at least a partial determination, the provision of a determinable thing, body with an identity characteristic or mark.

Confusion concerning the kind of necessity involved in statements of law arises because the long chain of sufficient conditions between the contingent metalinguistic law statement and the particular prediction statements of science which often employ the term 'must' is elliptically omitted. The term 'necessary,' as we have maintained earlier, characterizes a relationship between verbal expressions. Application of the term "necessary" to this relationship occurs first in the metalinguistic statement "'$(x)(Bx \supset Ix)$' is to be necessary" which is entailed by the quasi-reportive, legislative, metalinguistic IC law statement "'All Bodies have a tendency . . .' is to be at least a partial determination." The final particular prediction statement (a lawful statement[2] as opposed to a statement of law), "The next body we find must exhibit the inertial tendency," is true necessarily much in the manner of any analytic statement of a natural language discourse.

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[1]One statement is necessary as well as sufficient.

[2]A lawful statement is any statement non-vacuously deducible from a law statement.

A partial meaning of the term 'body' is "having an inertial tendency." One can always verify the prediction empirically, but checking the prediction is perfunctory unless the well confirmed statement of law which together with the statement "x is a body" which entails the prediction statement is in some jeopardy being perhaps incompatible with other more powerful laws or new unexplained phenomena. Once the implicit dictionary of a particular science includes within it a definition, such as "'body' means in part 'having an inertial tendency,'" it is not difficult to see why there is a necessary aspect of lawful prediction statements which are uttered in particular contexts by individual scientists on various occasions, e.g., "The next body must have this tendency. . . ." This latter statement token which is true necessarily is so because it is an analytic statement.

It is important to remember that these lawful statement tokens made on particular occasions may be analytic and may serve either to predict or to clarify the meanings of various scientific terms, as Garver suggested;[1] but the initial statements of scientific law which are found in scientific texts are never analytic or necessarily true. As the initial statement of a newly presented law, they are not deduced from some finite class of empirical statements; and thus, law statements in textbooks are neither analytic nor a priori. There are times, however, when statements expressed by sentences exactly like the sentences used to express the initially stated non-analytic or non-a priori law

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[1]See pp. 165-166.

statements, are analytic or a priori. If a scientist is using a law statement token by writing it or uttering it after its initial presentation, it may well be analytically true in the same way as A_2 stated at time t_2 is deducible from A_1 initially presented at time t_1. In such a case At_2 is analytically true when At_1 is true. At_1 might be the statement of Boyle's law in a physics text on page 8 when it is being presented for the first time as a law. Later on page 14 Boyle's law may be rewritten exactly as before within the context[1] of some discussion or deductive work. The law statement token on page 14 is an example of At_2 an analytic statement deducible from At_1 while At_1 is not deducible from any other particular statement which precedes its utterance or inscription on page 8.[2] Sometimes of course a low-level law is deducible from some other more general law. In this case even an At_1 law statement may be analytically true but not because it is a law rather only because it is a certain kind of low-level law.

At times, some very general and powerful law statements may also be a priori and therefore relatively necessary. A law statement which at times may be presupposed in some context of minute or specialized

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[1]We are not saying here that every time Boyle's law is uttered or written after Boyle's initial propounding of it, it expresses statements which are analytic. It will depend on the context in which an assertion of Boyle's law is made whether the writer or speaker is propounding it once again in the legislative way in which Boyle proposed it or whether the writer or speaker is making a statement of Boyle's law in a context where the hearer or reader is thought to have access to or knowledge already of this partial convention--Boyle's law.

[2]Again we mean non-vacuously deducible.

scientific work will be a priori in that situation. The orderly scientist who writes the laws he will be using at the top of his calculations may not write down the law that he is presupposing. Arthur Pap recognizes the possibility of such situations in explaining how laws may be functionally a priori.[1] Pap writes:

> e.g., in the context of experimental inquiry in which a certain measuring instrument is employed the law in accordance with which the indicators of that measuring instrument are interpreted is no doubt a priori in the sense of being irrefutable by the results of the experimental investigations. But no physicist would regard such a law as an arbitrary "rule of procedure" and deny to it its empirical foundation and contingency. The only way to solve this apparent paradox is to recognize the development of what are results of experience at one stage into "constitutive conditions of experience" in Kant's terms at another. . . . A proposition which is a priori in one context of inquiry may be a posteriori in another context.[2]

Pap's description of the possibility we have raised concerning the occasional a priori status of scientific laws succinctly represents our own position herein. However, unlike Pap we claim that the law mentioned is a priori because it is irrefutable by the results of experimental investigation. In terms of our theory of presuppositions in Chapter IV, we claim that this presupposed law statement is true necessarily (in a relative sense) but it can be falsified whenever the statements which entail it are falsified by experience. We also claim that lawful statements which are analytic as just described can also be

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[1]We have given a functional explanation of a priori in Chapter IV and therefore do not employ the term 'functional' as an adjective as does Pap.

[2]Arthur Pap, The A Priori in Physical Theory, pp. vii-viii.

considered empirical in that their terms can refer to objects in the empirical world and that they can be falsified whenever the IC law statements entailing them are falsified by experience.[1] Thus we see that even when law statements are occasionally analytic or a priori they are necessarily true and they also are empirical. This was our initial suspicion in Chapter I, which is supported by our research in Chapters II, III and IV.

Law statements as imputations

Our theory of scientific law is in complete agreement with the remarks of Nicholas Rescher in his book Scientific Explanation. Surely it is widely recognized by now that, as Rescher claims, "Lawfulness is a matter of imputation."[2] As he so clearly writes:

> When an empirical generalization is designated as a law, this epistemological status is imputed to it. Lawfulness is something which a generalization could not in principle earn entirely on the basis of warrant by the empirical fact. Men impute lawfulness to certain generalizations by according to them a particular role in the epistemological scheme of things, being prepared to use them in special ways in inferential contexts (particularly hypothetical contexts) and the like.[3]

In terms of our own theory, the imputation of lawfulness is expressed by our formulation of laws as intensional, contingent, metalinguistic statements, e.g., "'All bodies have a tendency . . .' is at least to be a partial determination." This metalinguistic statement

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[1]See Chapter III, p. 166.

[2]Rescher, op. cit., p. 107.

[3]Ibid.

imputes to the true, universal statement "All bodies have an inertial tendency," that it is at least a partial determination, i.e., that the thing body is a determinable determined by the determinator inertial tendency which omnitemporally classifies a body. The intensional aspect of such statements is their imputation, viz., that they establish complete or partial identity criteria until further notice (as might be given by future counter evidence or changing pragmatic considerations). Just as Rescher notes, it is certainly the case that if we look at "the explicit formulation of the overt content of a law, all we find is a certain generalization."[1] But when one characterizes laws as metalinguistic IC statements, as we have done, both the descriptive and legislative aspects of these statements of law is explicitly apparent. As Rescher claims, laws are not discovered, they are made. The form we have chosen to express these law statements reflects the act of their making. When any generalization is classed as a law, we always find a man-made element, an imputation of determination;[2] for the "evidential basis must always be grossly insufficient to the claim actually made" since this evidence relates to the past and present while a scientific law relates to the future and the hypothetical.[3] However, the imputations that men make are not made at a formal meeting or council of scientists but rather at that informal moment or interval of time

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[1]Omnitemporal classifying sortal properties are proclaimed determinators.

[2]Rescher talks about imputation of nomic necessity. We have tried to unpack what could be meant by nomic necessity.

[3]Rescher, op. cit., p. 107.

when scientists decide that a given confirmed statement is acceptable as a law. The when of imputation is as vague and informal as the when of becoming a law. However, hypotheses are accepted as laws by scientists somehow at some point; and the uniformity of physics texts suggests that agreement is fairly widespread among scientists though there are not formal meetings convened in order to make imputations.

The time of imputation is vague; but once it occurs, it is a yes-no process. Either a statement is a law or it is not. There are not laws of varying degree. While it may be possible to talk about degrees of confirmation of hypotheses, it is doubtful that we would want to say that any partially confirmed hypothesis is a law. For example, if we decide that some hypothesis will be confirmed after 100 violation free test trials, we would say that this hypothesis is confirmed to some degree after 10 successful trials and to a greater degree after 30 successful trials. Only after the goal of 100 successful trials is reached would we be willing to consider the imputation of our test hypothesis and perhaps not even then if our hypothesis lacks explanatory power, simplicity or some other pragmatic qualities. Nevertheless in any event, we would not impute the hypothesis a law until our testing program was carried out completely. Lawfulness is imputed at the last stage of scientific work; and when imputation takes place, the status of a hypothesis is entirely changed to that of a law. At the point of possible imputation, a hypothesis either remains a highly confirmed non-law or, via the imputation, it becomes a full-fledged law statement. No imputed statement is 40 percent a law or 80 percent a law.

All laws are 100 percent law even though some laws may be more important than others. More general laws can sometimes play more expansive or pervasive roles within a total body of laws. We will be less willing to give these more general laws up since we have greater need of them for our future theorizing and predictions. But nevertheless, all law statements with the same logical form, that of a metalinguistic IC statement, are precisely that--the same.

The view we have just presented is a necessary view of law statements which claims that they are contingent, intentional, meta-linguistic statements. Laws are not necessarily true but they inform us of what predicates are to be considered as necessarily related. While legislating a necessary relationship, laws can nevertheless be empirical in several ways. Though law statements are meta-statements they are not ultimately only about object-level expressions. Meta-linguistic statements can indirectly be about things of the empirical world to which the object-level terms within them refer.[1] Law statements also find their source in experience, and they can always be falsified by experience. It is in this way that laws are still empirical and non-necessary though they involve nomic necessity. The major objection to necessity views, i.e., that laws are not empirical, is avoided. Nor have we resorted to an object-level intensional language in which to formulate law statements. Our theory also explicates the dual aspects of laws: (1) that they are based on a finite number of

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[1]See page 200.

factual statements (constant conjunctions as Hume might say) but yet (2) they assert more than some claim about past observed cases. In our theory laws make claims about future and hypothetical cases as well. Thus our theory not only avoids the major objections to typical necessity views; but our metalinguistic necessity view also avoids the major objections to the regularity theory as well.

Our theory circumvents objections to the regularity view

It is clear that the imputation which occurs during the final stage of scientific work is only applied to constantly conjoined events within the justifying era of a law's biography. Hence our theory avoids the mere coincidence objection to the regularity theory. It is not any old regular invariable sequence which looks like a law. Only sequences that develop in experimentation or scientific observation will ever be imputed as metalinguistic IC law statements.

Our theory also enables us to distinguish accidental generalizations from laws. Mere accidental generalizations can still be written in a frist-order extensional language as material conditionals. But law statements as metalinguistic IC statements impute that some heretofore true non-strict universal should now be considered a strict universal. Mere accidental generalizations expressed by object-level statements such as "All pears in this box are ripe," may not be used for prediction or in the deduction of counterfactual statements simply because we have not imputed to them that they are at least partial determinations as we do when stating the metalinguistic, intensional,

contingent statements which express the law statements of science. These latter mention a true universal statement and legislate that it is to be at least a partial determination. Since the object-level statement "All pears in this box are ripe," merely purports to report that certain pears are ripe without legislating also that it is at least a partial determination that the property ripeness shall be considered a property which always classifies pears in this box, it cannot be said that any pear which is not now in this box would, if it were in this box, also be ripe since ripeness has not been imputed to be an identity characteristic of pears in this box.[1] If ripeness had been imputed or legislated as an omnitemporal identity characteristic of pears in this box, as it would be were "All the pears in this box are ripe" a part of a metalinguistic law statement, then of course anything not now a pear in this box, if it were a pear in this box, would have to be ripe also; for if it were not ripe, we would be unable to identify it as a pear in this box since it would lack one of the identity characteristics of being a pear in this box. Thus the imputation of certain properties as determinators is the difference between true universal statements that are laws and those that are not. The difference between accidental universals and strict law universals in our theory is clear. Mindful of Hempel's observations about the restrictedness (construed as finite extension) of some law statements

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[1]N.B. ripeness is not an omnitemporal classifying property thus it is not a potential determinator property and will be found neither in law statements nor lawlike statements. This will be explained more fully in succeeding pages.

and the essentially generalized form of some accidental generalizations, we, as Popper, construe restrictedness to mean closed extension rather than finite extension. Law statements which express the imputation of some generalization express that the extension of the generalization shall be considered open such that contrary-to-fact conditionals and subjective claims can be deduced from them. These contrary-to-fact and subjunctive conditionals would not only be those which claim that if some non-pear in this box were numerically the same as one of the objects which is a pear in this box it would be ripe but also that if some non-"pear-in-this-box" were added to the extension of "pears in this box" as a new object not before mentioned by the statement "All pears in this box are ripe," it would be a ripe pear. The openness or closedness of the extension of terms in laws and accidental generalizations is indicated in our theory by the words "is a determination" in the metalinguistic law statement. Since law statements are intensional metalinguistic statements, the extensions of the terms in a true universal object-level statement can vary without fear of truth value change while the extensions of terms in accidental generalizations expressed as first-order extensional object-level statements cannot.

Our theory therefore provides at once for a way to distinguish accidental generalizations from law statements and for an answer to the subjunctive case, vacuosness, and hypothetical cases objections. The characterization of laws as metalinguistic intensional statements allows for the introduction of the intensional notions of necessity and possibility. If a quality or event is imputed as the mark or identity

characteristic of another then this necessary relationship of course will apply to all possible cases. As mentioned in Chapter I,[1] if we can say that laws apply not only to actual cases but possible ones as well, then the vacuosness objection is easily avoided. We merely say of laws, such as Newton's force-free-body law, that it is a statement of possibility such that if there were any bodies on which no forces were acting then they would behave according to Newton's law. While the regularity view maintains that law statements cover only what is actual as Ayer concludes,[2] our theory states that law statements cover what is possible as well thus avoiding the vacuosness objection.

Our theory also provides for hypothetical cases such as that cited by Ayer. A functional law such as the one which legislates and reports the relationship between a volume of gas at a given temperature under a given pressure written as $x = Fy$ is one in which the range of the variable y covers all possible values of the quantity in question. In terms of our theory laws express a relationship which holds for all cases actual and possible since the posit of even a partial determination is the decision to characterize every x actual and possible as an Fy until further notice.

All objections to the extensional regularity view are dissipated by our intensional view. Yet we have not resorted to a first-order intensional language on the object-level of discourse. In addition our theory talks about laws legislating necessity without being necessary.

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[1]See page 5.

[2]See page 6.

Therefore, our laws are not self-evidently true. They are based on experience. They can be falsified while nevertheless providing for the relative necessity of particular prediction statements which often contain the term "must." It is in this way that we can say that laws have nomic necessity (establish certain connections as necessary) and yet are empirical while avoiding the typical objections to both the necessity and the regularity views of law statements.

It might still be objected that in our theory laws as man-made imputations are more conventional than empirical. We claim however that the idea of imputation is perfectly reflective of scientific practice. In our necessity view, statements of scientific law are not arbitrary or strictly conventional. Rather they are, as Rescher states, well-founded imputations based both on observational evidence and upon the "systematic-coherence of fitting the generalization into a fabric of others that in the aggregate constitute a rational structure, an integrated body of knowledge that constitutes a "branch of science."[1] In view of these conclusions it might well be wondered what exactly is to be understood by "science"?

A view of science

The views of reduction, realism, and instrumentalism are well-known, much-debated doctrines about the nature of scientific theories. The limitations of each view are also well known. However, in presenting the view of science which will yield a possibly adequate

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[1]Rescher, op. cit., p. 107.

account of it, we wish to consider instrumentalism as expressed in Duhem's The Aim and Structure of Physical Theory since it is the most suggestive starting place for our own view. Duhem writes:

> A physical theory is not an explanation. It is a system of mathematical propositions, deduced from a small number of principles, which aim to represent as simply, as completely, and as exactly as possible a set of experimental laws.[1]

In further elaboration he says:

> 1. Among the physical properties which we set ourselves to represent we select those we regard as simple properties, so that the others will supposedly be groupings or combinations of them. We make them correspond to a certain group of mathematical symbols, numbers and magnitudes, through appropriate methods of measurement. These mathematical symbols have no connection of an intrinsic nature with the properties they represent. They bear to the latter only the relation of sign to thing signified. Through methods of measurement we can make each state of a physical property correspond to a value of the representative symbol, and vice versa.
> 2. We connect the different sorts of magnitudes thus introduced by means of a small number of propositions which will serve as principles in our deductions. . . . These hypotheses may then be formulated in an arbitrary way. The only absolutely impassable barrier which limits this arbitrariness is logical contradiction either among the terms of the same hypothesis or among the various hypotheses of the same theory.
> 3. The diverse principles or hypotheses of a theory are combined together according to the rules of mathematical analysis. . . .
> 4. The various consequences thus drawn from the hypotheses may be translated into as many judgments bearing on the physical properties of the bodies. The methods appropriate for defining and measuring these physical properties are like the vocabulary and key permitting one to make this translation. These judgments are compared with the experimental laws which the theory is intended to represent.[2]

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[1]B. Brody and N. Capaldi, eds., Science: Men, Methods and Goals, p. 81.

[2]Ibid., pp. 81-82.

Theories in the above sense are useful, as Duhem points out, for classification of experimental laws and their ordering into a smaller number of principles. However, it is also part of such an instrumentalist view that scientific theories do not explain or describe reality and even in the view of some writers that scientific theories are not true or false but only useful or unuseful. Osiander, in his preface to Copernicus' On the Revolutions of the Celestial Spheres, claims that "it is not necessary that these hypotheses should be true or even probable; but it is enough if they provide a calculus which fits the observations."[1] Brody and Capaldi make the same claim when they say, according to instrumentalism,"a theory is neither true or false."[2] However, we find no reason to draw such a conclusion from the instrumentalist position. A scientific theory may be an economical way of classifying experimental knowledge, and it may also guide further research in the discovery of novel experimental laws. But this is not to say that such theories do not explain observed phenomena or that they are useful but not true. Obviously disagreement in this regard turns on the interpretation that is given to the words "true" and "explain."

We accept the interpretation of "true" which Duhen (an instrumentalist as we have already seen) must have had in mind when he spoke about theories being true and false. He says:

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[1] Ibid., p. 74.

[2] Ibid., p. 11.

> Thus a true theory is not a theory which gives an explanation of physical appearances in conformity with reality; it is a theory which represents in a satisfactory manner a group of experimental laws. A false theory is not an attempt at an explanation based on assumptions contrary to reality; it is a group of propositions which do not agree with the experimental laws. Agreement with experiment is the sole criterion of truth for a physical theory.[1]

More explicitly Duhem writes:

> The words "truth" and "certainty" have only one signification with respect to such a theory; they express concordance between the conclusions of the theory and the rules established by the observers.[2]

It would seem that even in terms of a correspondence theory of truth Duhem's account is a perfectly acceptable theory of truth. It is true that I am writing with a pen because I observe the pen in my hand as I write. My statement corresponds with what I observe. So too, a theory can be considered true as long as it corresponds with the experimental data and it is the theory actually adopted.[3] Several theories may be compatible with the experimental data, and one of them may be adopted because it classifies or catalogs the experimental laws more economically or leads to more research or has a wider predictive scope. Any or all of these considerations may be the rules established by observers to which Duhem refers. When a theory is compatible with observations and satisfies these other rules of economy, etc., it is the one theory accepted as true at least until the rules are changed

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[1] Ibid., p. 82.

[2] Ibid., p. 172.

[3] There may be other competing theories which are confirmed but not accepted or adopted. Inasmuch as they are not adopted, we would not say that they are true.

or contrary observations are made. Since other considerations besides experimental evidence enter into the decision to adopt a particular theory and theories extend well beyond the realm of observation, it is readily understandable why it is fairly useless to speak of a particular theory being the only possibly true description of the real world. Theories are corrigible, varying descriptions of the world; and each in its turn, as adopted, constitutes our present view of what is or is not the real world. C. D. Broad expresses the situation well when he says:

> Presumably there is a system of ojbective fact, with a structure of its own which is quite independent of us and our thoughts and our languages. Its structure may be compared with the intrinsic nature of a developable surface of finite uniform curvature or of a surface of finite variable curvature. In our cognitive activities we are trying to think about this system of objective fact and to know as much as we can of it. But in order to do this in any detail we have to use language and other systems of symbolism. . . . An immense number of alternative languages and other systems of symbolism are no doubt available. . . . But presumably the objective structure of the system of fact imposes some limitation on the alternative systems of language or symbolism which are capable of representing it. . . . Thus if we could disentangle and formulate any features common to all systems of symbolism and languages we would have a clue to the structure of the objective system of fact. And it is doubtful whether we could discover anything about the latter except in this rather roundabout way. Moreover to be intelligible the formulation would have to be made in some particular pre-existing language or system of symbolism.[1]

As we also have noted, the existence of competing theories does not mean that the one chosen according to certain rules as acceptable

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[1]C. D. Broad, "Are There Synthetic A Priori Truths?" p. 112.

and true does not describe what in some way[1] really exists. In stressing this point, Arthur Pap claims that the question of whether a theory is a true description of reality or merely an instrument of prediction is a pseydo-question that "owes its longevity to pictorial thinking."[2] Pap maintains that the statements that "'There is a table in the room' describes reality," and "'There is a table in the room' is a hypothesis confirmable by the predictions it yields," are compatible. He claims indeed that the latter explicates the former. As he states:

> If one feels that the former means more than the latter, the feeling has the following psychological origin; when nobody is there to perceive it, you yourself have in your mind an image of the table in the room, and this image is distinct from the purely hypothetical state of affairs that tablelike sense-data would occur if certain conditions were fulfilled. But any conceivable evidence for the existential proposition is evidence for the hypothetical proposition and conversely since the propositions are logically equivalent, have the same factual content?[3]

Pap raises this argument to combat the unsophisticated belief that only what is pictorial can explain phenomena or describe what is real.

> . . . Physical theories are intuitively satisfactory only if they gain pictorial content through models. Where such models are lacking, as in the relativisitic theory of geodesics in curved space and the quantum theory of probability waves, the feeling may arise that useful conceptual mathematical constructions have replaced descriptions of physical reality.[4]

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[1]We apply the phrase "really exists" to different entities as our theories change.

[2]Arthur Pap, An Introduction to the Philosophy of Science, p. 350.

[3]Ibid., pp. 355-356.

[4]Ibid., p. 355.

Thus, Pap is concerned to show that physical theories can be viewed both as descriptive of reality and as instrumental.

More extremely than Broad's pronouncement, we might agree with Thomas Kuhn that the theories, which are adopted by scientists as most instrumental, actually present us with the real. As theories or paradigms change so does reality. It is not merely our view of some absolute hidden reality behind our data which changes. As Thomas Kuhn writes:

> One perceptive historian, viewing a classic case of a science's reorientation by paradigm change, recently described it as "picking up the other end of the stick," a process that involves "handling the same bundle of data as before, but placing them in a new system of relations with one another by giving them a different framework. Others who have noted this aspect of scientific advance have emphasized its similarity to a change in visual gestalt: the marks on paper that were first seen as a bird are now seen as an antelope, or vice versa. That parallel can be misleading. Scientists do not see something as something else; instead, they simply see it.[1]

In terms of a metaphor of a boat we claim likewise that from the shore a philosopher of science might say that the ship of science follows different courses at different times on the ocean of reality but, as Kuhn would say, the scientist on the ship just sees on any given course the ocean--the real as it is at a given time.

Kuhn's description of science not only agrees with our instrumental view of science but also more particularly with our metalinguistic theory of law statements. Not surprisingly his words are much like our own when he says:

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[1]Thomas Kuhn, The Structure of Scientific Revolution, p. 78.

> . . . we shall see that the chemical law of fixed proportion, which before Dalton was an occasional experimental finding of very dubious generality, became after Dalton's work an ingredient of a definition of chemical compound that no experimental work could by itself have upset.[1]

The above quotation reflects the act of imputation whereby an object-level true universal generalization is declared to be a determination by a metalinguistic intensional contingent statement such that the terms which previously referred to accidentally correlated events or properties become definitionally joined by a second metalinguistic IC definition statement. A property or set of properties serves as a definitional mark of some investigated phenomenon until further notice--until there is an anomaly which "evokes a crisis."[2]

When a crisis arises definitions and the laws which provide us with them are changed. But as the word crisis suggests this is not a smoothe transitional change. Definitions do not blend into one another or build on one another so much as they replace one another.

In further discussion about the change of laws and their corresponding definition statements as when whole paradigms change Kuhn writes:

> Each of them (changes of theories) necessitated the community's rejection of one time-honored scientific theory in favor of another incompatible with it. Each produced a consequent shift in the problems available for scientific scrutiny and in the standards by which the profession determined what should count as an admissable problem or as a legitimate problem-solution.[3]

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[1] Ibid., p. 78.

[2] Ibid., p. 82.

[3] Ibid., p. 6.

The replacement of laws and theories by competing laws and theories serves to indicate the on-off process of imputation as we have described it. However, as we have also maintained the process whereby a law is imputed or refuted is not a clear-cut empirical activity. One well confirmed hypothesis is accepted or imputed while its competitors are not because such a hypothesis is more simple than they, more fruitful or more explanatory.

As Kuhn says again of the acceptance or rejection of sets of laws:

> The decision to reject one paradigm is always simultaneously the decision to accept another and the judgment leading to that decision involves the comparison of both paradigms with nature and with each other.[1]

The above passage points once again to an instrumental conventionalist view of science such as the one we adopt herein and this instrumental view permits us to talk of definitions and identifying marks without resorting to some brand of essentialism so stultifying to scientific progress.

Essentialism

We have, in the present account of statements of scientific law and of science itself, sought to avoid all suggestions that science either searches for the essences of things or deals with essential properties. Mr. Bennett in his discussion of sortal properties took the subject of his discussion to be essential properties, and he regarded sortal properties as necessary or natural properties. We

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[1] Ibid., p. 77.

have avoided adopting his characterization of non-phasal, sortal properties as necessary properties; and we have also avoided all mention of the term "essence" and its derivatives. The reason for our eschewment of the term "essence" should by now be clear. Ours is a relativistic, instrumentalistic, and conventionalistic (in the best sense of these terms) theory of science and its laws. Our theory is relativistic in that scientists choose to establish varying identity relationships depending on their varying interests. Man is identified by the biologist as a featherless biped, by the sociologist as a social agent, by the psychologist perhaps as a rational animal. The identification of man in the various branches of science is as varied as the interests of their practitioners. Our theory is instrumental in that the relativity of identity relationships reflects the truth that the possible true courses of a scientific ship upon the ocean of what is are many while the observational lighthouse guides are few. Many alternative theories employing diverse languages and symbolism may yield explanations of phenomena without being violated by any observational data. The theory (the ship's course) which is the pragmatically most workable is usually the one chosen as the true theory (best course of the ship). The pragmatic and epistemic considerations of systematic force, explanatory force, economy, and fruitfulness for further research, which are the basis of imputation to certain generalizations of law status, illustrate well the conventional though non-arbitrary character of our theory. This much stressed, it should be

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[1]Karl R. Popper, The Conjectures and Refutations, p. 104.

obvious that we argue neither for nominal essences or natural kinds when maintaining that identity relationships are conventionally established by scientists relative to their needs. IC law statements, which are instrumental in permitting scientists to make predictions about the phenomena they have chosen to study, are based partly on experience just as any tenable empiricism would require. Popper describes the theory of essentialism so contrary to ours by saying:

> . . . essentialism maintains that the best truly scientific theories describe the 'essences' or the essential natures of things--the realities which lie behind the appearances. These theories are neither in need nor susceptible of further explanations and to find them is the ultimate aim of the scientist.[1]

Newton, who adopted from Descartes the view that the essence of a thing must be a true or absolute property of the thing (a property which does not depend on the existence of other things) such as extension, did not regard gravity as an essential property of matter.[2] But as an essentialist, Newton did try to find an acceptable ultimate explanation of gravity by trying to deduce the square law from the assumption of a mechanical push. Such a solution, had he found it, would have been regarded by him as the ultimate explanation of gravity. But as Popper notes, the question of "Why can bodies push one another" can still be asked today.

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[1]Karl R. Popper, The Conjectures and Refutations, p. 104.

[2]Ibid., p. 107.

> We now believe that they push one another because of certain repulsive electric forces. But Cartesian and Newtonian essentialism might have prevented this question from being raised. So belief in essences creates obstacles to thought.[1]

Popper believes that essentialism must be discarded since the world of each of our theories may be explained by further theories of a higher level of abstraction or universality and of testability.[2] However, he also says:

> I do not think that a language without universals could ever work; and the use of universals commits us to asserting and thus at least to conjecturing the reality of dispositions though not of ultimate and explicable ones--essences.[3]

All that has been said in this paper concerning the statements of scientific laws has been said in agreement with the above. It can even be said that our theory is just the opposite of an essentialist doctrine. We do not suppose that in some arm chair manner a rationalist scientist can sit down, divide reality into parts and wholes, and then by reflection decide which properties are determinators, i.e., which will sort various properties, things, or events from other things, properties or events. Rather we mean to maintain quite oppositely that scientists observe, hypothesize, test experimentally, and confirm various hypotheses. Then for various reasons of conceptual consistency, economy, etc., scientists impute to various confirmed generalizations the status of law. The properties mentioned in these laws and not the

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[1] Ibid., p. 115.

[2] Ibid.

[3] Ibid., p. 119.

properties mentioned in the non-imputed (but perhaps confirmed lawlike generalizations) become the determinator properties of various things, events, or other properties. It may even be the case that determinators found in different law statements are clustered to form the identifying locus of some thing which was not considered a thing at all before the clustering was undertaken.[1] In this way the omnitemporal classifying properties that are chosen as determinators may actually affect the claims that scientists make about what is or is not a thing, property or event. Thus there is more to the real than what meets the eye. Our theory is not, therefore, purely empirical as is the regularity view nor purely conventional nor rationalist as previous necessity views. Our metalinguistic necessity view of law statements is, if anything, rationally empirical.

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[1]Horned angles example, p. 235.

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